Rural development & agrarian reform

Department:
Rural Development & Agrarian Reform
PROVINCE OF THE EASTERN CAPE

BID FOR THE CONSTRUCTION OF 2 x 50 SEATER FURNISHED LECTURE THEATRES AT FORT COX

LOCATION: MIDDLEDRIFT

VOLUME 3 – CONTRACT

BID NO - SCMU8-21/22-0092

Head Office: Supply Chain Management Private Bag X 0040 Bhisho 5605 Contact: Name: Nosibusiso Mateta Telephone: 040 605 5263/079 505 9722	**Consultants: Nolwandle Quantity Surveyors Principal Agent** P.O. Box 2250 Beacon Bay, East London 5241 Contact: Name: Fezeka Manyika Telephone: 083 271 7191
Tenderer……	
CSD Number:	
LOGIS Number:	
Preference Points Claimed:	
Closing date on tender: 30 September 2021	**Time at: 11:00 am**

The Contract

PART C1: AGREEMENT AND CONTRACT DATA

C 1.1 CONTRACT DATA

EASTERN CAPE PROVINCIAL GOVERNMENT
DEPARTMENT OF RURAL DEVELOPMENT AND AGRARIAN REFORM

BID FOR THE CONSTRUCTION OF FORT COX 2 X 50 SEATER FURNISHED LECTURER HALLS

C1.1 Contract Data

The Joint Building Contract Committee Principal Building Agreement (JBCC 2018 Edition 6.2 May 2018) published by the Joint Building Contract Committee, is applicable to this contract. Copies of these conditions of contract may be obtained from the Joint Building Contract Committee (Tel 011-482 3102).

The Contract Data and JBCC shall have precedence over the Drawings, Scope of Work and Standardised Specifications in the interpretation of any ambiguity or inconsistency.
The following contract specific data, referring to the Joint Building Contract Committee Agreement, Edition 6.2 May 2018, are applicable to this Contract:

The Joint Building Contracts Committee® - NPC

CONTRACT DATA

For use by ORGANS OF STATE and other PUBLIC SECTOR BODIES
Principal Building AgreementEdition 6.2 - May 2018

A PROJECT INFORMATION

A 1.0 Works [1.1]

Project name	CONSTRUCTION OF 2 X 50 SEATER FURNISHED LECTURER THEATRES AT FORT COX
Reference number	Tender No : SCMU8-21/22-0092
Works description	Refer to more detailed scope of works described in Volume 1 - Tendering Procedures Part T1.1 of the tender document. As a rough guide only to Tenderers, the work embodied in this contract comprises the construction of: • Building Works: Construction of two-50 seater lecture theatres; Study area; Offices and Ablution facilities • Civil Works: External Works which comprises of road and parking area, walkways and landscaping • Electrical and Electronic Works • Mechanical Works • Fire Detection and Protection

A 2.0 Site [1.1]

Erf / stand number	Fort Cox College
Township / Suburb	Middledrift
Site address	Cwarhu Road Fort Cox Agricultural College
Local authority	Raymond Mhlaba Local Municipality

A 3.0 Employer [1.1]

Official Name of Organ of State / Public Sector Body	Department of Rural Development and Agrarian Reform		
Business registration number	Public Entity		
VAT/GST number	VAT Exempt		
Country	South Africa		
Employer's representative: Name	Mr. Johan Koch		
E-mail	Johan.Koch@drdar.gov.za	Telephone number	043 683 4022
Mobile number			
Postal address	Private Bag X 0040		
	Bhisho	Postal code	5605
Physical address	UIF Building, Cnr Phalo and Rharhabe Road		
	Cnr Phalo and Rharhabe Road	Postal code	5605
	Bhisho		

A 4.0 Principal agent [1.1]

Name	Nolwandle Quantity Surveyors		
Legal entity of above	Nolwandle Quantity Surveyors	Contact person	Fezeka Manyika
Practice number	Pr QS 5784	Telephone number	083 271 7191
		Mobile number	083 271 7191
Country	South Africa	E-mail	info@nolwandleqs.co.za
Postal address	PO Box 2250		
	Beacon Bay	Postal code	5241
Physical address	21 Pell Street		
	Beacon Bay	Postal code	5241

A 5.0 Agent [1.1; 6.2]

Discipline	Architect

Name	Miso Architects		
Legal entity of above	Miso Architects	Contact person	Milisani Manasoe
Practice number		Telephone number	082 308 8293
		Mobile number	082 308 8293
Country	South Africa	E-mail	milisani@misoarchitect.co.za
Postal address	4A Samson Road		
	Vincent	Postal code	5247
Physical address	4A Samson Road		
	Vincent	Postal code	5247

A 6.0 Agent [1.1; 6.2]

Discipline	Quantity Surveyor

Name	Nolwandle Quantity Surveyors		
Legal entity of above		Contact person	Fezeka Manyika
Practice number	Pr QS 5784	Telephone number	083 271 7191
		Mobile number	083 271 7191
Country	South Africa	E-mail	info@nolwandleqs.co.za
Postal address	PO Box 2250		
	Beacon Bay	Postal code	5241
Physical address	21 Pell Street		
	Beacon Bay	Postal code	5241

A 7.0 Agent [1.1; 6.2]

Discipline	Civil & Structural Engineer

Name	Saunders and Wium Engineers		
Legal entity of above		Contact person	Elisabeth Victor
Practice number		Telephone number	043 721 1517
		Mobile number	083 793 0104
Country	South Africa	E-mail	liz@saunwium.co.za
Postal address	68 Frere Road		
	Vincent	Postal code	5247
Physical address	68 Frere Road		
	Vincent	Postal code	5247

A 8.0 Agent [1.1; 6.2]

Discipline	Mechanical, Electrical & Fire Engineer

Name	AKM Associates		
Legal entity of above		Contact person	Fezeka Mvulana
Practice number		Telephone number	043 726 2955
		Mobile number	083 379 9744
Country	South Africa	E-mail	fezekam@akmel.co.za
Postal address	P.O. Box 15505		
	Beacon Bay	Postal code	5241
Physical address	P.O. Box 15505		
	Beacon Bay	Postal code	5241

A 9.0 Agent [1.1; 6.2]

Discipline	Health & Safety

Name	SheShay Solutions		
Legal entity of above		Contact person	Annastachia Jacobus
Practice number		Telephone number	
		Mobile number	081 324 5147
Country	South Africa	E-mail	tessa@sheshay.com
Postal address	8 Kathryn Road		
	Amalinda	Postal code	5201
Physical address	8 Kathryn Road		
	Amalinda	Postal code	5201

B CONTRACT INFORMATION

B 1.0 Definitions [1.1]

Bills of quantities: System/Method of measurement	Seventh Edition 2015 of the Standard System of Measuring Builder's Work

B 2.0 Law, regulations and notices [2.0]

Law applicable to the **works**, state country[2.1]	Republic of South Africa

B 3.0 Offer and acceptance [3.0]

Currency applicable to this **agreement** [3.2]	South African Rands

B 4.0 Documents [5.0]

The original signed **agreement** is to be held by the **principal agent** [5.2], ifnot, indicate by whom	**Employer**
Number of copies of **construction information** issued to the **contractor** at nocost [5.6]	**2**

Documents comprising the **agreement**	Page numbers
The **JBCC®** Principal Building Agreement, Edition 6.2 May 2018	1 to 30
The **JBCC®** Principal Building Agreement - Contract Data for Organs of Stateand other Public Sector Bodies, Edition 6.2 May 2018	1 to 14
The **JBCC®** General Preliminaries for use with the **JBCC®** Principal Building Agreement, Edition 6.2 May 2018	1 to 7
Bills of Quantities	Refer to index
Additional documentation as stated in Procurement document	

Contract drawings – description	Number	Revision	Date
Refer to drawings included in tender document annexures			

B 5.0 Employer's agents [6.0]

Authority is delegated to the following **agents** to issue **contract instructions** and perform duties for specificaspects of the **works** [6.2]
Nolwandle Quantity Surveyors

Principal agent's and **agents**' interest or involvement in the **works** other than a professional interest [6.3]
N/A

B 6.0 Insurances [10.0]

Insurances by **employer**			Amount including **tax**	Deductible amount including **tax**
Yes/no? **No**				
Contract works insurance:				
	New **works** [10.1.1] (**contract sum** or amount)			
or	**Works** with **practical completion** in **sections** [10.2] (**contract sum** or amount)			
or	**Works** with alterations and additions [10.3] (reinstatement value of existing structures with or including new **works)**			
	Direct contractors [10.1.1; 10.2] where applicable, to be included in the contract works insurance			
	Free issue [10.1.1; 10.2] where applicable, to be included in the contract works insurance			
	Escalation, professional fees and reinstatement costs if not included above			
Total of the above contract works insurance amount				
Supplementary insurance [10.1.2; 10.2]				
Public liability insurance [10.1.3; 10.2]				
Removal of lateral support insurance [10.1.4; 10.2]				
Other insurances [10.1.5]				
Yes/no?		If yes, description 1		
Yes/no?		If yes, description 2		

and/or

Insurances by **contractor**			Amount including **tax**	Deductible amount including **tax**
Yes/no?	**Yes**			
	New **works** [10.1.1 and 11.1.1] (**contract sum** or amount)		Contract Sum	
or	**Works** with **practical completion** in **sections** [10.2] (**contract sum** or amount)		N/A	
or	**Works** with alterations and additions [10.3] (reinstatement value of existing structures with or including new **works)**		N/A	
	Direct contractors [10.1.1; 10.2] where applicable, to be included in the contract works insurance		N/A	
	Free issue [10.1.1; 10.2] where applicable, to be included in the contract works insurance		N/A	
	Escalation, professional fees and reinstatement costs if not included above		N/A	
Total of the above contract works insurance amount			Sum of above	
Supplementary insurance [10.1.2]			Contract works insurance value	
Public liability insurance [10.1.3]			R5,000,000.00	
Removal of lateral support insurance [10.1.4]			N/A	
Other insurances [10.1.5]: Refer B17.0			N/A	
Yes/no?		If yes, description 1		
Guarantee for Construction 10% of the Contract Sum [11.1.1]				
Yes/no?		If yes, description 2		
Contract Sum and a payment reduction of 5% of the value of eachpayment certificate				

B 7.0 Obligations of the employer [12.1]

Existing premises will be in use and occupied [12.1.2]	Yes/no?	Yes
If yes, description	Existing College Facilities, located on the same site, will remain in operation during the construction period, the operation of which must not be hindered in any way by the construction activities	
Restriction of working hours [12.1.2]	Yes/no?	No
If yes, description	Contractor to utilise and spend much time on site to ensure the completion of works within the schedule of works.	
Natural features and known services to be preserved by the **contractor** [12.1.3]	Yes/no?	No
If yes, description	No indigenous trees on the site	
Restrictions to the **site** or areas that the **contractor** may not occupy [12.1.4]	Yes/no?	Yes
If yes, description	Fort Cox College is a clean educational area and the contractor's team will need to stay within the demarcated building construction site. Materials used will need to be approved by the Employer's agent and stacked within the site.	
Supply of **free issue** [12.1.10]	Yes/no?	No
If yes, description		

B 8.0 Nominated subcontractors 14.0]

Yes/no?	No	If yes, description of specialisation

Specialisation 1	
Specialisation 2	
Specialisation 3	
Specialisation 4	
Specialisation 5	

B 9.0 Selected subcontractors [15.0]

Yes/no?		If yes, description of specialisation

Specialisation 1	
Specialisation 2	
Specialisation 3	
Specialisation 4	
Specialisation 5	

B 10.0 Direct contractors [16.0]

Yes/no?		If yes, description of extent of work

Extent of work [12.1.11]	
Extent of work [12.1.11]	
Extent of work [12.1.11]	
Extent of work [12.1.11]	
Extent of work [12.1.11]	

B 11.0 Description of sections [20.1]

Refer to Scope of Works described elsewhere in the tender document for more detailed description ofsections

Sections		N/A
Section		Remainder of the **works**

B 12.0 Possession of site [12.1.5], practical completion [19.0; 20.0] and penalty [24.0]

Practical completion for the **works** as awhole	Intended date of possession of the **site** Refer B17.0 [12.1.5; 12.2.22]	Period for inspection by the **principal agent** [19.3]	The date for **practical completion** shall be the period as indicated below from the date of possession of the **site** by the **contractor** [12.2.7; 24.1]	**Penalty** for late completion [24.1]
		working days	Period in months	Penalty amount per **calendar day** (excl. **tax**)
				3.75c/R100

or where **sections** are applicable **(N/A)**

Practical completion of a **section** of the **works**	Intended date of possession of a **section** Refer B17.0 [12.1.5; 12.2.22]	Period for inspection by the **principal agent** [19.3]	The date for **practical completion** shall be the period as indicated below from the date of possession of the **site** by the **contractor** [12.2.7; 24.1]	**Penalty** for late completion [24.1]
		working days	Period in months	Penalty amount per **calendar day** (excl. **tax**)
Sections		N/A	N/A	N/A
Remainder of the **works**		N/A	N/A	N/A

B 13.0 Defects liability period [21.0]

Extended defects liability period: Refer B17.0 [21.13]	Yes/no?	
If yes, description ofapplicable elements		

B 14.0 Payment [25.0]

Date of month for issue of regular **paymentcertificates** [25.2]	25th		
Contract price adjustment / Cost fluctuations[25.3.4; 26.9.5]	Yes/no?		
If yes, method to calculate			
Employer shall pay the **contractor** within:[25.10]	Thirty (30) **calendar days**		

B 15.0 Dispute resolution [30.0]

Adjudication [30.6.1; 30.10]Name of nominating body	Association of Arbitrators (Southern Africa)
Applicable rules for adjudication [30.6.2]	JBCC rules of Adjudication
Arbitration [30.7.4; 30.10] If Yes, name of nominating body * If No, then dispute will be referred to litigation	Yes/no? * Yes Association of Arbitrators (Southern Africa)
Applicable rules for arbitration [30.7.5]	

B 16.0 JBCC® General Preliminaries - selections

Provisional bills of quantities [P2.2]		Yes/no?	Yes	
Availability of construction information [P2.3]		Yes/no?	No	
Previous work - dimensional accuracy - details of previous contract(s) [P3.1]		N/A		
Previous work - **defects** - details of previous contract(s) [P3.2]		N/A		
Inspection of adjoining properties - details [P3.3]		N/A		
Handover of **site** in stages - specific requirements[P4.1]		N/A		
Enclosure of the **works** - specific requirements [P4.2]		Refer to Bill No. 1 Preliminaries		
Geotechnical and other investigations - specific requirements [P4.3]		DONE		
Existing premises occupied - details [P4.5]		Refer to Bill No. 1 Preliminaries		
Services - known - specific requirements [P4.6]		Refer to Bill No. 1 Preliminaries		
Water	By **contractor**	Yes/no?	No	

[P8.1]	By **employer**	Yes/no?	No	
	By **employer** – metered	Yes/no?	Yes	
Electricity[P8.2]	By **contractor**	Yes/no?	No	
	By **employer**	Yes/no?	No	
	By **employer** – metered	Yes/no?	Yes	
Ablution and welfarefacilities [P8.3]	By **contractor**	Yes/no?	Yes	
	By **employer**	Yes/no?	No	
Communication facilities - specific requirements[P8.4]		Refer to Bill No. 1 Preliminaries		
Protection of the **works - s**pecific requirements[P11.1]		Refer to Bill No. 1 Preliminaries		
Protection / isolation of existing **works** and **works** occupied in **sections -** specific requirements [P11.2]		Refer to Bill No. 1 Preliminaries and OHS Spec		
Disturbance - specific requirements [P11.5]		Refer to Bill No. 1 Preliminaries		
Environmental disturbance - specific requirements[P11.6]		Refer to Bill No. 1 Preliminaries		

2.	CLAUSES APPLICABLE TO EPWP CONTRACTS
4.1	Variations to the Conditions of Contract are: *Add the following at the end of sub clause 4.1.2.*
4.1.3	The Employer and the Contractor hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Amendment Act, 1993 (Act 85 of 1993), hereinafter referred to as 'the Act', that the following arrangements and procedures shall apply between them to ensure compliance by the Contractor with the provisions of the Act: (i) The Contractor undertakes to acquaint the appropriate officials and employees of the Contractor with all relevant provisions of the Act and the Regulations promulgated in terms of the Act. (ii) The Contractor undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations on the Contractor will be fully complied with. (iii) The Contractor accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the Employer from himself being obliged to comply with any of the aforesaid duties, obligations and prohibitions, with the exception of such duties, obligations and prohibitions expressly assigned to the Employer in terms of the Act and its associated Regulations. (iv) The Contractor agrees that any duly authorised officials of the Employer shall be entitled, although not obliged, to take such steps as may be necessary to monitor that the Contractor has conformed to his undertakings as described in paragraphs (i) and (ii) above, which steps may include, but will not be limited to, the right to inspect any appropriate site or premises occupied by the Contractor, or any appropriate records or safety plans held by the Contractor. (v) The Contractor shall be obliged to report forthwith to the Employer and Engineer any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the Act and Regulations, pursuant to work performed in terms of this Contract, and shall, on written demand, provide full details in writing, to the Employer and Engineer, of such investigation, complaint or criminal charge.
4.1.4	The Contractor shall furthermore, in compliance with Constructional Regulations 2014 to the Act: (i) Acquaint himself with the requirements of the Employer's health and safety specification as laid down in regulation 5(1) of the Construction Regulation 2014, and prepare a suitably and sufficiently documented health and safety plan as contemplated in regulation 7(1) (a) of the Construction Regulation 2014 for approval by the Employer or his assigned agent. The Contractor's health and safety plan and risk assessment shall be submitted to the Employer for approval within fourteen (14) days after receiving a completed copy of the Agreement and shall be implemented and maintained from the Commencement of the Works. (ii) The Employer, or his assigned agent, reserves the right to conduct periodic audits, as contemplated in the Construction Regulations 2014, to ensure that the Contractor is compliant in respect of his obligations. Failure by the Contractor to comply with the requirements of these Regulations shall entitle the Engineer, at the request of the Employer or his agent, to suspend all or any part of the Works, with no recourse whatsoever by the Contractor for any damages incurred as a result of such suspension, until such time that the Employer or his agents are satisfied that the issues in which the Contractor has been in default have been rectified.
6.7.6	*Add new subclause 6.7.6:* **"Payment for the labour-intensive component of the works** Payment for works identified in the Scope of Work as being labour-intensive shall only be made in accordance with the provisions of the Contract if the works are constructed strictly in accordance with the provisions of the scope of work. Any non-payment for such works shall not relieve the Contractor in any way from his obligations in contract.

3. ADDITIONAL CONDITIONS OF CONTRACT:	
Clause	
4.13	Add new sub clause 4.13: **Applicable labour laws** The Ministerial Determination, Special Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice No R63 of 25 January 2002, as reproduced below, shall apply to works described in the scope of work as being labour-intensive and which are undertaken by unskilled or semi-skilled workers.
4.13 (cont.)	**1 Introduction** 1.1 This document contains the standard terms and conditions for workers employed in elementary occupations on a Special Public Works Programme (SPWP). These terms and conditions do NOT apply to persons employed in the supervision and management of a SPWP.
4.13 (cont.)	1.2 In this document – (a) "department" means any department of the State, implementing agent or contractor; (b) "employer" means any department, implementing agency or contractor that hires workers to work in elementary occupations on a SPWP; (c) "worker" means any person working in an elementary occupation on a SPWP; (d) "elementary occupation" means any occupation involving unskilled or semi-skilled work; (e) "management" means any person employed by a department or implementing agency to administer or execute an SPWP; (f) "task" means a fixed quantity of work; (g) "task-based work" means work in which a worker is paid a fixed rate for performing a task; (h) "task-rated worker" means a worker paid on the basis of the number of tasks completed; (i) "time-rated worker" means a worker paid on the basis of the length of time worked. **2 Terms of work** 2.1 Workers on a Special Public Works Programme (SPWP) are employed on a temporary basis. 2.2 A worker may NOT be employed for longer than 24 months in any five-year cycle on a SPWP. 2.3 Employment on a SPWP does not qualify as employment as a contributor for the purposes of the Unemployment Insurance Act 30 of 1966. **3 Normal hours of work** 3.1 An employer may not set tasks or hours of work that require a worker to work– (a) more than forty hours in any week; (b) on more than five days in any week; and (c) for more than eight hours on any day. 3.2 An employer and worker may agree that a worker will work four days per week. The worker may then work up to ten hours per day. 3.3 A task-rated worker may not work more than a total of 55 hours in any week to complete the tasks allocated (based on a 40-hour week) to that worker. **4 Meal breaks** 4.1 A worker may not work for more than five hours without taking a meal break of at least thirty minutes duration.

	4.2 An employer and worker may agree on longer meal breaks. 4.3 A worker may not work during a meal break. However, an employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break. 4.4 A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.
4.13 (cont)	**5 Special conditions for security guards** 5.1 A security guard may work up to 55 hours per week and up to eleven hours per day. 5.2 A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each. **6 Daily rest period** Every worker is entitled to a daily rest period of at least eight consecutive hours. The daily rest period is measured from the time the worker ends work on one day until the time the worker starts work on the next day.
4.13 (cont)	**7 Weekly rest period** Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work ("emergency work"). **8 Work on Sundays and public holidays** 8.1 A worker may only work on a Sunday or public holiday to perform emergency or security work. 8.2 Work on Sundays is paid at the ordinary rate of pay. 8.3 A task-rated worker who works on a public holiday must be paid – (a) the worker's daily task rate, if the worker works for less than four hours; (b) double the worker's daily task rate, if the worker works for more than four hours. 8.4 A time-rated worker who works on a public holiday must be paid – (a) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday; (b) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday. **9 Sick leave** 9.1 Only workers who work four or more days per week have the right to claim sick-pay in terms of this clause. 9.2 A worker who is unable to work on account of illness or injury is entitled to claim one day's paid sick leave for every full month that the worker has worked in terms of a contract. 9.3 A worker may accumulate a maximum of twelve days sick leave in a year. 9.4 Accumulated sick leave may not be transferred from one contract to another contract. 9.5 An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave. 9.6 An employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave. 9.7 An employer must pay a worker sick pay on the worker's usual pay day. 9.8 Before paying sick pay, an employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is – (a) absent from work for more than two consecutive days; or (b) absent from work on more than two occasions in any eight-week period. 9.9 A medical certificate must be issued and signed by a medical practitioner, a qualified nurse or a clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity.

	9.10 A worker is not entitled to paid sick leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.
4.13 (cont)	**10 Maternity leave** 10.1 A worker may take up to four consecutive months unpaid maternity leave. 10.2 A worker is not entitled to any payment or employment-related benefits during maternity leave. 10.3 A worker must give her employer reasonable notice of when she will start maternity leave and when she will return to work. 10.4 A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife or qualified nurse certifies that she is fit to do so. 10.5 A worker may begin maternity leave – (a) four weeks before the expected date of birth; or (b) on an earlier date – (i) if a medical practitioner, midwife or certified nurse certifies that it is necessary for the health of the worker or that of her unborn child; or (ii) if agreed to between employer and worker; or (c) on a later date, if a medical practitioner, midwife or certified nurse has certified that the worker is able to continue to work without endangering her health. 10.6 A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth. 10.7 A worker who returns to work after maternity leave, has the right to start a new cycle of twenty-four months' employment, unless the SPWP on which she was employed has ended. **11 Family responsibility leave** 11.1 Workers who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances: (a) when the employee's child is born; (b) when the employee's child is sick; (c) in the event of a death of (i) the employee's spouse or life partner; (ii) the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling. **12 Statement of conditions** 12.1 An employer must give a worker a statement containing the following details at the start of employment: (a) the employer's name and address and the name of the SPWP; (b) the tasks or job that the worker is to perform; and (c) the period for which the worker is hired or, if this is not certain, the expected duration of the contract; (d) the worker's rate of pay and how this is to be calculated; (e) the training that the worker will receive during the SPWP. 12.2 An employer must supply each worker with a copy of these conditions of employment.

4.13 (cont)	**13 Keeping records** 13.1 Every employer must keep a written record of at least the following: (a) the worker's name and position; (b) in the case of a task-rated worker, the number of tasks completed by the worker; (c) in the case of a time-rated worker, the time worked by the worker; (d) payments made to each worker. 13.2 The employer must keep this record for a period of at least three years after the completion of the SPWP. **14 Payment** 14.1 An employer must pay all wages at least monthly in cash or by cheque or into a bank account. 14.2 A task-rated worker will only be paid for tasks that have been completed. 14.3 An employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the contractor having submitted an invoice to the employer. 14.4 A time-rated worker will be paid at the end of each month. 14.5 Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker. 14.6 Payment in cash or by cheque must take place – (a) at the workplace or at a place agreed to by the worker; (b) during the worker's working hours or within fifteen minutes of the start or finish of work; (c) in a sealed envelope which becomes the property of the worker. 14.7 An employer must give a worker the following information in writing: (a) the period for which payment is made; (b) the numbers of tasks completed or hours worked; (c) the worker's earnings; (d) any money deducted from the payment; (e) the actual amount paid to the worker. 14.8 If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it. 14.9 If a worker's employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment. **15 Deductions** 15.1 An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law. 15.2 An employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay. 15.3 An employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement law, court order or arbitration award concerned. 15.4 An employer may not require or allow a worker to – (a) repay any payment except an overpayment previously made by the employer by mistake; (b) state that the worker received a greater amount of money than the employer actually paid to the worker; or (c) pay the employer or any other person for having been employed.

4.13 (cont)	**16 Health and safety** 16.1 Employers must take all reasonable steps to ensure that the working environment is healthy and safe. 16.2 A worker must – (a) work in a way that does not endanger his/her health and safety or that of any other person; (b) obey any health and safety instruction; (c) obey all health and safety rules of the SPWP; (d) use any personal protective equipment or clothing issued by the employer; (e) report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager. **17 Compensation for injuries and diseases** 17.1 It is the responsibility of the employers (other than a contractor) to arrange for all persons employed on a SPWP to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993. 17.2 A worker must report any work-related injury or occupational disease to their employer or manager. 17.3 The employer must report the accident or disease to the Compensation Commissioner. 17.4 An employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home. **18 Termination** 18.1 The employer may terminate the employment of a worker for good cause after following a fair procedure. 18.2 A worker will not receive severance pay on termination. 18.3 A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the employer in advance to allow the employer to find a replacement. 18.4 A worker who is absent for more than three consecutive days without informing the employer of an intention to return to work will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period. 18.5 A worker who does not attend required training events, without good reason, will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period. **19 Certificate of service** 19.1 On termination of employment, a worker is entitled to a certificate stating – (a) the worker's full name; (b) the name and address of the employer; (c) the SPWP on which the worker worked; (d) the work performed by the worker; (e) any training received by the worker as part of the SPWP; (f) the period for which the worker worked on the SPWP; (g) any other information agreed on by the employer and worker.

C 1.2 OCCUPATIONAL HEALTH AND SAFETY AGREEMENT

AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 OF 1993

THIS AGREEMENT is made between .....

……

(hereinafter called the EMPLOYER) of the one part, herein represented by: .....

.....

in his capacity as: .....

AND:

(hereinafter called the CONTRACTOR) of the other part, herein represented by .....

.....

in his capacity as: .....

duly authorised to sign on behalf of the Contractor.

WHEREAS the CONTRACTOR is the Mandatory of the EMPLOYER in consequence of an agreement between the CONTRACTOR and the EMPLOYER in respect of
CONTRACT No.: **SCMU8-21/22-0092**

for the construction, completion and maintenance of the works;

NOW THEREFORE the parties agree as follows:

1. **The CONTRACTOR undertakes to acquaint the appropriate officials and employees of the CONTRACTOR with all relevant provisions of the ACT and the regulations promulgated in terms thereof.**

2. The CONTRACTOR undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations: Provided that should the EMPLOYER have prescribed certain arrangements and procedures that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.

3. The CONTRACTOR hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the ACT and Regulations, and the CONTRACTOR expressly absolves the EMPLOYER and the Employer's CONSULTING EMPLOYER'S AGENTS from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the contract.

4. The CONTRACTOR agrees that any duly authorised officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the CONTRACTOR has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to take such steps it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.

5. The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the ACT and Regulations, pursuant to work performed in terms of this agreement, and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

Thus signed at .....for and on behalf of the **CONTRACTOR**

on this day .....day of .....20_____

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESS: 1. ..... ……...

2. .....

Thus signed at ..... for and on behalf of the **EMPLOYER**

on this day .....day of ..... 20_____

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESS: 1. .....

2. …….

C 1.3 CESSION FOR THE RIGHTS OF MATERIALS ON SITE

CESSION OF RIGHTS FOR MATERIALS ON SITE

Claim for materials on site

Payment Certificate No. ..... **Date:** ....

Contract: .....

Employer: ....…

Contract No:.....….....

Contractor: .....….....

I / We, the undersigned, ...
(Print name)

in my / our capacity as.....of .....…….
(Print capacity) (Company)

hereby confirm that the Contractor is the bona fide owner of the goods and materials described in the attached schedule and the Contractor hereby cedes assigns and transfers all the right, title and interest claim and demand in and due to the materials and goods described in the attached schedule in favour of the Employer.

All rights of the Employer in and to this Cession shall become effective immediately upon the Contractor obtaining payment for the goods referred to on the attached schedule (less payment of retention monies that may be validly retained in respect thereof) from which time forward the ownership of all the stated goods and materials will vest in and pass irrevocably to the Employer.

Notwithstanding the foregoing all risk or loss and/or damage to the said goods and materials whilst in the Contractor's stores up until the time that all the goods and materials have been installed in the Works shall be the responsibility of the Contractor.

This Cession shall neither constitute a novation of nor amend the terms of the Contract existing between the Employer and the Contractor nor shall it in any manner vitiate any of the rights and obligations imposed on either party.

Signed by: ..... Date: .....
for and on behalf of the Contractor.

Witnessed by: .....Date: .....

(NOTE: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractor's claim for payment for materials on site in terms of Clause 4 of the Joint Building Contracts Committee Principal Building Agreement Edition 6.2 – May 2018).

C 1.4 FORM OF GUARANTEE

C1.4 Form of Guarantee: Contract No. SCMU8-21/22-0092

THE JOINT BUILDING CONTRACTS COMMITTEE
JBCC

Guarantee for Construction

For use with the **JBCC**® **Principal Building Agreement** edition /date

GUARANTOR DETAILS AND DEFINITIONS

Guarantor:

Physical Address:

Guarantor's signatory 1: Capacity

Guarantor's signatory 2: Capacity

Employer:

Contractor:

Principal Agent:

Works:

Site:

Contract Sum:

Amount in words:

Accepted amount inclusive of tax Currency

The maximum aggregate amount Currency

Guaranteed Sum:

Amount in words:

Guarantee for *(Insert Variable or Fixed)*

Construction: Expiry Date:

AGREEMENT DETAILS

Sections: Total number / not applicable Last Section

Principal Agent issues JBCC® format Recovery Statement, Interim Payment Certificates, the Final Payment Certificate, the Certificate of Practical Completion and the Certificate of Final Completion

1.0 GUARANTEE FOR CONSTRUCTION (Variable)

1.1 Where a Guarantee for Construction (Variable) in terms of the Agreement has been selected this clause 1.0 and 3.0 to 13.0 shall apply. The Guarantor's liability shall be limited to the diminishing amounts of the Guaranteed Sum as follows:-

GUARANTOR'S LIABILITY	**PERIOD OF LIABILITY**
1.1.1 Maximum Guaranteed Sum (not exceeding 10.0% of the contract sum) in the amount of:	From and including the date of issue of this Guarantee for Construction and up to and including the date of issue of the Interim Payment Certificate certifying in excess of 50% of the contract sum

Amount in words:

1.1.2 Reducing to the Guaranteed Sum (not exceeding 6.0% of the contract sum) in the amount of:

From and including the day after the date of the aforesaid Interim Payment Certificate and up to andincluding the date of issue of the only Certificate of Practical Completion or last Certificate of Practical Completion where there are sections

Amount in words:

1.1.3 Reducing to the Guaranteed Sum (not exceeding 4.0% of the contract sum) in the amount of:

From and including the day after the date of the applicable Certificate of Practical Completion and up to and including the date of issue of the only Certificate of Final Completion or the last Certificate of Final Completion where there are sections

Amount in words:

1.1.4 Reducing to the Guaranteed Sum (not exceeding 2.0% of the contract sum) in the amount of:

From and including the day after the date of the applicable Certificate of Final Completion and up toand including the date of issue of the Final Payment Certificate where payment is due to the Contractor, whereafter this Guarantee for Construction shall expire. Where the Final Payment Certificate reflects payment due to the Employer, this Guarantee for Construction shall expire upon payment of the full amount certified

Amount in words:

1.2 The Guarantor's liability limits set out in 1.1.1 to 1.1.4 shall apply in respect of any claim received by the Guarantor during the guarantee validity period

2.0 GUARANTEE FOR CONSTRUCTION (Fixed)

2.1 Where a Guarantee for Construction (fixed) in terms of the Agreement has been selected this clause 2.0 and 3.0 to 13.0 shall apply. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum asfollows:

GUARANTOR'S LIABILITY **PERIOD OF LIABILITY**

Maximum Guaranteed Sum (not exceeding5.0% of the contract sum) in the amount of:	From and including the date of issue of this Guarantee for Construction and up to and including the date of the only Certificate of Practical Completion or the last Certificate of Practical Completion where there are sections, whereafter this Guarantee for Construction shall expire

Amount in words:

3.0 The Guarantor acknowledges that:

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

3.2 Its obligation under this Guarantee for Construction is restricted to the payment of money; and

3.3 Reference to a Recovery Statement or an Interim or Final Payment Certificate, or a Certificate(s) of Practical or Final Completion shall mean such certificate issued by the Principal Agent.

4.0 Subject to the Guarantor's maximum liability referred to in 1.0 or 2.0, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4. 3:

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

4.2 A first written demand notice issued by the Employer to the Guarantor at the Guarantor's Physical Address with a copy to the Contractor stating that a period of seven (7) calendar days has elapsed since the issue of the first written demand notice in terms of 4.1 and that the sum certified has not been paid to date. The Employer herewith calls up this Guarantee for Construction and demands payment of the sum certified from the Guarantor; and

4.3 A copy of the applicable payment certificate which entitles the Employer to receive payment in terms of the Agreement of the sum certified in 4.0

5.0. Subject to the Guarantor's maximum liability referred to in 1.0 or 2.0, the Guarantor undertakes to pay the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand notice from the Employer tothe Guarantor at the Guarantor's Physical Address calling up this Guarantee for Construction stating that:

5.1 The Agreement has been terminated due to the Contractor's default and that the Guarantee for Construction is called up in terms of 5.0. The demand shall enclose a copy of the notice of termination; or

5.2 A provisional sequestration or liquidation court order has been granted against the Contractor and that the Guarantee for Construction is called up in terms of 5.0. The demand notice shall enclose a copy of the court order.

6.0 The aggregate amount of payments to be made by the Guarantor in terms of 4.0 and 5.0 shall not exceed the Guarantor's maximum liability in terms of 1.0 or 2.0.

7.0 Where the Guarantor is a registered insurer and has made payment in terms of 5.0, the Employer shall within one hundred and eighty (180) calendar days of receipt of payment submit an expense account to the Guarantor showing how all monies received in terms of the Guarantee for Construction have been expended, or will be expended, and shall refund to the Guarantor any surplus amount. All monies refunded to the Guarantor in terms of this Guarantee forConstruction shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date of payment by the Guarantor to the Employer until the date of refund.

8.0 Payment by the Guarantor in terms of 4.0 or 5.0 shall be made within seven (7) calendar days upon receipt of the firstwritten demand notice to the Guarantor.

9.0 The Employer shall have the absolute right to arrange its affairs with the Contractor in any manner which the Employerdeems fit and the Guarantor shall not have the right to claim its release from this Guarantee for Construction on account of any conduct alleged to be prejudicial to the Guarantor.

10.0 The Guarantor chooses the Physical Address stated above for all notices and correspondences in relation to this Guarantee.

11.0 This Guarantee for Construction is neither negotiable nor transferable and shall expire in terms of either 1.1.4 or 2.1, or payment in full of the Guaranteed Sum or on the Expiry Date, whichever is the earlier, whereafter no claims will beconsidered by the Guarantor. This original Guarantee for Construction shall be returned to the Guarantor after it has expired.

12.0 This Guarantee for Construction, with the required demand notices in terms of 4.0 or 5.0, shall be regarded as a liquiddocument for the purpose of obtaining a court order.

13.0 Where this Guarantee for Construction is issued in the Republic of South Africa this Guarantee for Construction shall be governed by the laws of the Republic of South Africa. A competent court in the Republic of South Africa shall havesole jurisdiction in terms of this Guarantee for Construction. Where this Guarantee for Construction is issued outside the Republic of South Africa, the laws of the guarantor who issued this Guarantee for Construction shall prevail. A competent court, in the jurisdiction in which the guarantor is domiciled shall prevail.

Signed at: _____ Date: _____

Guarantor's Signatory 1: .....

Guarantor's Signatory 2: .....

Witness: .....

Guarantor's Seal or Stamp:

PART C2 – PRICING DATA

C 2.1 PRICING INSTRUCTIONS

C2.1 Pricing Instructions

1. Measurement and payment shall be in accordance with the relevant provisions of clause 8 of each of the SABS 1200 Standardized Specifications for Civil Engineering Construction referred to in the Scope of Work and Clause 25 of JBCC Edition 6.2 - 2018 for Building Works . The Preliminary and General items shall be measured in accordance with the provisions of SABS 1200-A, *General and JBCC General Preliminaries Edition 6.2 - 2018.*

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
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m²	=	square metre
m²-pass	=	square metre-pass
m³	=	cubic metre
m³-km	=	cubic metre-kilometre
month	=	month
MN	=	meganewton
MN.m	=	meganewton-metre
MPa	=	megapascal
No.	=	number
Prov sum	=	Provisional sum
PC sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000 kg)
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)

3. 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.

10. Descriptions in the Bills of Quantities are abbreviated and comply generally with those in the SABS 1200 Standardised Specifications and Standard System of Measuring Building Works.

PART C3 SCOPE OF WORK AND SPECIFICATIONS

C 3.1 SCOPE OF WORK

EASTERN CAPE PROVINCIAL GOVERNMENT
DEPARTMENT OF RURAL DEVELOPMENT AND AGRARIAN REFORM

BID FOR THE CONSTRUCTION OF 2 X 50 SEATER FURNISHED LECTURER THEATRES AT FORT COX

C3.1 Scope of Work

1. Scope of Work and Management

TOPIC	SUB TOPIC
DESCRIPTION OF THE WORKS	
Employer's objective	CONSTRUCTION OF 2 X 50 SEATER FURNISHED LECTURER HALLS THEATRES AT FORT COX
Overview and extent of works	This contract entails the Construction of 2 x 50 Lecture halls, study area and ablution facilities. The construction works shall include the following: • Building Works: Construction of two-50 SEATER FURNISHED lecture halls; Study area; Offices and Ablution facilities • Civil Works: External Works which comprises of road and parking area, walkways and landscaping • Electrical Works • Mechanical Works • Fire Detection and Protection
Location of the works	Fort Cox College under Raymond Mhlaba Local municipality, Cwarhu Road in Middledrift. Refer to the GPS co-ordinate 32°46'57.00'' S and 27°01'.40.00'' E and locality drawings for location.
ENGINEERING	
Design + Drawings + Specifications	Done + Will be issued + Compiled by Nolwandle Quantity Surveyors (PTY) Ltd
PROCUREMENT	
Preferential procurement procedures	Method 1 – Price Preference
Sub-contracting	Sub-contracting will be allowed. The Contractor must however indicate at tender stage which portions of the work will be sub-contracted and to whom.
CONSTRUCTION	
Works specifications	1. The standards specifications will apply, as stated in: **PW 371 - SPECIFICATION OF MATERIALS AND METHODS TO BE USED**, 2. Applicable SANS 1200 standards for the building works. 3. Attached Project Particular Specifications will apply.
Plant and materials	1. The Employer will not provide any plant or material. 2. The Contractor shall inform the Engineer in good time, to inspect and approve the plant and materials that will be used before construction commences or on arrival of material on site.
Construction equipment	1. The Employer will not provide any equipment. 2. The Contractor shall provide all suitable construction equipment necessary to complete the project.
Existing services	Care should be taken by the contractor not to damage any existing services. The Engineer shall show the position of all existing infrastructure both above ground and below ground to the Contractor and the contractor are to ensure that no excavations shall commence without consent of the Engineer.
Site establishment	1. The Employer will not provide any facilities on site.

	2. The Contractor shall provide an office, storage shed, toilets, security, vehicles, labour and accommodation.
Site usage	The Contractor shall not utilize the site for any other purpose than the construction of the agreed works.
Permits and way leaves	The Contractor will negotiate all necessary permits and way leaves with the local community.
Survey control and Setting out works	The Contractor will be responsible for the survey and setting out of all construction levels. After setting out the levels the Contractor will inform the Engineer to inspect the levels before any excavation work or construction work may commence.
MANAGEMENT	
Management of works	1. Applicable SANS 1200, SANS 10400 and 10142 standards will apply. 2. Attached generic standards will apply. 3. The standards specifications will apply, as stated in: PW 371 - SPECIFICATION OF MATERIALS AND METHODS TO BE USED, will apply. 4. Drawings and specifications will be provided by the Employer and shall be the only acceptable drawings for the agreed works. 5. The Engineer will be available to perform inspections every day on request, but will perform at least one scheduled inspection per week. 6. The Contract type is measured where payments to the Contractor will be made after measurement of the work done by the Engineer according to the following payment schedule. 6.1. The Contractor shall submit invoices according to the agreed claims and the Engineer will recommend the payment. 6.2. The Engineer will inspect the work at the Contractor's request to measure the progress and determine the part payment that is due when both parties are in agreement about the claim. 6.3. All payments can include materials that are secured on site under control of the Contractor. Materials on site which are not yet built into the works will compensated at 80% of the value as per the invoice from the material suppliers. 6.4. The Employer allows for monthly interim payments for the project that can be used, 1 practical and 1 final payment. 6.5. The practical completion of the construction work implies the work is complete and the beneficiaries can use the infrastructure. 6.6. The final and last payment is the retention money that will be paid after a predetermined period after all construction work is done. This is the defects liability period. 6.7. Certificates of Completion and Final Approval will be issued by the Engineer for practical and final construction completion. 7. The Contractor shall provide the Engineer with proof that Insurance has been obtained for the contract period. 8. The Contractor shall keep a daily record of all labour related matters, weather occurrences, all incidents that influenced construction. 9. Communications between the Employer and Contractor will be in writing with copies to all stakeholders. 10. The Contractor shall be responsible for testing the works after completion to ensure compliance with the Employer's requirements. 11. The Employer will commission the works during a public handing over ceremony. 12. The Contractor shall repair all defects of workmanship and materials during the liability period.
Health and safety	1. Attached Occupational Health and Safety Specifications will apply. 2. Applicable SANS 1200, SANS 10085,SANS 10400 and 10142 standards will apply; 3. Occupational Health and Safety Act (Act No. 85 of 1993) will apply;

	4. The Contractor shall appoint a person that will be responsible for health and safety issues on site and provide the Engineer with the name and credentials of this person. 5. Trained First Aider and must have a comprehensive First Aid Kit on site. 6. The Contractor shall be responsible to design and apply measures to prevent accidents or injury to any person or property during construction. 7. Fall arrest and rescue kit for working at heights. 8. Toilet facilities for contractor

C 3.2 PARTICULAR AND GENERIC SPECIFICATIONS

C 3.2.1 GENERIC SPECIFICATIONS

PS SCOPE

The Construction of a 2 × 50 seater furnished lecture theatres at the Fort Cox College of Agriculture. The construction works shall include the following:

- Building Works: Construction of two-50 seater furnished lecture halls; Study area; Offices and Ablution facilities
- Civil Works: External Works which comprises of road and parking area, walkways and landscaping
- Electrical Works
- Mechanical Works
- Fire Detection and Protection

PS 1 DISCLAIMER

The information regarding subsurface conditions, materials on site and site information supplied, is provided in good faith for the contractor's convenience as an indication of conditions likely to be encountered. No responsibility will be accepted for, and there is no guarantee of the information being representative of the whole area of the works or materials.

The information provided will not be regarded as in way limiting. The contractor will be held to have satisfied himself of all conditions to be encountered on site and to allow accordingly in his tendered rates.

PS 2 APPLICABLE STANDARDS

The South African Bureau of Standards, Standard Specifications for Civil Engineering Construction (SABS 1200), and Public Works Specifications. It shall however be noted that reference is made in certain of the specifications to other standardized specifications which may or may not be included in this document. Where such specifications are not included, they shall however be deemed to be included in the Contract documents.

The Contractor shall have available for reference on site at all times a full set of the above specifications, together with any other to which they refer. These specifications shall remain the property of the Contractor but shall be made available to the Engineer whenever required throughout the duration of the Contract.

The South African Bureau of Standards, Standard Specifications for Civil Engineering Construction (SABS 1200) and Public Works Specifications shall apply to this Contract together with additional amendments as set out herein

PS 3 PLANT AND MATERIALS

The Employer will not be providing any plant or supplying any materials for use by the Contractor in executing the works. The Contractor must provide all plant and materials of whatever nature necessary to enable him to undertake the works as specified.

The Contractor must provide all necessary samples and copies of the relevant test results required to prove compliance with the specifications, prior to utilisation of any material within the works.

PS 3.1 Construction Equipment

The provision of all tools and equipment of whatever nature, required for execution of the scheduled items, must be the responsibility of the Contractor, and the cost thereof must be included in the rates for the respective items of work.

PS 4 EXISTING SERVICES

The Contractor will be issued with drawings showing the position of existing services in the vicinity of his working area. The Contractor must contact the service authorities concerned (i.e. Water, Sanitation, Electricity and Telecommunications) to confirm the position of existing services, and must apply for the Construction Permit for work programmed within the road reserve when required.

The Contractor is required to undertake work in proximity to existing services and he must take all necessary expose and confirm the location and depth of each existing service prior to carrying out any construction over or around the service.

Should his operations result in any damage to existing services, he must immediately notify the Engineer and the local authority, who will inspect the damage and determine what further action is required. The Contractor must be responsible for the cost of all repairs or reinstatement necessary, whether these are carried out with his own resources or by a third party.

PS 5 SITE ESTABLISHMENT

PS 5.1 Services and Facilities Provided by the Employer

The Employer will not provide any facilities or services.

PS 5.2 Facilities Provided by the Contractor

Due to the extremely constricted nature of the site, the Contractor must be required to determine the most convenient location for his camp site in consultation with the Community/Owner such that this will cause the least disruption and interference with his activities. Dependent on his actual space requirement, different components of the camp could be located in different areas.

Should the Contractor elect to locate any or all of his facilities in one area for a certain duration, and then relocate them later, any associated costs must be solely for his account, and no claims of any nature for additional costs will be entertained.

The Contractor will be required to provide certain facilities for the exclusive use of the Engineer and his staff, all as defined in SABS 1200 AB and JBCC P & G's, and as amended by any variations / additions in clause C3.4.1.6.

PS 5.3 Storage and Laboratory Facilities

The employer has no specific requirements for any storage or laboratory facilities, and the Contractor should provide whatever he deems to be necessary to support his activities.

PS 5.4 Other Facilities and Services

Should the Contractor require a supply of municipal water to enable him to undertake any of his activities on the site then he must make his own arrangements with the Community/Owner or Municipality for a suitable point of supply. The Contractor must agree the details of both the position and the size of connection required with the relevant officials, and must be responsible for the cost of the connection, the cost of water used, and the cost of removal and reinstatement on completion.

Should the Contractor require an electrical connection to his campsite then he must submit an application to the Community/Owner, Municipality's electricity department or Eskom as might be applicable to obtain a supply with the necessary capacity at a suitable position. The Contractor must be responsible for the cost of the connection, the cost of electricity used, and the cost of removal and reinstatement on completion.

The Contractor must:

i) make his own arrangements for whatever telephone and facsimile services he may require.
ii) provide sufficient serviced, portable toilets at convenient locations for the use of his staff during their time spent on site.
iii) supply a first aid kit to be available at the site office, and re-stock the contents as and when necessary.
iv) make available a list of emergency contact numbers for ambulance, police and fire services.
v) provide the necessary facilities on site to temporarily store refuse, and make arrangements with the Municipality for regular refuse removals. Refuse storage facilities must make allowance for waste separation, re-cycling and re-use wherever possible

All costs associated with any of the above aspects must be included in the relevant preliminary and general items.

PS 5.5 Vehicles and Equipment

No vehicles or specialised equipment is required for the employer and his agents.

PS 5.6 Advertising Rights

No advertising of any kind will be allowed on the site.

PS 5.7 Notice Boards

Two project notice boards will be required in accordance with SABS 1200 AB, and as amended by any variations/additions in clause C3.4.1.6.

PS 6 SITE USAGE

The Contractor must restrict his operations to the boundaries of the site and he must not be allowed to occupy or impact on any other adjacent areas. The construction site must be Fenced off and ensure privacy (cover with shade cloth all fenced areas) (Fence must be 2 meters in height).

PS 7 PERMITS AND WAY LEAVES

The Contractor will be required to provide copies of permits for any borrow pits or quarries from which he intends to obtain bedding material or aggregate.

The Contractor must be responsible for obtaining all of the necessary way leaves, permissions or permits applicable to working near any existing services or other infrastructure on Site, and must ensure that any way leaves, permissions or permits obtained by the Employer's Agent prior to the award of the Contract are transferred into the Contractor's name. (Refer also to clause C3.4.4 above.)

The Contractor must abide by any conditions imposed by such way leaves, permissions or permits.

The Contractor must ensure that all way leaves, permissions and permits are kept on site and are available for inspection by the relevant service authorities on demand.

PS 8 ALTERATION, ADDITIONS, EXTENSIONS AND MODIFICATIONS TO EXISTING WORKS

Wherever the Contractor is required to carry out construction to lines and levels based on or tying into existing infrastructure, he must first check that the information provided for the existing works is accurate and correct. Should there be any discrepancies as regards position, or defects in the quality of the existing work which may affect the proposed work, then the Contractor must report these to the Engineer and request clarification prior to proceeding with the new construction.

PS 9 INSPECTION OF ADJOINING PROPERTIES

The Contractor and the Engineer must together inspect and record the condition of all adjoining properties or existing services, prior to the commencement of any work that may impact on these existing facilities in any way.

PS 10 WATER FOR CONSTRUCTION PURPOSES

The Contractor must make his own arrangements with the Community/Owner or Municipality to obtain water for construction purposes.

PS 11 SURVEY CONTROL AND SETTING OUT OF THE WORKS

The Contractor must be solely responsible for the setting out of his work, and will be provided with the necessary bench marks and co-ordinated pegs on which to base the setting out.

All other control points and benchmarks required for construction or computation of quantities must be set out by the Contractor in consultation with the Engineer. Points set out must be clearly marked and the position and all other relevant data placed on a site plan. A copy of the plan must be handed to the Engineer immediately, for control purposes.

Any existing beacons disturbed or removed during the course of the Contract will be replaced at the Contractor's cost. Only a land surveyor or the Engineer's Surveyor who originally installed the beacons will be allowed to replace them.

PS 12 MANAGEMENT

PS 12.1 Management of the Works

PS 12.1.1 Applicable SANS Standards

The applicable standards are listed in clause PPS 2.

PS 12.1.2 Particular / Generic Specifications

Particular or generic specifications are included for all parts of the work.

PS 12.1.3 Planning and Programming

Within 14 days of the Commencement Date the Contractor must prepare and submit to the Engineer for approval a fully detailed programme showing:

- the sequence and duration of all activities required to undertake the scheduled work.
- the linkage between activities deemed to be on the critical path.
- critical dates for receipt of information and drawings.
- milestone date for Completion of different sections of the work.

Whenever the work deviates significantly from the proposed programme for whatever reason, the Contractor must, following a request from the Engineer, must prepare a new programme that shows how the work will be re-scheduled so as to achieve the original Completion Date.

The Contractor must take cognisance of the exploration work which has to be executed prior repairing or replacing of existing pipelines.

PS 12.1.4 Sequence of the Works

The sequence of work must be carried out strictly in accordance with the approved programme as detailed above.

PS 12.1.5 Methods and Procedures

Prior to the commencement of any work on the Site the Contractor must submit method statements for each separate construction activity that he is required to undertake. The method statements must be submitted to the Engineer for approval at least 10 days prior to the scheduled start of the activity. The method statements must set out the technical procedures to be followed in carrying out the activity and must include details of compliance with both Occupational Health and Safety and Environmental aspects.

The Contractor must ensure that his staff and workers are properly trained in the safe and effective use of any equipment, plant or materials necessary to undertake the work.

PS 12.1.6 Quality Control

The Contractor must provide whatever samples of materials are required for approval prior to commencement, together with the applicable test results to prove compliance with the relevant specification. He must undertake all necessary tests that are stipulated in terms of the applicable specification to ensure that his workmanship meets the required standard.

PS 12.1.7 Environment

The Contractor must ensure that he is fully aware of the requirements of the CEMP and that he understands his responsibilities regarding both his management of the project and the actual construction activities on Site.

PS 12.1.8 Accommodation of Traffic

The Contractor is responsible for the safety of all vehicular and pedestrian traffic affected by his work and must provide all the necessary warning signs, barricading and lighting as necessary, fully in compliance with the requirements of the SADC Road Traffic Signs Manual and with the approval of the Traffic Department.

PS 12.1.9 Other Contractors

The Contractor has sole possession of the site and does not have to deal with other contractors.

PS 12.1.10 Testing, Completion, Commissioning

Each aspect of the work included in the Contract must be fully tested in accordance with the requirements of the relevant standard specification, as amended by the Specification Data as applicable, prior to completion of the works as a whole. All outstanding work must be completed and substandard work must be corrected prior to completion taking place.

PS 12.1.11 Recording of weather

The Contractor is required to keep a detailed record of daily weather conditions on the Site. The information must include rainfall, wind speed and direction, cloud cover and temperature. The format and extent of detail required must be agreed with the Engineer prior to commencement. (Refer to clause PS 12.1.17) below). A summary of inclement weather shall be recorded in the minutes of site meetings.

PS 12.1.12 Format of Communications

All communication of whatever nature is through the Engineer. Only under circumstances that relate to health and safety can the Contractor act on instructions issued by any other party. These instructions must then be immediately communicated to the Engineer with a request for confirmation of the instruction.

The Contractor is required to provide a suitable triplicate book which is used for communication between the Engineer or his representative and the Contractor. The book may be used for the issue of site instructions, the request for information or inspections, or merely to record aspects of contractual importance.

PS 12.1.13 Key Personnel

Within 14 days of the Commencement Date and prior to commencement of any operations on site, the Contractor shall submit to the Employer's Agent detailed CV's of his key personnel together with their relevant contact details. Should the key personnel not be the same as those included in the tender submission, then the Contractor shall be required to provide personnel with equivalent or better qualifications and experience.

The Contractor keeps a site representative competent to administer and control the works continuously in the Working Areas during the execution of the works. The Contractor informs the Engineer of the name of the site representative, and any instruction given to the site representative by the Engineer is deemed to be given to the Contractor.

PS 12.1.14 Management Meetings

The Contractor is required to attend a monthly site meeting during which all aspects relating to the progress, scope, expenditure, OHS, environmental and general administration of the Contract is discussed. The Contractor must ensure that his representative at the meeting has the necessary understanding and authority to make decisions regarding these issues.

In addition, technical meetings are held on monthly, during which time aspects of a more technical nature relating to the actual construction process and quality of the work are addressed.

PS 12.1.15 Forms for Contract administration

The Contractor will keep all records as stated below as well as the following:

- EPWP forms to be submitted together with all Payment Certificates.
- Report on progress and labour at site meetings.

PS 12.1.16 Payments

All payments to the Contractor are by means of direct electronic transfer and the Contractor must provide his banking details to the Engineer together with the initial payment claim.

PS 12.1.17 Daily Records

The Contractor is required to maintain a daily record of all construction activities taking place on Site which includes details of plant, personnel, and visitors as well as other events such as weather conditions or any circumstances that may have a bearing on the nature and progress of his operations.

The Contractor is required to provide a detailed report at each site meeting. The report must be in a format to be agreed with the Engineer and contain the following:

- Details of actual progress versus programme for each construction activity.
- A daily record of rainfall and other weather events that could affect the work.
- Details of any delays that have occurred due to weather or any other cause.
- A record of resources (people, plant and equipment) present on Site.
- Details of any accidents or lost time incidents that have occurred.
- A list of information required.

PS 12.1.18 Payment Certificates

Payment Certificates shall be drawn up in an agreed format based on the bills of quantities and any variation orders authorised. The date for submission of each payment claim shall be agreed with the Employer's Agent. The procedure for preparation of Payment Certificates shall be as follows:

- The actual quantity for each item shall be agreed with the Employer's Agent or his representative based on the cumulative total of the previous monthly quantity and the additional work carried out during the month.
- The Contractor shall draw up and submit his claim using the agreed quantities.
- The Employer's Agent shall check the claim and confirm the amount to be paid.
- The Contractor shall provide a VAT invoice to the Employer's Agent for the agreed amount.
- The Employer's Agent shall prepare the payment certificate and submit the claim, accompanied by the VAT invoice.

PS 12.1.19 Proof of Compliance with the Law

The Contractor is required to comply with all regulations and laws of whatever nature which are applicable to his operations throughout the duration of the Contract, and produce documentary evidence when requested for all aspects, including, but not limited to:

- Valid proof of registration with the Compensation Commissioner.
- Proof of registration for income tax and VAT.

- Compliance with the Occupational Health and Safety Act and Construction Regulations.

PS 12.2 Health and Safety

The Contractor must comply with all relevant aspects of the Occupational Health and Safety Act together with the Regulations referred to therein, as applicable to the scope of his activities.

Particular attention must be paid to the issuing of the relevant Notices, appointment of responsible people, undertaking Hazard Identification and Risk Assessments, and preparation of a Health and Safety Plan. All necessary documentation must be prepared and submitted for comment and approval immediately after the Contract award.

Specific Health and Safety considerations applicable to this project are detailed in the Occupational Health and Safety Specification, attached to this document.

Method statements submitted for the Contractor's construction activities include details of compliance with Occupational Health and Safety, and must be submitted immediately after the Contract award and prior to commencement with any work on Site.

The Contractor must provide the necessary personal protective equipment and clothing to all staff as relevant for the type of work being carried out.

Whenever the Contractor's staff are subjected to hazardous substances, excessive dust or noise, he must arrange for pre and post-employment medical examinations on the affected employees.

No member of the Contractor's staff is allowed on Site while under the influence of alcohol or drugs. Any member of his staff who exhibit signs of alcohol or drug usage must be immediately removed from the premises.

The Contractor is responsible for the protection of the public in the areas in which he is working and must provide barricades and lighting as necessary to ensure their safety. He is also responsible for the safe control of traffic wherever his works impact on the existing roadways.

C 3.2.2 PARTICULAR SPECIFICATIONS

BUILDING WORKS

DEPARTMENT OF PUBLIC WORKS PW 371 - SPECIFICATION OF MATERIALS AND METHODS TO BE USED

The specifications for the building works shall comply to the Department of Public Works specifications PW 371 “SPECIFICATION OF MATERIALS AND METHODS TO BE USED”.

All references in this specifications to South African Bureau of Standards Specifications and Codes of Practice in this Document shall be deemed to refer to the latest issue of such specifications and codes as may be amended from time to time and are to be read in conjunction with the latest issue of the National Building Regulations.

This document is issued by the Department of Public Works. (Short title “PW 371 - SPECIFICATION OF MATERIALS AND METHODS TO BE USED”), and is obtainable separately. Tenderers shall obtain their own copies.

C 3.2.3 PARTICULAR SPECIFICATIONS

ELECTRICAL INSTALLATION

SECTION 4: ELECTRICAL INSTALLATION

PROJECT SPECIFICATION

SPECIFICATION FOR ELECTRICAL WORK

PART 1

ELECTRICAL WORK MATERIAL SCHEDULE

PROJECT NAME : ELECTRICAL INSTALLATION FOR THE CONSTRUCTION OF FORT COX COLLEGE

The contractor shall complete the following schedules and submit them with their tender submission.

The schedules will be scrutinised by the Representative / Agent and should any material offered not comply with the requirements contained in the specification, the 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	SABS
1	Distribution boards			
2	Circuit breakers 1P, 2P, 3P			
3	Contactors 1P, 2P, 3P			
4	Earth leakage relays 1P & 3P			
5	Daylight sensitive switch			
6	Conduit			
7	Conduit boxes			
8	Surface switches			
9	Watertight switches			
10	16A single/duo/ euro flush socket outlets			
11	16A single/duo dedicated socket outlets			
12	20A DP rotary isolator switch			
13	Weather proof enclosure			
14	Luminaires: Type PL & PL1			

Item	Material	Make or trade name	Country of origin	SABS
17	Luminaires: Type D			
24	Luminaires: Type PNL1			
25	Luminaires: Type PNL2			
27	Luminaires: Type EXIT			
28	PVC SWA cable			
29	Earth Rods			
30	Finials (lightning protection)			
31	Roof and down conductors (lightning protection)			

NOTE: Under no circumstances will the tenderer be permitted to deviate from the materials specified above unless agreed in writing, by the Engineer, prior to award of tender.

PART 2: ELECTRICAL INSTALLATION

SPECIFICATION FOR ELECTRICAL WORK

GENERAL

1 TESTS

The Contractor shall provide all instruments and equipment required for testing and any water, power and fuel required for the commissioning and testing of the installations at completion.

2 MAINTENANCE OF INSTALLATIONS

With effect from the date of the First Delivery Certificate the Contractor shall at his own expense undertake the regular servicing of the installation during the maintenance period and shall make all adjustments necessary for the correct operation thereof.

The Contractor's liability in respect of defects.

If during the said period the installation is not in working order for any reason for which the Contractor is responsible, or if the installation develops defects, he shall immediately upon being notified thereof take steps to remedy the defects and make any necessary adjustments.

Should such stoppages however be so frequent as to become troublesome, or should the installations otherwise prove unsatisfactory during the said period the Contractor shall, if called upon by the Representative / Agent or the Director-General, at his own expense replace the whole of the installations or such parts thereof as the Representative/Agent or the Director-General may deem necessary with apparatus specified by the Representative / Agent or the Director-General.

3 REGULATIONS

The installation shall be erected and tested in accordance with the following Acts and regulations:
The latest issue of SANS 10142: "Code of Practice for the Wiring of Premises",
The Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended,
The Local Government Act 1998(Act 10 of 1998) as amended and the municipal by-laws and any special requirements of the local supply authority,
The Fire Brigade Services Act 2000 (Act 14 of 2000) as amended,
The National Building Regulations and Building Standards Act 1996 (Act 29 of 1996) as amended,
The Post Office Act 1998 (Act 124 of 1998) as amended,
The Electricity Act 1996 (Act 88 of 1996) as amended and
The Regulations of the local Gas Board where applicable.

4 NOTICES AND FEES

The Contractor shall give all notices required by and pay all necessary fees, including any inspection fees, which may be due to the local Supply Authority.

On production of the official account, the Department will refund the net amount of the fee charged by the Supply Authority for connection of the installation to the supply mains, to the Contractor.

5 SCHEDULE OF FITTINGS

In all instances where schedule of light, socket outlet and power points are attached to or included on the drawings, these schedules are to be regarded as forming part of the specification.

6 QUALITY OF MATERIALS

Only materials of first-class quality shall be used and all materials shall be subject to the approval of the Department. Departmental specifications for various materials to be used on this Contract are attached to and form part of this specification.

Wherever applicable the material is to comply with the relevant South African National Standards,

specifications, or to British Standard Specifications, where no SABS Specifications exist.

Materials wherever possible, must be of South African manufacture.

7 CONDUIT AND ACCESSORIES

The type of conduit and accessories required for the service, i.e. whether the conduit and accessories shall be of the screwed type, plain-end type or of the non-metallic type and whether metallic conduit shall be black enamelled or galvanised, is specified in Part 2 of this specification.

Unless other methods of installation are specified for certain circuits, the installation shall be in conduit throughout. No open wiring in roof spaces or elsewhere will be permitted.

The conduit and conduit accessories shall comply fully with the applicable SABS specifications as set out below and the conduit shall bear the mark of approval of the South African National Standards.

Screwed metallic conduit and accessories: SANS 60614, parts 1 and 2
Plain-end metallic conduit and accessories: SANS 60614, parts 1 and 2
Non-metallic conduit and accessories: SANS 950

All conduit fittings, except couplings, shall be of the inspection type. Where cast metal conduit accessories are used, these shall be of malleable iron. Zinc base fittings will not be allowed.

Bushes used for metallic conduit shall be brass and shall be provided in addition to locknuts at all points where the conduit terminates at switchboards, switch-boxes, draw-boxes, etc.

Draw-boxes are to be provided in accordance with the “Wiring Code” and wherever necessary to facilitate easy wiring.

For light and socket outlet circuits, the conduit used shall have an external diameter of 20mm. In all other instances the sizes of conduit shall be in accordance with the “Wiring Code” for the specified number and size of conductors, unless otherwise directed in part 2 of this specification or indicated on the drawings.

Only one manufactured type of conduit and conduit accessories will be permitted throughout the installation.

Running joints in screwed conduit are to be avoided as far as possible and all conduit systems shall be set or bent to the required angles. The use of normal bends must be kept to a minimum
with exception of larger diameter conduits where the use of such bends is essential.

All metallic conduits shall be manufactured of mild steel with a minimum thickness of 1,2mm for plain-end conduit and 1,6mm in respect of screwed conduit.

Under no circumstances will conduit having a wall thickness of less than 1,6mm be allowed in screeding laid on top of concrete slabs.

Bending and setting of conduit must be done with special bending apparatus manufactured for the purpose and which are obtainable from the manufacturers of the conduit systems.

Damaged conduit resulting from the use of incorrect bending apparatus or methods applied must on indication by the Department’s inspectorate staff, must be completely removed and rectified and any wiring already drawn into such damaged conduits must be completely renewed at the Contractor’s expense.

Conduit and conduit accessories used for flameproof or explosion proof installations and for the suspension of luminaires as well as all load bearing conduit shall in all instances be of the metallic screwed type.

All conduit and accessories used in areas within 50 km of the coast shall be galvanised to SABS standards.

Tenderers must ensure that general approval of the proposed conduit system to be used is obtained from the local electricity supply authority prior to the submission of their tender. Under no circumstances will consideration be given by the Department to any claim submitted by the Contractor, which may result from a lack of knowledge in regard to the supply authority’s requirements.

8 CONDUIT IN ROOF SPACES

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,5m by means of saddles screwed to the roof timbers. Nails or “crampets” will not be allowed.

Where non-metallic conduit has been specified for a particular service, the conduit shall be supported and fixed with saddles with a maximum spacing of 450mm. The Contractor shall supply and install all additional supporting timbers in the roof space as required.

Under flat roofs, in false ceilings or where there is less than 0,9m of clearance, or should the ceilings be insulated with glass wool or other insulating material, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.

Conduit runs from distribution boards shall, where possible terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards.

9 SURFACE MOUNTED CONDUIT

Wherever possible, the conduit installation is to be concealed in the building work; however, where unavoidable or otherwise specified under Part 2 of the specification, conduit installed on the surface must be plumbed or levelled and only straight lengths shall be used.

The use of inspection bends is to be avoided and instead the conduit shall be set uniformly and inspection coupling used where necessary.

No threads will be permitted to show when the conduit installation is complete, except where running couplings have been employed.

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

Conduit is to be run on approved spaced saddles rigidly secured to the walls.

Alternatively, fittings, tees, boxes, couplings etc., are to be cut into the surface to allow the conduit to fit flush against the surface. Conduit is to be bedded into any wall irregularities to avoid gaps between the surface and the conduit.

Crossing of conduits is to be avoided; however, should it be necessary purpose-made metal boxes are to be provided at the junction. The finish of the boxes and positioning shall be in keeping with the general layout.

Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

Distribution boards, draw-boxes, industrial switches and socket outlets etc., shall be neatly recessed into the surface to avoid double sets.

In situations where there are no ceilings the conduits are to be run along the wall plates and the beams.

Painting of surface conduit shall match the colour of the adjacent wall finishes.

Only approved plugging materials such as aluminium inserts, fibre plugs, plastic plugs, etc., and round-head screws shall be used for fixing saddles, switches, socket outlets, etc., to walls, wood plugs and the plugging in joints in brick walls are not acceptable.

10 CONDUIT IN CONCRETE SLABS

In order not to delay building operations the Contractor must ensure that all conduits and other electrical equipment, which are to be cast in the concrete columns and slabs, are installed in good time.

The Contractor shall have a representative in attendance at all times when the casting of concrete takes place.

Draw-boxes, expansion joint boxes and round conduit boxes are to be provided where necessary. Sharp bends

of any nature will not be allowed in concrete slabs.

Draw and/or inspection boxes shall be grouped under one common cover plate and must preferable are installed in passages or male toilets.

All boxes, etc., are to be securely fixed to the shuttering to prevent displacement when concrete is cast. The conduit shall be supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete slabs and/or beams.

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

11 FLEXIBLE CONNECTIONS FOR CONNECTING UP OF STOVES, MACHINES, ETC.

Flexible tubing connections shall be of galvanised steel construction, and in damp situations of the plastic sheathed galvanised steel type. Other types may only be used subject to the prior approval of the Department's site electrical representative.

Connectors for coupling onto the flexible tubing shall be of the gland or screw-in types, manufactured of either brass or cadmium or zinc plated mild steel, and the connectors after having been fixed onto the tubing, shall be durable and mechanically sound.

Aluminium and zinc alloy connectors will not be acceptable.

12 WIRING

Except where otherwise specified in Part 2 of this specification, wiring shall be carried out in conduit throughout. Only one circuit per conduit will be permitted.

No wiring shall be drawn into conduit until the conduit installation has been completed and all conduit ends provided with bushes.

All conduits are to be clear of moisture and debris before wiring is commenced.

Unless otherwise specified in Part 2 of this specification or indicated on the service drawings, the wiring of the installation shall be carried out in accordance with the "Wiring Code". Further to the requirements concerning the installation of earth conductors to certain light points as set out in the "Wiring Code", it is a specific requirement of this document that where plain-end metallic conduit or non-metallic conduit has been used, earth conductors must be provided and drawn into the conduit with the main conductors to all points, including all luminaires and switches throughout the installation.

Wiring for lighting circuits is to be carried out with 1.5mm² conductors and a 1.5 mm² earth conductor. For socket outlet circuits the wiring shall comprise 2.5mm² conductors and a 2.5mm² earth conductor.

In certain instances, as will be directed in Part 2 of this specification, the sizes of the aforementioned conductors may be increased for specified circuits. Sizes of conductors to be drawn into conduit in all other instances, such as feeders to distribution boards, power points etc., shall be as specified elsewhere in this specification or indicated on the drawings. Sizes of conductors not specified must be determined in accordance with the "Wiring Code".

The loop-in system shall be followed throughout, and no joints of any description will be permitted.

The wiring shall be done in PVC insulated 600/1000 V grade cable to SANS 1411.

Where cable ends connect onto switches, luminaires etc., the end strands must be neatly and tightly twisted together and firmly secured. Cutting away of wire strands of any cable will not be allowed.

13 SWITCHES AND SOCKET OUTLETS

All switches and switched-socket outlet combination units shall conform to the Department of Public Works Quality Specifications and be SABS accredited.

No other than 16A 3 pin sockets are to be used, unless other special purpose types are distinctly specified or

shown on the drawings.

All light switches shall be installed at 1,1m above finished floor level and all socket outlets at 300mm above finished floor levels unless otherwise specified in the Schedule of Fittings which forms part of this specification or alternatively the height of socket outlets may be indicated on the drawings.

14 SWITCHGEAR

Switchgear, which includes circuit breakers, iron-clad switches, interlocked switch-socket outlet units, contactors, time switches, etc., is to be in accordance with the Departmental Quality Specifications which form part of this specification and shall be equal and similar in quality to such brands as may be specified.

For uniform appearance of switchboards, only one approved make of each of the different classes of switchgear mentioned in the Quality Specifications shall be used throughout the installations.

15 SWITCHBOARDS

All boards shall be in accordance with the types as specified, be constructed according to the detail or type drawings and must be approved by the Engineer before installation.
In all instances where provision is to be made on boards for the supply authority's main switch and/or metering equipment the contractor must ensure that all requirements of the authorities concerned in this respect are met.
Any construction or standard type board proposed as an alternative to that specified must have the prior approval of the Engineer.

All busbars, wiring, terminals, etc., are to be adequately insulated and all wiring is to enter the switchgear from the back of the board. The switchgear shall be mounted within the boards to give a flush front panel.

Cable and boxes and other ancillary equipment must be provided where required.

Clearly engraved labels are to be mounted on or below every switch. The working of the labels in English and Afrikaans is to be according to the layout drawings or as directed by the Department's representative and must be confirmed on site. Flush mounted boards to be installed with the top of the board 1.5m above the finished floor level.

16 WORKMANSHIP AND STAFF

Except in the case of electrical installations supplied by a single-phase electricity supply at the point of supply, an accredited person shall exercise general control over all electrical installation work being carried out.

The workmanship shall be of the highest grade and to the satisfaction of the Department.

All inferior work shall, on indication by the Department's inspecting officers, immediately be removed and rectified by and at the expense of the Contractor.

17 CERTIFICATES OF COMPLIANCE

On completion of the service, a certificate of compliance must be issued to the Department's Representative / Agent, in terms of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).

18 EARTHING OF INSTALLATION

Main earthing

The type of main earthing must be as required by the supply authority if other than the Departments, and in any event as directed by the Department's representative, who may require additional earthing to meet test standards.

Where required an earth mat shall be provided, the minimum size, unless otherwise specified, being 1,0m x 1,0m and consisting of 4mm diameter hard-drawn bare copper wires at 250mm centres, brazed at all intersections.

Alternatively, or additionally earth rods or trench earths may be required as specified or directed by the Department's authorised representative.

Installations shall be effectively earthed in accordance with the “Wiring Code” and to the requirements of the supply authority. All earth conductors shall be stranded copper with or without green PVC installation.

Connection from the main earth bar on the main board must be made to the cold water main, the incoming service earth conductor, if any and the earth mat or other local electrode by means of 12mm x 1,60mm solid copper strapping or 16mm² stranded (not solid) bare copper wire or such conductor as the Department’s representative may direct. Main earth copper strapping where installed below 3m from ground level, must be run in 20mm diameter conduit securely fixed to the walls.

All other hot and cold-water pipes shall be connected with 12mm x 0,8mm perforated for solid copper strapping (not conductors) to the nearest switchboard. The strapping shall be fixed to the pipework with brass nuts and bolts and against walls with brass screws at 150mm centres.

In all cases where metal water pipes, down pipes, flues, etc., are positioned within 1,6m of switchboards an earth connection consisting of copper strapping shall be installed between the pipework and the board.

In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each distribution board.

Roofs, gutters and down pipes

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10mm² copper conductors, shall be installed over the full length of the ceiling void, fixed to the top purlin and connected to the main earth conductor and each switchboard.

The roof and gutters shall be connected at 15m intervals to this conductor by means of 12mm X 0,8mm copper strapping (not conductors) and galvanised bolts and nuts. Self-tapping screws are not acceptable. Where service connections consist of underground supplies, the above requirements are not applicable.

Sub-distribution boards

A separate earth connection shall be supplied between the earth busbar in each sub-distribution board and the earth busbar in the Main Switchboard. These connections shall consist of bare or insulated stranded copper conductors installed along the same routes as the supply cables or in the same conduit as the supply conductors. Alternatively, armoured cables with earth continuity conductors included in the armouring may be utilised where specified or approved.

Sub-circuits

The earth conductors of fall sub-circuits shall be connected to the earth busbar in the supply board in accordance with SANS 10142.

Ring Mains

Common earth conductors may be used where various circuits are installed in the same wire way in accordance with SANS 10142.

In such instances the sizes of earth conductors shall be equivalent to that of the largest current carrying conductor installed in the wire way, alternatively the size of the conductor shall be as directed by the Engineer.

Earth conductors for individual circuits branching from the ring main shall be connected to the common earth conductor with T-ferrules or soldered.

The common earth shall not be broken.

Non-metallic Conduit

Where non-metallic conduit is specified or allowed, the installation shall comply with the Department’s standard quality specification for “conduit and conduit accessories”.

Standard copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including metal switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaires, etc. The

securing of earth conductors by means of self-threading screws will not be permitted.

Flexible Conduit

An earth conductor shall be installed in all non-metal flexible conduits. This earth conductor shall not be installed externally to the flexible conduit but within the conduit with the other conductors.

The earth conductor shall be connected to the earth terminals at both ends of the circuit.

Connection

Under no circumstances shall any connection points, bolts, screws, etc., used for earthing be utilised for any other purpose. It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed where these are not provided.

Unless earth conductors are connected to proper terminals, the end shall be tinned and lugged.

19 MOUNTING AND POSITIONING OF LUMINAIRES

The Contractor is to note that in the case of board and acoustic tile ceilings, i.e. as opposed to concrete slabs, close co-operation with the building contractor is necessary to ensure that as far as possible the luminaires are symmetrically positioned with regard to the ceiling pattern.

The layout of the luminaires as indicated on the drawings must be adhered to as far as possible and must be confirmed with the Department's representative.

Fluorescent luminaires installed against concrete ceilings shall be screwed to the outlet boxes and in addition 2 x 6mm expansion or other approved type fixing bolts are to be provided. The bolts are to be ¾ of the length of the luminaires apart.

Fluorescent luminaires to be mounted on board ceilings shall be secured by means of two 40mm x No. 10 round head screws and washers. The luminaires shall also be bonded to the circuit conduit by means of locknuts and brass bushes. The fixing screws are to be placed ¾ of the length of the fitting apart.

Fluorescent luminaires to be mounted on roof trusses shall be secured by means of two 40mm x No. 10 round head screws and washers. The luminaires shall also be bonded to the circuit conduit by means of locknuts and brass bushes. The fixing screws are to be placed ¾ of the length of the fitting apart

Earth conductors must be drawn in with the circuit wiring and connected to the earthing terminal of all fluorescent luminaires as well as other luminaires exposed to the weather in accordance with the "Wiring Code".

Incandescent luminaires are to be screwed directly to outlet boxes in concrete slabs. Against board ceilings the luminaires shall be secured to the brandering or joists by means of two 40mm x No. 8 round head screws.

PART 2B

SPECIFICATION FOR ELECTRICAL WORK

INSTALLATION DETAILS

1 CABLE SLEEVE PIPES

Where cables cross under roadways, other services and where cables enter buildings, the cables shall be installed in high-density polyethylene pipes.

The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

2 NOTICES

The Contractor shall issue all notices and make the necessary arrangements with Supply Authorities, the Postmaster-General, S.A. Transport Services, Provincial or National Road Authorities and other authorities as may be required with respect to the installation.

3 ELECTRICAL EQUIPMENT

All equipment and fittings supplied must be in accordance with the attached quality specification (Part 3 of this document), suitable for the relevant supply voltage, and frequency and must be approved by the Department's representative.

4 DRAWINGS

The drawings generally show the scope and extent of the proposed work and shall not be held as showing every minute detail of the work to be executed.

The position of power points, switches and light points that may be influenced by built-in furniture must be established on site, prior to these items being built in.

5 BALANCING OF LOAD

The Contractor is required to balance the load as equally as possible over the multiphase supply.

6 SERVICE CONDITIONS

All plant shall be designed for the climatic conditions appertaining to the service.

7 SWITCHES AND SOCKET OUTLETS

The installation of switches and socket outlets must conform to clause 13 of Part 1 of this specification. All switches shall be rectangular in shape.

8 LIGHT FITTINGS AND LAMPS

The installation and mounting of luminaires must conform to clause 19 of Part 1 of this specification.

All fittings to be supplied by the Contractor shall have the approval of the Department; all lamps shall bear the approved mark of the SABS, and shall have the British light centre length.

The light fittings must be of the type specified in the Schedule of Light Fittings.

9 EARTHING AND BONDING

The Contractor will be responsible for all earthing and bonding of the building and installation. The earthing and bonding is to be carried out strictly as described in clause 18 of Part 1 of this specification and to the satisfaction of the Department's representative.

10 MAINTENANCE OF ELECTRICAL SUPPLY

All interruptions of the electrical supply that may be necessary for the execution of the work will be subject to prior arrangement between the Contractor and the user Department.

11 EXTENT OF WORK

The work covered by this Contract comprises the complete electrical installation, **(including a 12-month defects liability period)**, as further detailed in this specification.

Contractor to refer to the attached drawings detailing the scope of all the work required. The Electrical Contractor shall include for all items necessary to complete the work. The contractor is to allow for the stripping of the existing installation when required.

The work covered by this contract comprises the supply, installation, testing, commissioning and three (3) months guarantee, of the complete electrical engineering services installation, in working order, as shown on the drawings and as per this specification.

The Works involved and for which the Electrical Contractor must allow is briefly as follows, namely:

- Low Voltage Distribution Boards inside the building
- LV Cable supplies and installation
- Light fitting installation external and internal.
- Switches, socket outlets and isolators.
- Power skirting.
- Cable trays, wiring channels and wire mesh cable trays.
- Access Control systems.
- UPS system.
- ICT system
- Fire detection system.
- Electrical supply for HVAC systems.
- Earthing systems and additional earthing as may be required by the Engineer.
- Core Drilling on existing walls and slabs
- Testing of the works together with the Engineer.
- Provision of Certificates of Compliance as per Sectional Completion
- Danger signs and notices in terms of OHS Act.
- Submission of 3 sets of “As Built" information, operational- and maintenance manuals for the additional work.

All other materials, equipment, labour and services necessary for the complete, safe and efficient operation of the Works in full accordance with the specifications as laid down in this document.

The following work is excluded and shall be executed by others, namely: Patching and plastering conduit chases (chasing to be carried out and left in a suitable manner)..

12 SITE CONDITIONS

Location

Fort Cox Agriculture and Forestry Training Institute
Cwaru location
Middledrift
Eastern Cape

GPS Coordinates:
lat 32°46’ 57.00”S
lon 27°01’ 40.00”E

Access

Access to the site is via a tired road

13 PROGRAMME

The Electrical Contractor will be appointed as a Sub-contractor to the Builder.
The Electrical Contractor will be expected to comply with the Main Contractor's programme.

The cost of overtime, additional labour and plant necessary for the completion of the Works in accordance with the programme shall be included in the Electrical Contractor's tender price for the Works.

14 DESCRIPTION OF BUILDINGS

All buildings are indicated on the site plan.

15 ELECTRICAL DISTRIBUTION BOARDS

All electrical distribution boards shall be purpose made boards; supplied and installed in accordance with the attached Standard Technical Specifications and the single line diagrams and shall comply with SANS 10142.

All circuit breaker sizing and design has been done using CBI specifications for Heinemann 5kA breakers.

Each DB shall have sufficient ways for each circuit neutral and each circuit earth wire. Doubling up of circuits will not be accepted. Each DB shall have 20% additional spare space for future circuits.

All Main Switches shall be clearly marked "MAIN SWITCH" and the necessary warning labels installed at the switch.

All circuit breakers for mechanical equipment to be of D curve type with orange handle.

Each section of the DB shall be provided with a legend card holder with a clear perspex front. Each circuit breaker shall be clearly numbered in accordance with the single line diagrams. Corresponding numbers and circuit descriptions shall be clearly printed or typed on the legend cards.

Where existing DB's are to be modified to accommodate new switchgear, such work shall be neatly carried out and paint work reinstated on completion.

Sufficient matching paint shall be provided to allow for the touching up of scratches etc. encountered on site.

In addition to clause 14 and clause 15 of Part 1 of this specification the following shall be applicable to switchboards required for this installation.

Refer to the Summary of Switchgear and Circuits for the minimum fault level rating of specified equipment.

16 CONDUIT AND WIRING

Conduit and conduit accessories shall be galvanised plain end conduit in accordance with SANS 60614.

All conduits, regardless of the system employed, shall be installed strictly as described in the applicable paragraphs of clauses 4 to 8 of Part 1 of the specification. Wiring of the installation shall be carried out as directed in clause 9 Part 1 of this specification.

The Contractor shall ensure that the minimal, preferably none, services i.e. conduit and wiring, are to be installed within the ceiling voids. Wherever possible, the services shall be chased, or cast into, the concrete slabs and walls.

All LV single core conductors shall be of the PVC insulated type rated at 600 V general service duty, colours being red, white and blue for phases, black for neutrals and green/yellow for earth.

No openly installed "surfix" or twin and earth will be permitted unless otherwise authorized by the Engineer prior to installation.

The Electrical Contractor shall allow for chasing in of conduits from the position of all switch drops and switched socket outlets where these are being installed in new buildings.

Where new services are called for in existing buildings, conduits and equipment shall be of surface mounting type.

Flexible tubing or other Engineer approved method shall be used for:
Expansion joint crossings
Connections to hot water cylinders and stoves

No conduit smaller than 20mm diameter shall be permitted. All conduits shall be of the metal type and pre-painted either electric orange for service buildings or white for the houses. Only purpose made bends will be accepted for conduits of 32 diameter or larger. The conduit shall be installed using the loop-in method. Draw boxes in ceilings will not be accepted.

Galvanised conduits shall be installed in the walls for fire detection and protection installations.

No single core conductors will be permitted on open channels and cable ladders.
All wiring in flammable areas shall be done using approved flameproof cable with copper conductors.

Joints in wiring are to be avoided as best as possible. Where unavoidable joints shall be made using ferrules crimped with a proper crimping tool and insulated with heat shrink insulation of the correct grade for the voltage and amperage of the system.

17 TELEPHONE INSTALLATION

Unless otherwise specified, telephone and data outlets shall each comprise of a 100 x 100 conduit box with a white cover plate. The telephone cover plate shall be provided with an RJ11 socket outlet and the data cover plate with an RJ45 socket outlet.

All conduits for telephone and data services shall be 25mm diameter and draw wires shall be drawn into all of these wireways.

18 EXCAVATIONS AND RELATED WORKS

For further details refer to “Low Voltage Cables”.

PVC sleeves shall only be installed where the cable installation passes beneath paved walkways / parking area, etc., as indicated on the attached drawings.
The sleeves shall be manufactured from a high-density polyethylene with a double wall construction, allowing a corrugated outer wall finish and a smooth inner wall finish.

19 LOW VOLTAGE CABLES AND EARTH CONTINUITY CONDUCTORS

The Contractor shall supply and completely install all distribution cables as indicated on the drawings, and listed in the Schedule of Cables.

The storage, transportation, handling and laying of the cables shall be according to first class practice, and the contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operations.

The cable-trenches shall be excavated to a depth of 0.9m deep below ground level and shall be 450mm wide for one to three cables, and the width shall be increased where more than three cables are laid together so that the cables may be placed at least two cable diameters apart throughout the run. The bottom of the trench shall be level and clean and the bottom and sites free from rocks or stones liable to cause damage to the cable.

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

In the trenches the cables shall be laid on a 75mm thick bed of earth and be covered with a 150mm layer of earth before the trench is filled in.

All joints in underground cables and terminations shall be made either by means of compound filled boxes according to the best-established practice by competent cable jointers using first class materials or by means of approved epoxy-resin pressure type jointing kits such as “Scotchcast”. Epoxy-resign joints must be made entirely in accordance with the manufacturer’s instructions and with materials stipulated in such instructions. Low tension PVC SWA cables are to be made off with sealing glands and materials designed for this purpose, which must be of an approved, make. Where cables are cut and not immediately made off, the ends are to be sealed without delay.

The laying of cables shall not be commenced until the trenches have been inspected and approved. The cable shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused and must be adequately supported at intervals during the whole operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed to approval after drawing in of the cables.

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

On each completed section of the laid and jointed cable, the insulation resistance shall be tested to approval with an approved “Megger” type instrument of not less than 500 V for low tension cables.

Earth continuity conductors are to be run with all underground cables constituting part of a low-tension distribution system. Such continuity conductors are to be stranded bare copper of a cross-sectional area equal to at least half that of one live conductors of the cable, but shall not be less than 4mm² or more than 70mm². A single earth wire may be used as earth continuity conductor for two or more cables run together, branch earth wires being brazed on where required.

The cable installation shall be kept at a minimum distance of 0.5mm from the edge of the foundation of the boundary wall and or building walls. Deviations from this shall be confirmed by the Representative / Agent.

The cable installation shall be complete with concrete cable markers, positioned every 30 meters, or at every change in direction, whichever, is the lesser.

Cable warning tape (“skull and crossbones” danger tape) shall be installed 150mm above the cable installation.

19.1 Laying, Jointing and Making off of Electrical Cables

The requirements specified hereafter, are aimed essentially at high tension cable but are also valid for low tension cable, where applicable.

1. The use of the term “Inspector” includes the engineer or inspector of the Department or an empowered person of the concerned supervising consulting engineer’s firm.

2. No cable is to be laid before the cable trench is approved and the Contractor and inspector agree upon the soil qualification of the excavation.

3. After the cable has been laid and before the cable trench is back-filled the inspector must ensure that the cable is properly bedded and that there is no undesirable material included in the bedding layer.

4. All cable jointing and the making off of the cables must only be carried out by qualified experienced cable jointers. Helpers of the jointers may not saw, strip, cut, solder, etc. The cable and other work undertaken by them must be carried out under the strict and constant supervision of the jointer.

5. Before the Contractor allows the jointer to commence with the jointing work or making off of the cable (making off is recognised as half a joint) he must take care and ensure:

   a) That he has adequate and suitable material available to complete the joint properly and efficiently. Special attention must be given to ensure the cable ferrules and cable lugs are of tinned copper and of sufficient size. The length of the jointing lugs must be at least six times the diameter of the conductor,

   b) That the joint pit is dry and that all loose stones and material are removed,

   c) That the walls and banks of the joint pit are reasonable firm and free from loose material, which can fall into the pit,

   d) That the necessary cofferdams or retaining walls are made to stop the flow of water into the joint pit,

   e) That the joint pit is provided with suitable groundsheets so that the jointing work is carried out in clean conditions,

   f) That the necessary tents or sails are installed over the joint pit to effectively avert unexpected rainfall and that sufficient light or lighting is provided,

   g) That the necessary means are available to efficiently seal the jointing or cable end when an unexpected storm or cloudburst occurs, regardless of how far the work has progressed,

   h) That the cables and other materials are dry, undamaged and in all respects are suitable for the joint work or making off,

   i) That the heating of cable oil, cable compound, plumbers' metal and solder is arranged that they are at the correct temperature when required so that the cable is not unnecessary exposed to the atmosphere and consequently the ingress of moisture (care must be taken of overheating)

   Flow temperatures of cable oil and compound must be determined with suitable thermometers. Cable oil and compound must not be heated to exceed the temperatures given on the containers and precaution must be taken to ensure that the tin is not overheated in one position. The whole mass must be evenly and proportionally heated.

   (Temperatures of solder and plumbers' metal may be tested with brown paper (testing time: 3 seconds). The paper must colour slightly - not black or burnt).

6. Before the paper insulated cables are joined, they must be tested for the presence of moisture by the cable jointers test. This consists of the insertion of a piece of un-handled insulated impregnated paper tape in warm cable oil heated to a temperature of 130 ± 5°C.

   Froth on the surface of the oil is an indication that moisture is present in the impregnated insulation and the amount of the froth gives an indication of the moisture present.

7. If the cable contains moisture or is found to be otherwise unsuitable for jointing or making of the inspector is to be notified immediately and he will issue the necessary instruction to cope with the situation.

8. The joint or making off of paper-insulated cables must not be commenced during rainy weather.

9. Once a joint is in progress the jointer must proceed with the joint until it is complete and before he leaves the site.

10. The jointer must ensure that the material and his tools are dry at all times, reasonably clean and absolutely free from soil.

11. Relating to the jointing of the cable the following requirements apply:

    a) All jointing must be carried out in accordance with recognised and tried techniques and comply strictly with the instructions given by the supplier of the jointing kit.

b) The cables must be twisted by hand so that the cores can be joined according to the core numbers. If necessary, the cable is to be exposed for a short distance to accomplish this. Under no circumstances may the cores in a joint be crossed so as to enable cores to be joined according to the core numbers. If it is not possible to twist the cables so that the preceding requirements can be met, then cores are to be joined in the normal way without any consideration of the core numbers.

c) Normally the cables will have profile conductors. The conductors shall be pinched with gas pliers to form a circular section, bound with binding wire so that they do not spread, and then tinned before jointing.

d) Jointing ferrules, the length of which are at least 6 times the diameter of the conductors, must be slid over the conductor ends to be joined and pinched tightly. Then they are soldered by means of the ladle process whilst being pinched further closed.

Use resin only as a flux. The slot opening in the ferrule must be completely filled, including all depressions.

Remove all superfluous metal with a cloth dipped in tallow. Work during the soldering process must be from top to bottom. Rub the ferrule smooth and clean with aluminium oxide tape after it has cooled down to ensure that there are not any sharp points or edges.

NB: The spaces between the conductor strands must be completely filled by soldering process and must be carried out quick enough to prevent the paper insulation from burning or drying out unnecessarily.

e) After the ferrules have been rubbed smooth and clean, they and the exposed cores must be treated with hot cable oil (110°C) to remove all dust and moisture. These parts are to be thoroughly basted with the oil.

f) The jointer must take care that his hands are dry and clean before the joint is insulated. Also, the insulating tape, which is to be used, must first be immersed in warm cable oil (110°C) for a sufficient period to ensure that no moisture is present.

g) After the individual cores have been installed, they must be well basted with hot cable oil and again after the applicable separator and/or belt insulation tape is applied before the lead joint sleeve is placed in position

h) The lead joint sleeve must be thoroughly cleaned and prepared before it is placed on the cable and must be kept clean during the whole jointing process. Seal the filling apertures of the sleeve with tape until the sleeve is ready for compound filling.

i) The plumbing joints employed to solder the joint sleeve to the cable sheath, must be cooled off with tallow and the joint sleeve is to be filled with compound while it is still warm. Top up continuously until the joint is completely filled to compensate for the compound shrinkage.

The outer joint box must be clean and free from corrosion. After it has been placed in position it must be slightly heated before being filled with compound. Top up until completely full.

As far as cable end boxes are concerned, the requirements as set out above are valid where applicable.

20 SCHEDULE OF ELECTRICAL DISTRIBUTION BOARDS

Board	Type	Panel	Fault Level (kA)	Load (kW)
KIOSK 1	Floor Standing Kiosk – 3CR12	Normal	10	50
DB-GH	Flush Mounted, metal with doors	Normal	10	50

21 SCHEDULE OF CABLES

Supply, install and connect cables as indicated on the single line diagrams.

FROM	TO	SIZE AND TYPE	LOAD (kW)
MINI-SUB	KIOSK 1	50 mm^2 4-core PVC SWA PVC cable + 25 mm^2 BCEW	50
KIOSK1	DB-LH	50 mm^2 4-core PVC SWA PVC cable + 25 mm^2 BCEW	50

22 SWITCHGEAR AND CIRCUITS

The single line diagrams show all circuits and types of switchgear required. All Circuit Breakers used for motors, a D-Curve Breaker with orange handle is to be used.

23 SCHEDULE OF LIGHT FITTINGS

In addition to the clauses in Part 1, the luminaires shall comply with the following:

TYPE	***DESCRIPTION***
PLN1	White 35 LED 600mm x 600mm recessed light fitting with minimum of 3500 Lumen output (4000k). **Similar or equal to Beka Dari or Regent Lighting Luxon prism**
PNL2	White 35 LED 1200mm x 600mm recessed light fitting with minimum of 5000 Lumen output (4000k). **Similar or equal to Beka Dari or Regent Lighting Luxon prism**
D	White 12W (4000K) Ceiling Mounted 125mm Downlight. **Similar or equal to Regent Lighting's Luxon round.**
PL	20W LED (4000K) round wall mounted Bulkhead (Black Trim).**Similar or Equally Approved by Electrical Engineer or Architect to BEKA series 20 or Regent Lighting's Geo**
PL1	20W LED (4000K) round Ceiling mounted Bulkhead (White Trim).**Similar or Equally Approved by Electrical Engineer or Architect to BEKA series 20 or Regent Lighting's Geo**
BR	Recessed night light with 4W LED and dali control gear. **Similar or Equally Approved by Electrical Engineer or Architect to Regent Lighting's Lotis frame or** ILM/LOTIS/4W/4000K
EXIT1	LED Emergency Exit Sign: Single-sided wall mounted, with 1hr battery backup. **Similar or Equally Approved by Electrical Engineer or Architect to Beka Lisu-P**.

24 MOTION SENSORS

Motion / Occupancy Sensors shall be of the following type and manufacture.

a) 360º PIR Presence Detectors

Ceiling Mounted PIR Presence Detectors. Similar or equally approved by Electrical Engineer or Architect to **CP Electronics' EBDSPIR** and **EBDSM.**
Compact PIR detectors with automatic control for lighting, heating and ventilation loads. Shall be able to mount either flush into a ceiling tile or using a surface mounting box. The optional infrared remote handset allows the user to override the set up on some models. To be fully programmable using either the UHS5 or UNLCDHS handsets.

Key features:

- Switching with lux level sensing
- Programmable via our programming handset
- Absence detection functionality
- User handset available to control on/off and lux levels
- Time delay : 10s–99m

- Low profile design
- Self-contained unit
- Infrared programmable
- 5 year warranty included
- 2 channel
- IP40 rating

25 UNINTERRUPTIBLE POWER SUPPLY (UPS)

This contract includes the supply, delivery, installation and commissioning of all uninterrupted power supplies as specified in this document. The UPS will act as back up supply for the Security Management System.

25.1 QUALITY, STANDARDS AND REGULATIONS

All material and equipment supplied for this contract shall be new and the best of their respective kind. All new materials and equipment supplied, shall comply fully with the Department of Public Works requirements and guidelines. The whole of the works shall be executed in accordance with best practice and to approval of the Engineer. The equipment shall comply with the latest issues of the following standard specifications:

25.2 SOUTH AFRICAN BUREAU OF STANDARDS

SANS 150 Insulated wire.
SANS 1091 Colour standards for paint.
SANS 10142 Wiring code of practice.
SANS 1474 UPS units.

25.3 REGULATIONS AND RIGHTS OF ENGINEER

Apart from any other authority, which the Engineer may have in terms of the contract, he shall have the right to set the standard and to accept or reject part of the specified equipment depending on the quality of material and workmanship offered.

The Contractor shall be notified if the quality of such materials and/or workmanship is not acceptable. In such an event, the Contractor shall replace the specific part or repair it to the satisfaction of the Engineer, all at the cost of the Contractor. Such an instruction shall not exempt the Contractor from any of his obligations in terms of the contract.

The installation shall be erected and carried out in accordance with:

a) The Basic Conditions of Employment Act and the Machinery and Occupational Safety Act of 1983, as amended.

b) All local by-laws and Regulations as well as the regulations of the local Supply Authority.

c) The local Fire regulations.

d) The Regulations of the Department of Posts and Telecommunications.

e) The Standard Regulations of any Government Department or public service company where applicable.

In addition the Contractor shall at his cost issue all notices in respect of the installation to the local authorities, and shall exempt the client from all losses, costs or expenditures which may arise as a result of the Contractor's failure to comply with the requirements of the regulations enumerated above.

It shall be assumed that the Contractor is conversant with the above-mentioned requirements. Should any requirements, by-law or regulation, which contradicts the requirements of this document, apply or become applicable during erection of the installation, the Contractor shall immediately inform the

Engineer of such a contradiction. Under no circumstances shall the Contractor carry out variations to the installation in terms of such contradictions without obtaining the written permission to do so from the Engineer.

Definitions

a) **UPS** shall denote the complete UPS unit with associated controls, remote alarm panel and batteries and any accessories required by the system for its successful operation.

b) **Power Converter Module** shall denote a rectifier, battery charger, inverter, electromechanical by-pass switch and manually operated by-pass switch.

c) **Rectifier** shall denote that portion of the converter module containing the equipment and controls to convert the incoming AC power to regulated DC power required by the inverter.

d) **Inverter** shall denote that part that converts the DC supplied by the rectifier to AC satisfying the load requirements.

e) **Electro-mechanical** by-pass static switch shall denote a by-pass system provided break free switching from inverter to mains operation and vice versa.

f) **Battery charger** shall denote that portion of the power converter module containing the equipment and controls to convert the incoming AC power to precisely regulated DC power required for battery charging.

g) **Critical load** denotes the load as presented to the UPS by the computer or other load requiring constant supply and associated circuits and apparatus.

h) **Mean-Time-Between-Failure (MTBF)** shall denote an overall MTBF of the UPS as a complete system.

i) **A system failure** shall denote any interruption to, or degradation of the critical load bus voltage or frequency beyond the limits set forth herein.

j) **Efficiency** shall denote the ratio of real output power (kW) to real input power (kW) with the UPS operating at a defined load power at the defined power factor, the battery fully charged and with nominal input voltage.

25.4 SYSTEM REQUIREMENTS

4.1 Input to the UPS

a)	Nominal Input Voltage	–	400V 3PH
b)	Input frequency	–	45 - 65 Hz
c)	Input Connections	–	Hard Wire 5-wire (3PH + N + G)
d)	Input voltage range for main operations	–	340 - 477V
e)	Input voltage adjustable range for mains operation	–	323 - 437 (380V), 340 - 460 (400V), 357 - 477 (415V)V
f)	Input Total Harmonic Distortion	–	Less than 5% for full load
g)	Type of Input Protection Required	–	gL fuse
h)	Other Input Voltages	–	380, 415
i)	Maximum Input Current	–	10.0A
j)	Input Power Factor at Full Load	–	0.99

4.2 Output to Load

a)	Output power capacity	–	4.0 KWatts / 5 kVA
b)	Max Configurable Power (Watts)	–	4.0 KWatts / 5 kVA
c)	Nominal Output Voltage	–	400V 3PH

d)	Output Voltage Note	–	Configurable for 380 : 400 or 415 V 3 Phase nominal output voltage
e)	Output Voltage Distortion	–	Less than 5%
f)	Output Frequency (sync to mains)	–	50/60 Hz +/- 5%
g)	Output Frequency (not synced)	–	60Hz +/- 0.1% for 60Hz nominal, 50Hz +/- 0.1% for 50Hz nominal
h)	Other Output Voltages	–	380, 415
i)	Load Crest Factor	–	2.5 : 1
j)	Topology	–	Double Conversion Online
k)	Waveform type	–	Sine wave
l)	Overload Operation	–	60 seconds @ 120% and 30 seconds @ 145%
m)	Maximum Output Current	–	87
n)	Output Connections	–	(1) Hard Wire 5-wire (3PH + N + G) (Battery Backup)
o)	Output Voltage THD	–	< 3% linear load and <5% non-linear load
p)	Output Voltage Tolerance	–	+/- 2% static and 100% load step

4.3 **Batteries & Runtime**

a)	Battery type	–	No internal battery - uses external battery system
b)	Nominal Battery Voltage	–	+/-192 V (split battery referenced to neutral)
c)	Expected Battery Life (years)	–	3 - 5
d)	End of Discharge Battery Voltage	–	+/-154 V
e)	Overload Operation	–	60 seconds @ 120% and 30 seconds @ 145%
f)	Efficiency	–	View Efficiency Graph

4.4 **Overall Performance**

Efficiency (overall) : 80 - 85%

4.5 **Ambient Operating Conditions**

a)	Operating Environment	–	0 - 35 °C
b)	Operating Relative Humidity	–	0 - 95 %
c)	Operating Elevation	–	0-3000meters
d)	Storage Temperature	–	-10 - 60 °C
e)	Storage Relative Humidity	–	0 - 95 %
f)	Storage Elevation	–	0-9000meters
g)	Audible noise at 1 meter from surface of unit	–	53.6dBA
h)	Online thermal dissipation	–	2479.0BTU/hr
i)	Protection Class	–	IP 20

4.6 **System Description**

The system shall consist of a static UPS complete with the following components:

a) Rectifier/charger.
b) Inverter.
c) Battery.
d) Automatic electronic no-break bypass circuit and switch.
e) Separate manual bypass switch.
f) Protective devices and measuring equipment.
g) The required controls and necessary equipment.

- The system shall be capable of providing an uninterrupted supply to the load with the output characteristics as specified for a minimum period in **minutes** for the times as specified elsewhere during a total mains failure (i.e. normal mains and standby generator supply failure). The batteries shall be rated at an AC load power factor of 0,8 lagging. The switchover time for Off Line UPS's shall be 4 ms or less.

- The complete system, including all controls shall be designed in such a way that the failure of any one vital central component will **NOT** cause a complete system failure. If necessary such a failure must be avoided by connecting the load directly to the mains by means of the bypass switch.

- The UPS shall operate satisfactorily synchronous with the mains supply even under severe conditions of up to 100% unbalanced load.

- The UPS shall be amply rated to carry the stated full load current. The UPS shall furthermore be capable of withstanding the following overloads:

  Static Overloads: 100% of full load continuously.
  125% of full load for 5 minutes.
  150% of full load for 2 minutes.
  165% of full load for 1 second with inductive decay after initial equipment switch on surge current.

  Dynamic Overload: 300% for less than 5 msec.
  1000% for less than 1 msec.

All component parts, cables and other connections shall be amply rated to withstand the overloads stated and maintain the input voltage **at the load** within the tolerances stated.

The equipment shall be designed for the maximum operating efficiency. The efficiency shall be determined when the system is delivering full load at 0.18 power factor with the batteries fully charged. The load required by the auxiliary equipment (controls, alarms, etc). Electronic switches and cabinet fan shall be included in his determination of overall efficiency. A typical test report clearly showing how the efficiencies are calculated shall be submitted with the tender.

It shall be the responsibility of the successful tenderer to ensure satisfactory operation of the complete system for the load to be supplied. It is, therefore, essential that the tenderer acquaint himself fully with typical load conditions before the tender closing date.

25.5 UPS POWER PLUG OUTLET

All UPS power plug outlets must be of the red non-standard 3-pin type with the earth pin not earthed to the plug baseplate to facilitate the installation of a single earth connection earthing system. Each socket outlet must be provided with a red plug top.

Each socket outlet must be labelled with an engraved label indicating the power circuit number to which it is connected.

25.6 DISTRIBUTION WIRING

All sub-distribution wiring circuits must be wired as follows:

Mains power plug circuits
4 mm^2 PVC/copper in red and black conductors and a 2,5mm^2 bare copper earth.

UPS power plug circuit
4 mm^2 PVC/copper in blue and black and a green PVC insulated 2,5mm^2 earth wire.

The black neutral conductors must be clearly labelled at each end as follows: "UPS" or "OKT"

UPS Earthing
The main earth bar must be connected to the insulated earth bar of the UPS via a removable copper link bar.

All UPS boards must have insulated earth bars, separately earthed to a clean 1,2m earth spike by means of 70mm^2 insulated earth to obtain at least one ohm at the UPS board.

25.7 TEST CERTIFICATES AND INSPECTIONS

The following tests are to be carried out:

a) After completion of the works and before first delivery is taken, a full test will be carried out on the installation for a period of sufficient duration to determine the satisfactory working thereof. During this period the installation will be inspected and the Contractor shall make good, to the satisfaction of the Representative/Agent, any defects which may arise.

b) The Contractor shall provide all instruments and equipment required for testing and any water, power and fuel required for the commissioning and testing of the installation at completion.

c) Test reports of both tests as specified under (a) and (b) are to be submitted to the Department.

25.8 GUARANTEE AND MAINTENANCE

The Contractor shall guarantee the complete plant for a period of twelve (12) months after first delivery has taken place.

If during this period the plant is not in working order, or not working satisfactorily owing to faulty material, design or workmanship, the Contractor will be notified and immediate steps shall be taken by him to rectify the defects and/or replace the affected parts on site at his own expense.

The Contractor shall maintain the plant in good working condition for the full twelve month period to the final delivery of the installation. However, should the Contractor fail to hand over the plant in good working order on the expiry of the specified twelfth months, the Contractor shall be responsible for further monthly maintenance until final delivery is taken.

During this period the Contractor will undertake to arrange that the plant be inspected at regular intervals (whatever number of visits the Contractor deems necessary to fully maintain the equipment) by a qualified member of his staff who shall:

a) Check the mechanical soundness of all parts

b) Check and adjust all the output and control values of the system (voltage, frequency, control voltages, etc.)

d) Take control measurements on the major system components and record these measurements.

e) Replace all defective components.

f) Service batteries.

g) Check ventilation UPS equipment.

h) Clean all equipment and/or rooms as required.

i) Provide 24 hour standby maintenance and repair service at all times, including statutory holidays.

NOTE: At each visit, which shall be arranged in advance with the client's representative, a record of maintenance carried out shall be kept. The time and date of visits shall be entered in a logbook, which shall be kept in the plant room.

25.9 MATERIALS AND WORKMANSHIP

a) The work throughout shall be executed to the highest standards and to the entire satisfaction of the Representative/Agent who shall interpret the meaning of the Contract Document and shall have the authority to reject any work and materials, which, in his judgement, are not in full accordance therewith. All condemned material and workmanship shall be replaced or rectified as directed and approved by the Engineer.

b) All work shall be executed in a first-class manner by qualified tradesman.

c) The Contractor shall warrant that the materials and workmanship shall be of the highest grade, that the equipment shall be installed in a practical and first-class manner in accordance with the best practices and ready and complete for full operation. It is specifically intended that all material or labour which is usually provided as part of such equipment as is called for and which is necessary for its proper completion and operation shall be provided without additional cost whether or not shown or described in the Contract Document.

d) The Contractor shall thoroughly acquaint himself with the work involved and shall verify on site all measurements necessary for proper installation work. The Contractor shall also be prepared to promptly furnish any information relating to his own work as may be necessary for the proper installation work and shall co-operate with and co-ordinate the work of others as may be applicable.

e) All components and their respective adjustment, which do not form part of the equipment installation work, but influence the optimum and safe operation of the equipment shall be considered to form part of, and shall be included in the Contractor's scope of works.

f) All control equipment and serviceable items shall be installed and positioned such that they will be accessible and maintainable.

g) The Contractor shall make sure that all safety regulations and measures are applied and enforced during the installation and guarantee periods to ensure the safety of the public and the User Client.

h) The Contractor is to include for all scaffolding required to complete the work required.

25.10 BROCHURES

Detailed brochures of all equipment offered shall be presented together with the tender documents.

25.11 SUBMITTALS

The following information must accompany the tender documents:

a) The information requested in the schedule of information.

b) A paragraph by paragraph schedule of compliance with detailed description of any deviations from this specification.

c) If alternative systems are offered, a clear description of the operating characteristics and special features of the equipment along with a motivation for offering the alternative.

d) Descriptive and illustrated brochures and other information pertaining to the inverter and ventilation equipment and switchgear.

e) The proposed layout as stated.

f) Arrangement of batteries.

g) A sample test report as stated.

h) The circuit diagram requested.

j) The information requested.

26 LIGHTNING PROTECTION

GENERAL SPECIFICATION

1. SATISFACTORY INSTALLATION

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

a) The latest SANS Code of Practice for the Protection of Structures against Lightning – SANS 1013, SANS 61024-1, 61024-1-1, SANS 61312-1, SANS 61662 & NRS 042

b) The Municipality By-Laws and any other special requirements as deemed necessary by the Local Supply Authority;

c) Local Fire Regulations.

2. SANS APPROVED DRAWINGS

SANS Approved drawings are not required for this project.

3 TEST ON COMPLETION

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

3.1 Earth Resistance Test

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

3.2 Electrical Continuity Tests

a) **External Down-Conductors**

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

b) **Metallic Services**

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

4. DESCRIPTION OF MATERIAL

4.1 Air Terminals and Down-conductors

All conductors must be in accordance with the requirements of BSS 1474 or American Standards Specification 6063. All aluminium conductors shall have a cross-section area of not less than 30mm^2 (domestic dwelling only) or 50mm^2 for all other applications. The dimensions of flat section conductors are to be 20mm x 3mm. Where conductors are mounted in stand-off guides, the cross-section area of the conductor must be not less than 70mm^2 to give adequate mechanical strength.

4.2 **Conductor Guides**

The conductor must be mounted in aluminium alloy guides conforming to the material specification given in 4.1 above. The guides must allow for free longitudinal movement of the conductor to cater for expansion and contraction of the system caused by temperature variation. The minimum thickness of any part of the guide shall not be less than 3mm. The guides must be securely attached to the structure using two stainless steel screws and plugs; the use of plated screws is not permitted.
The conductor system shall be supported in guides so that an air gap exists at all times between the aluminium and the surface of the structure, the guides being seated upon plastic or other similar insulation material. Should conductors be installed directly upon the surface of concrete or cement plaster, an insulating strip is to be installed over its whole length to prevent contact between the two surfaces. Guides shall be installed to support the conductor at intervals no exceeding 1.2 meters horizontally or 1,5 meters vertically.

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

4.3 **Expansion Loops**

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

4.4 **Protection of Down-conductors**

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

4.5 **Earthing Electrodes**

Earthing electrodes must consist of either copper-clad steel rods not less than 12mm in diameter and having a minimum copper thickness of 0,20mm driven into the ground, or a 50mm^2 (35mm^2 for domestic dwellings) bare copper conductor buried in a trench, or a combination thereof. Where copper clad steel electrodes are used, they must have a suitable bond between the steel core and copper exterior to prevent moisture ingress between the two metals.

Where it is necessary to extend earth rods, an electrolytically compatible corrosion resistant, coupling device, which prevents ingress or moisture into the joint shall be used. The copper conductor below the down-conductor joint shall be covered by a semi-rigid P.V.C. conduit for a distance of approximately 200mm above ground and 400mm below ground.

4.6 **Joints Above Ground**

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

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

Down-conductors are to be terminated approximately 200mm above finished ground level. Circular

section aluminium is to be jointed to a 50mm^2 (35mm^2 in the case of domestic dwellings) stranded copper conductor by securely crimping in place two heavily tinned lugs and bolting these together using 10mm diameter copper, brass or bronze nuts, bolts and washers.
N.B. Under no circumstances shall aluminium conductors be buried in the ground

4.7 Joints below Ground

A joint in the standard copper conductor which forms part of the earthing system must be made by using a crimped copper ferrule clamping (not lugs) using two copper line taps of suitable dimensions, or exothermic welding.

The copper earth conductor must be joined to an earth rod by either clamping, using a standard earth rod clamp or copper line tap or by exothermic welding. Joints, which are made between dissimilar metals, (i.e. copper conductor to galvanized steel water main) must be thoroughly cleaned before assembly. They shall be rendered watertight using waterproof adhesive tape on a suitable compound for a minimum distance of 200mm in all directions from the joint.

4.8 Bonds

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

5. GENERAL INSTALLATION PROCEDURE

5.1 Air Terminals for Non-metallic Pitched Roofs

Aluminium conductors are to be installed along all ridges of roofs and projections such as dormer windows, etc., terminating at the ends with conductors running downwards over the surface of the roof and the eaves. Non-metallic chimneys must be protected by means of a finial of sufficient length to cover the chimney within a 45^0 angle struck downwards from its point. Alternately it should have a conductor installed in the form of a closed loop upon the upper surface. The conductors are to follow the outer contour to the stack and must be bonded at a convenient point to the nearest component of the air terminal system.

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

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

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

a) Where the maximum distance from the ground level to the eaves of the building is less than 4 meters and the pitch of the roof is more than 1 in 2 (27˚ from the horizontal).
b) Where the maximum distances from ground level to the eaves is less than 7 meters and the pitch of the roof is more than 1 in 1,5 (34º from the horizontal).
c) Where the distance from the ground level to the eaves is more than 7 meters and the pitch of the roof is more than 1 in 1 (i.e. the included angle at the apex of the roof is less than 90º).

Under these circumstances eaves conductors need not be installed.

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

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

5.2 **Air Terminals for Metallic Pitched Roofs**

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

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

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

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

5.4 **Air Terminals for Non-metallic flat or Mono-pitched Roofs**

Metallic flat or mono pitched roofs do not require separate air terminal conductors, providing that there is electrical continuity between the metallic roofing sheets, (see5.2). A metallic roof surrounded by a non-metallic parapet wall shall have conductors installed at the top of the parapet wall and these must be bonded to the metallic roof at intervals not exceeding 20 meters. If the parapet wall is clad with metal over its upper surface or a handrail is installed which affords good electrical continuity, separate air terminal conductors need not be installed. Under these circumstances the metal handrail or cladding must be bonded to the metal roof covering at intervals not exceeding 20 meters.

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

5.5 **Down Conductors for Non-metallic Structures**

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

The lower ends of down conductors are to be terminated and bonded to the earthing system approximately 200mm above finished ground level. Under no circumstances must aluminium conductors be buried underground. Test joints must be provided between the down conductors and earthing system. Down conductors must run vertically between the air terminal and earthing systems. Where this is impracticable, their course may be deviated to run at any angle up to and including horizontal.
Where it is necessary to run conductors horizontally over the upper surface of a structural protrusion, such as an exposed concrete slab, the conductor may run down vertically over the edge of the slab and return to the main structure, so that the distance between the upper and lower conductors exceeds one third of the length of the horizontal run. Looped down conductors are not permitted. Down conductors must not run over the underside of large overhangs which are less than 6meters above ground level, or other areas where people are likely to be present during a thunderstorm.

External or internal metallic rainwater pipes may be used as down conductors providing these are of

substantial section and are joined by screwing one length into another or welding. Thin gauge galvanized steel pipes whose sections are held together by friction, rivets or screws must not form part of a lightning protection system.

5.6 Down conductors for reinforced concrete framed structures

The steel reinforced of this type of structure may be used in place of down conductors.

Where the reinforcing system is used, the air terminal system must be bonded to it a maximum of 30meter intervals using steel clamps. This bond may be achieved by clamping, with steel clamp, a steel conductor to a selected reinforcing bar, the opposite end of this conductor must terminate at a corrosion resistance metallic terminal such a Grade 316 stainless steel.

The reinforced system of prefabricated concrete buildings must not be used unless special provision is made for bonding the various prefabricated sections together.
The terminals should be mounted flush with the face of the concrete. An aluminium alloy bond must then be taken from the air terminal system and be connected to the stainless-steel terminal by means of a heavily tinned crimp lug for circular section aluminium, or a suitable bi-metallic joint in the case of flat section aluminium. A similar system must be used to bond the reinforcing system at ground level to the earthing system at points directly below the air terminal bonds. Here copper conductors must be used as the external bonding material.

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

5.7 Down conductors for steel framed structures

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

5.8 Earthing by means of vertically installed rod type electrodes

Rod-type electrodes must be driven into the ground at a position directly below each down connector. The maximum earthing resistance of each electrode or number of electrodes bonded to any one down conductor shall not exceed N X 30 ohms, where N equals the total number of down conductors which are bonded to a common air terminal system or 200 ohms whichever is the lower value.
The minimum horizontal separating distance between rod-type electrodes bonded together must not be less than their installed depth. The upper ends of installed rod-type electrodes are to be terminated approximately 500mm below finished surface level. A 50mm^2 copper bonding conductor must be installed to run between each earthing electrode system and the lower ends of the adjacent down conductors.

A joint is to be made between each of these bonding conductors and the down conductors at a position approximately 200mm above finished ground level. These bonding conductors must be installed in P.V.C. conduit securely affixed to the wall (see 3.4). The length of this P.V.C. conduit must be approximately 600mm and must be installed so that approximately 200mm protrudes above ground level, the remainder being buried into the soil.

5.9 Earthing by means of metallic water mains

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

5.10 Earthing by means of trench type electrodes

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

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

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

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

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

PART 2C

ELECTRICAL INSTALLATION

QUALITY SPECIFICATION FOR MATERIAL AND EQUIPMENT OF ELECTRICAL INSTALLATIONS

Below is a list of the contents of the quality specification. The specification has not been bound into this document but is available in part or in whole from the Department of Public Works or the Engineer upon request. The Electrical Contractor shall be deemed to know and understand the contents of the specification and no excuse will be considered for non-compliance with the specification.

CONTENTS

C 3.2.4 PARTICULAR SPECIFICATIONS

FIRE DETECTION INSTALLATION

SECTION 5: FIRE DETECTION INSTALLATION (MECHANICAL)

PART 1: GENERAL PROJECT SPECIFICATION

1 SCOPE OF WORK

1.1 The work covered by this Contract comprises the supply and complete Installation, including a twelve (12) months defects liability period as further detailed in the Detailed Specification below.

2 INSPECTION OF SITE

2.1 The Tenderers are advised to thoroughly acquaint themselves with the nature and extent of work to be done and to make allowance for items obviously intended and necessary for the proper completion of the Works, although not specified. Claims due to lack of knowledge will not be entertained.

3 COMPLIANCE WITH REGULATIONS, STANDARDS AND CODES

3.1 The Contractor shall arrange for the necessary inspection and testing after completion of the Works. All notices fees, including inspection and re-inspection are the responsibility of the Contractor and all relevant costs shall be borne by him.

3.2 Any items not specified, but reasonably assumed to be necessary, for the completion of the Works to recognised standards of workmanship and practice, shall be deemed to be included in the Contract.

3.3 The workmanship throughout the Works shall be to the satisfaction of the Employer and relevant codes of practice. Any materials or workmanship considered to be faulty or incorrectly or inadequately erected or repaired shall be substituted, altered or rectified to the satisfaction of the Employer without additional costs to the Employer.

3.4 The Contractor shall adhere to all the relevant regulations, standards and codes specified in this Tender Document.

4 SUPERVISION

4.1 The work shall at all times, for the duration of the contract, be carried out under the supervision of a competent representative of the Contractor, who should also be an Accredited Person registered as an Installation Technician in terms of the Occupational Health and Safety Act No. 85 of 1993, as amended.

4.2 The representative of the Contractor shall be able and authorised to receive and carry out instructions on behalf of the Sub-contractor.

5 PROGRAMME

5.1 The Contractor shall submit a programme for the Works within 14 days of receipt of the Letter of Acceptance of Tender and / or Letter of Commencement of Works and / or on receipt of an order as a domestic sub-contractor. The programme shall be co-ordinated and agreed by the Main Contractor prior to submitting it to the Engineer for approval.

5.2 The cost of overtime, additional labour and plant necessary for the completion of the Works in accordance with the Principal Contractor’s programme shall be included in the Contractor’s Tender Price for the Works.

6 SAMPLES AND ALTERNATIVES

6.1 The preferred manufacturer / makers of equipment and / or material are either as described in the Project Specification, the Standard Technical Specifications or as listed in the Schedule of Quantities.

6.2 The Employer reserves the right to specify the equipment and / or materials utilised in the Works. No alternatives to equipment and / or materials are to be used unless written approval is obtained from the Employer, or his Representative.

7 DEFINITIONS

7.1	Supply	To purchase, procure and deliver complete with all related specified accessories
7.2	Erect	To place or mount and fix in position
7.3	Install	To erect, connect up and commission, complete with related accessories
7.4	Indicated shown, Noted	As indicated or shown on drawings
7.5		Approved, Alternative Approved in writing by the Engineer.
7.6	Similar, Equal	Equal or better in efficiency of performance and compatibility

8 CONFLICT BETWEEN SPECIFICATIONS, SCHEDULE OF QUANTITIES AND DRAWINGS

8.1 The Tender drawings must be read in conjunction with the detailed specification and the Schedules of Quantities. Any conflict shall be considered in the following order of priority:

(i) Project Detailed Specifications
(ii) Drawings
(iv) Standard Technical Specifications
(v) Schedules of Quantities

Any discrepancies found must be reported to the Engineer prior to the closing of tenders. Failure to comply will be taken that all requirements have been met and no variations will be accepted.

8.2 Should the Contractor note an inconsistency between the Project Specifications, Standard Technical Specifications, and Drawings, he shall notify the Engineer immediately and obtain clarification or instructions prior to ordering or installing equipment.

9 DRAWINGS

9.1 Design (Tender Document) drawings are issued with this Tender Document, as per the Drawing Schedule. These are for information purposes and are to be read in conjunction with the Schedules of Quantities that form the basis of the Tender. Any obvious discrepancies found are to be brought to the attention of the Engineer prior to the submission of the tender.

9.2 The Contractor shall read the drawings in conjunction with the Architects and other Engineers drawings in order to ensure the correct positioning of outlets, plant and equipment.

9.3 Where room data sheets are provided the Contractor shall use these as a means of identifying and co-ordinating the installation with the other services. He shall advise the Engineer of any discrepancies found in the room data sheets and other services drawings prior to installation.

10 MEASUREMENT

10.1 At no time is the Contractor to scale drawings or to make any assumptions regarding measurements / dimensions. If in doubt, the Contractor is to obtain clarification from the Engineer.

11 MOVING OF EQUIPMENT

11.1 The Contractor shall investigate each space through which equipment must be moved. Where necessary, equipment shall be transported in sections of size suitable for moving through spaces available.

12 MISCELLANEOUS

12.1 Labels

a) Labels shall be installed as required in terms of the relevant codes of practice and as further specified in this Tender Document.

b) All labels shall be in English with capital letters, in black and on a white background, and a minimum of 4mm in height. All labels shall be of ivorine or plastic construction and riveted / screwed in place.

12.2 Danger Notices / Signage

a) The Contractor shall supply and install all danger, sub-station and safety notices and signs in terms of the relevant regulations.

b) All safety signage installed shall be in accordance with SANS 1186.

13 OPERATING INSTRUCTIONS, MAINTENANCE MANUALS AND RECORD DRAWINGS

13.1 The Contractor shall supply, after approval by the Engineer, three (3) bound sets of operating instructions, maintenance manuals and record drawings for the complete Fire Detection Installation, including the portions thereof completed by Specialist Contractors.

13.2 The provision of operation instructions, maintenance manuals and record drawings shall be inclusive of the demonstration of the specific portion of the Mechanical Engineering Services Installation by the Contractor and / or Specialist Sub-contractor and training of the Employer's representatives and staff members.

13.3 The Contract will not be accepted as complete until these have been supplied, and approved by the Engineer.

14 INSTALLATION DRAWINGS

14.1 Drawings shall be submitted in triplicate as soon as possible after the signing of the Sub-contract, but in ample time to allow the Engineers to examine and approve before equipment manufacture is started, or material delivered to site.

14.2 Should the Engineers require that any drawing be amended, the Contractor shall make the necessary alterations and re-submit the drawing within two weeks.

14.3 The Contractor shall provide the Principal Contractor and the Consulting Mechanical Engineers with complete layout, installation and shop drawings, together with any necessary descriptions and specifications. Sufficient details shall be given to permit a full appraisal of all parts of the installation and their relation to the building structure.

14.4 Drawings shall give full details of all foundations, ducts, chases, pits and openings and shall set out all lines and levels for the work.

14.5 Delays caused by the submission of drawings or by an error, omission or inadequacy in these drawings, shall not be considered a reason for an extension of the Sub-contract time.

15 TESTING AND COMMISSIONING

15.1 The Contractor shall carry out all tests required in terms of the relevant Acts, SANS Codes of Practice and Local Authority requirements. The Contractor shall provide all the equipment and apparatus required for the purpose of carrying out all necessary tests.

15.2 If any part of the Works fails the test, the Contractor shall be responsible for rectifying, at his own cost, the defective Works and the re-testing thereof to ensure compliance. If in consequence, the Engineers are obliged to attend the further acceptance tests the additional costs incurred by the Engineers shall be payable by the Contractor.

15.3 The Works shall be deemed to be practically complete only when the Engineer has approved all tests and inspections, and a Completion Advice Notice or other relevant completion notice is issued.

16 COMPULSORY FORMS AND CERTIFICATES

16.1 The Contractor shall submit the necessary commencement, compliance and completion forms for the installation as required in terms of the Occupational Health and Safety Act No. 85 of 1993, as amended, the relevant SABS Specifications and the requirements of the relevant Supply Authorities.

17 VARIATION ORDERS

17.1 Variations orders shall be ordered and processed in one of the following ways:

a) Issue of a revised drawing.
b) By Architect's Instruction.

17.2 The Contractor shall ensure that the above procedures have been followed prior to carrying out any work. Failure to comply may invalidate any claim for work done.

17.3 Unless otherwise agreed with the Engineer, all claims for variation orders shall be approved prior to proceeding with the relevant Works. The Contractor shall submit variation order claims to the Engineer for approval with the preceding monthly payment claim.

17.4 However, the Contractor shall only include the value of approved variation orders in any payment claim or invoice, once approved in writing by the Engineer. Variation order claims, which have not been approved, but are included in the monthly payment claim, will be deducted from the payment claim in question.

18 PAYMENT CERTIFICATES

18.1 The Fire Detection Contractor shall be entitled to submit monthly payment claims to the Principal Contractor.

18.2 The payment claim shall be set out in accordance with the Price Schedule.

MECHANICAL INSTALLATION AT FORT COX LECTURE ROOMS

FIRE DETECTION INSTALLATION

PART 2 STANDARD TECHNICAL SPECIFICATIONS

SECTION	DESCRIPTION
Section A3	Painting
Section GFD -	General Requirements for Early Warning Detection (EWD) Installation
Section EFD -	Electrical Installation for an Early Warning Detection Installation
Section MFD -	Maintenance for a EWD Installation
Section MM -	Operating and Maintenance Manuals
Section QFD -	General Equipment Specifications for Early Warning Detection (EWD) Installation

SECTION A3

PAINTING AND COLOUR CODING

1 GENERAL

1.1 No untreated metal surfaces shall be permitted on the project. Items which are not galvanised or similarly protected against rust and corrosion shall be painted.

1.2 All piping (with the exception of hot dipped galvanised copper and plastic/PVC), brackets and fixings, canvas covered insulation (where not clad with aluminium or galvanised sheet metal), unclad asbestos cement compound finish over insulation material, and surface mounted black conduits exposed to view shall be painted as specified below. Conduits not exposed to view need not be painted.

1.3 Where walls or ceilings which require to be painted, are to be inaccessible after the erection of equipment, the Contractor is to ensure that these are painted prior to his fixings taking place.

1.4 The surfaces of articles to be painted, which will be inaccessible after their erection, shall receive the full specified coating procedure before installation. This applies to fixing brackets bolted to the structure.

1.5 All preparation, treatment and painting shall be done in accordance with SANS 10064.

2 PAINTING

The minimum requirement for painting shall comprise the following consecutive processes:

- thoroughly clean, descale and degrease all surfaces
- apply one coat of the appropriate primer
- give one undercoat prior to erection
- touch up damaged undercoat after erection
- follow with two coats of enamel or suitable weather and/or heat resistant paint

3 SURFACE TREATMENT PRIOR TO PAINTING

3.1 Paint should not be applied over any surface containing traces of grit, grease, oil, loose rust, loose mill scale or corrosion products of any kind, nor to within 50mm of areas which are to be welded.

3.2 Welds and adjacent parent material shall be abrasive blasted and/or ground and all contaminants such as flux and weld spatter shall be removed prior to painting. Rust spots shall be removed by means of a wire brush or emery paper. The surrounding paint which is still intact shall be feathered for a distance of 50mm beyond the damaged area.

3.3 Spot priming and repair shall consist of all coats previously applied, and shall overlap the damaged area.

4 PAINTING ON GALVANISED SURFACES

4.1 Where further protection against corrosion is necessary, is specified, or is required for colour coding, the contractor shall proceed as follows:

- Surface to be thoroughly cleaned with a detergent chemical solution in accordance with SANS 10064 Code of Practice for the Preparation of Steel Surfaces for Coating.
- One coat of self-etching primer (Wash Primer) / (Metal Etch Primer)
- One coat of zinc chromate paint (Zinc Chromate Primers for Steel) Type II, Grade I
- One coat oleo-resinous, micaceous iron oxide paint to approved colour

- Two coats pure acrylic emulsion exterior or enamel paint.

4.2 All paints used shall be by the same and approved manufacturer and the Contractor shall ensure that the various paints are compatible with the other.

4.3 Surfaces exposed on galvanised material through cutting, drilling and/or pipe grips, shall be painted with Gallvalloy or similar.

5 COLOUR CODING

5.1 General

All equipment shall be colour-coded in accordance with standards recognised, and where possible, to comply with the relevant SANS colour codes, unless specified otherwise.

5.2 Identification of the contents of pipes shall 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 10140 Identification Colour Marking, Part III, Contents of Pipelines, as detailed below.

5.3 The colour names referred to in the tables are specified in SANS 1091 – National Colour Standard.

5.4 Colour bands shall be at intervals of not less than 6 m apart, but in any case, shall be adjacent to each side of bends, valves, etc. Where the run of pipes is hidden, i.e. within ducts, false ceilings etc. colour coding bands shall be provided opposite each access panel or equal.

5.5 A descriptive code indicator shall be used to describe the contents of the pipe where necessary. This shall give the name in full, or an abbreviation of the name, or by chemical formula or symbol, and where relevant, the pressure, temperature or flow direction. The characters are to be of a size suitable for legibility of the indicator. If the diameter of the pipe is too small to provide adequate legibility of a descriptive colour code indicator, the indicator is to be fixed to a plate, and the plate fixed firmly to the pipeline.

Arrows indicating the direction of flow of the contents of the pipe shall be applied as per colour coding bands.

IDENTIFICATION COLOUR MARKINGS PART 3: CONTENTS OF PIPELINES AS PER SANS 10140-3

CONTENTS OF PIPE	PRIMARY COLOUR	COLOUR BANDS
AIR		
• Compressed	Arctic Blue	Salmon Pink
• Instrument (pneumatics)	Arctic Blue	Primrose
• Vacuum	Arctic Blue	Black - White - Black
• Medical	Arctic Blue	-

N.B: Distinguish between high- and low-pressure medical air by superimposing the letter L or H as relevant.

FIRE FIGHTING		
• All pipes	Signal Red	-
WATER		
• Cold water (i.e. Drinkable)	Brilliant Green	-
• Hot Water	Brilliant Green	Crimson - Cornflower
• Boiler Feeder (Distilled)	Brilliant Green	Crimson - White - Crimson
• Boiler Feeder (Demineralised)	Brilliant Green	White
• Industrial	Brilliant Green	Gold Yellow

STEAM

• Steam Mains and Condensate Lines	Pastel Grey	-

ELECTRICAL

The base colour of electrical conduit, ductwork, distribution boards, etc., is to be Orange RAL 2000 or B26 Light Orange and shall be sub-divided with colour banding as follows:

• Power distribution	Electric Orange
• Fire alarm	Signal Red A II band
• Clock systems	Arctic Blue F 28 band
• Telephones GPO	White HG 100 band
• Data transmission	Jacaranda F 18 band
• Private telephones	Golden Brown B 13 band
• Intercom	Golden Yellow B 49 band

Bands are to be 25mm wide with a 2000mm pitch. PVC coloured tape may also be utilised.

OILS

• Diesel Fuel	Golden Brown	White
• Hydraulic Power	Golden Brown	Salmon Pink

GASES

• Acetylene	Light Stone	Maroon
• Argon	Light Stone	Peacock Blue
• Butane/Propane letters LPG/VPG)	Light Stone	Crimson (superimpose with the
• Carbon Dioxide	Light Stone	Light Brunswick Green
• Carbon Dioxide (Medical)	Light Stone	Light Brunswick Green - Green Light Grey
• Chlorine	Light Stone	Canary Yellow
• Hydrogen	Light stone	Poppy Red
• Nitrogen	Light stone	Light Grey - Black
• Nitrous Oxide	Light stone	Ultramarine
• Nitrous Oxide and Oxygen Mixed	Light Stone	White - Ultramarine
• Oxygen Light Stone	White	

The following pipe contents which have not been covered by SANS 10140 Part III have been based, where possible, on the colour coding specified by BSS.

CONTENTS OF PIPE	PRIMARY COLOUR	COLOUR BANDS
WATER		
• Drains Black	-	
• Chilled Water	Brilliant Green	Ultramarine
• Condenser Water	Brilliant Green	Arctic Blue
• Cooling Water	Brilliant Green	White - Arctic Blue -White
• High Temperature Hot Water	Pastel Grey	Brilliant Green

FIRE FIGHTING

Where more than one piped service is installed in a complex, the following pipe identification is to be employed

• Sprinklers	Signal Red	-
• Fire Hose Reels	Signal Red	Brilliant Green
• Hydrants	Signal Red	White - Brilliant Green
• CO2		Signal Red Light Stone - Light Brunswick Green
• Halon	Signal Red	Light Stone - Golden Brown

6 PLANT IDENTIFICATION

Wherever equipment rooms contain, and or switchboards serve multiple items or similar plant (e.g. run and stand-by pumps) each item shall be clearly identified. Generally a single numeral not less than 100 mm in height will suffice for this purpose. Such numeral may be stencilled directly on to the item in a contrasting colour, or a purpose made plate may be affixed to the unit. Self-adhesive numerals will not be accepted.

SECTION GFD

GENERAL REQUIREMENTS FOR AN EARLY WARNING DETECTION (EWD) INSTALLATION

1 GENERAL

The work shall be carried out strictly in accordance with:

1) Occupational Health & Safety Act 85 of 1993.
2) All relevant Regulations and Byelaws of the Municipal Council and Fire Department concerned.
3) The National Fire Protection Association (NFPA) No 12.
4) SANS 10139-1981 - Code of Practice for The Prevention, Automatic Detection and Extinguishing of Fire in Buildings.
5) SANS 50054 Parts 1 to 5, 7 and 11

Where no Building, Municipal, Health or Fire Department Act, Regulation, Byelaw or other requirement exist, nor any SANS standard or detailed requirement by the Engineers then the Contractor's terms of reference shall always be the current editions of NFPA Handbook.

All tests shall be to the satisfaction of the Consulting Engineer or his representative who shall have the right to inspect the installation at all reasonable hours during the progress of the works.

2 GUARANTEED PERFORMANCE

The system and individual items of the system shall be guaranteed by the Contractor to operate efficiently.

It is the Contractor's responsibility to establish, to the Engineer's satisfaction, that the installation performs as specified.

If at any time during the tender period or course of the contract the Contractor has any doubts about the specified installation he must check and if necessary, contact the Engineers in order to resolve the doubts.

Should it be established that the system is not sufficient, the Engineers may then issue a variation order to cover the cost of expanding the installation.

3 CO-ORDINATION

The Contractor shall be responsible for the co-ordination of his own work, and is to be mindful of co-ordination with all other services as regards both physical clashes and installation programme.

4 EMPLOYER TRAINING

A representative of the Contractor shall be available to instruct the proprietor's building maintenance staff (or his appointed representative) in the operation of his system, and to ensure that such persons are fully conversant with the control and operation of the system.

This instruction exercise is to take place prior to the system being left operational. The Engineers are to be informed in writing as to when this instruction period is scheduled to commence. Upon completion of the exercise the contractor is to obtain the Proprietor's representative's written acceptance of the hand-over tuition, thus acknowledging his complete understanding of the operational procedures for his installation.

5 RECORD DRAWINGS

The Contractor is responsible for the production of 3 copies of all Record drawings, which are to be included in the Operating and Maintenance Manuals.

These drawings are to illustrate any changes in the detector and other equipment layouts and the conduit layouts (if the conduiting required by the specialist fire services contractor differs from the consultant's layout). The record drawings are to include for control diagrams, board diagrams, and the detector layouts.

The Contractor shall provide a full set of drawings electronically on a disc and bound into the Operating and Maintenance Manuals.

6 OPERATING AND MAINTENANCE MANUALS

The Contractor is required to furnish the Operating and Maintenance Manuals as detailed in Part 4 Section MM. These are to be produced before the sub-contract will be passed by the engineers as complete and recommended for acceptance.

One draft copy of the manual is to be submitted to the offices of the Consulting Engineer for checking and acceptance.

If for any reason it is not possible to produce the completed manual by such date, an abbreviated draft copy of the operating instructions is to be issued to the client/tenant for his reference until the final copies are available.

In addition to the manuals he shall also provide a very simple operating instruction, on A4 or A5 paper sheet size, framed and mounted adjacent to the control console. This is to enable a non-technical person to operate the system. It shall give clear instructions of the procedures to be followed in the event of Fire and Fault alarms, how to isolate the system, to silence the alarms and how to reset the system following its activation.

Where necessary, the text of the instruction book shall be illustrated with photographs or drawings (reduced to A4 size) required for clear interpretation.

7 MAINTENANCE

The Contractor shall be responsible for maintaining the installation during the initial 12 months of operating of the plant. Unless otherwise specified this shall require service visits not less than 3 months apart. The costs of this initial 12 months maintenance shall be built into the contract price.

He shall service all the equipment supplied by him as normally required by the NFPA under a comprehensive maintenance contract.

The Contractor is to negotiate and formalise a Maintenance Contract Agreement at least 3 months prior to the expiry of the free maintenance period.

8 MAINTENANCE CONTRACT

A price, based on present-day rates, is to be inserted in the Priced Schedule page to indicate the charges of an annual maintenance agreement. This shall be the (present-day) charge for a service contract to commence on the completion of the 12 month guarantee (with free maintenance) period, and is required to give the client an indication of the anticipated charges involved. It is noted that this value will be escalated by a recognised formula.

This price will not form part of the tendered sum.

The details of the works to be carried out are to be based on the requirements as detailed under the Maintenance clause in Part 5 of this document.

Immediately following the service at the middle of the guarantee period, the Contractor is to submit a draft Maintenance Contract Agreement to the client, through the Engineer's, in order that a

maintenance contract (between Client and Contractor) can be formalised well in advance of the expiry date of the guarantee period.

9 TESTING

The Contractor will be responsible for the supply of all test equipment necessary to carry out all tests required.

Performance tests shall be carried out in the presence of the Consultants and, if required, the local Fire Department.
It must be emphasised that any tests applied without the air conditioning and/or ventilation in operation are initial only and final acceptance will only be taken after tests are carried out with those air handling plants in service.

The method of checking and testing the operation of the system shall be as follows:

1) **Ionisation and Optical Detectors**

Should an approved, suitable environmentally friendly pressurised gas testing dispenser be unavailable, sheets of newspaper shall be cut into strips and placed in a metal container. This container shall be placed on the floor of the room directly under the ionisation detector. The detector shall operate within 90 seconds of the paper being ignited and an alarm condition shall be extended to the control panel. The zone lamp applicable to area shall light, the alarm bell shall sound and the extension alarm panel, if supplied, shall indicate an alarm condition.

This test shall be repeated for each ionisation detector.

Care must be taken to avoid any damage to the floor as a result of heat being generated from the smoke source.

2) **Duct Mounted Detectors**

This type of detector is mounted in a duct of the air conditioning or ventilation plant.

If the air handling plant is not operational no test of this type of detector can be made. The test will have to be conducted at a later date.

The same type of smoke generation is to be employed for testing this type of detector.

If required, the operation of the detector must extend the alarm condition to the control equipment of the air conditioning plant when a relay shall operate to interrupt the power supply to the fan of the air conditioning plant. This interface is to be checked for correct operation.

3) **Heat Detectors**

Heat detectors are to be tested for operation by the application of a low powered heat source. Preference should be given to a 60 W lamp applied 100 mm below the detector head. The detector shall operate within 2 minutes.

The detector on operating shall extend alarm conditions and indications as specified for the ionisation detector operation.

This test must be repeated for each heat detector.

4) **Control Panel**

All the control panel alarms and facilities specified must be checked and tested for correct operation.

5) **Fire Brigade Signalling**

If an automatic link to the local Fire Station is specified, the activation of the alarm at the Station must be checked for correct operation following energisation of the smoke detection circuit or circuits.

10 STANDARDISATIONS OF EQUIPMENT

Equipment shall be made by one manufacturer when practicable. The Contractor shall not use items of different manufacture or type to perform the same function in different parts of the installation.

11 CONFLICT BETWEEN SPECIFICATIONS AND DRAWINGS

Should the Contractor note any inconsistency between the Specification and drawings he shall be responsible for notifying the Engineer and obtaining clarification or instructions prior to ordering or installing equipment.

12 DEFINITIONS

Supply	:	To purchase or procure and deliver complete with all necessary and additional specified accessories.
Erect	:	To place or mount and fix in position.
Install	:	To erect, connect up and commission, complete with related accessories.
Indicated, Shown, Noted	:	As indicated or shown on drawings.
or Equal Approved/	:	Equal or better in efficiency of performance and compatibility with installation.
or Other Approved	:	Approval to be sought prior to Tender Closing Date.

SECTION EFD

ELECTRICAL INSTALLATION FOR AN EARLY WARNING DETECTION INSTALLATION

1 GENERAL

1.1 All electrical equipment shall comply with the relevant SANS or BSS where applicable, and to SANS 10142, Code of Practice for the Wiring of Premises. Specifications to be in accordance with SANS 10139 AND SANS 50054 as applicable.

1.2 Material shall be subject to the approval of the Engineer, to whom samples shall be submitted upon request.

1.3 Cable sizes for each circuit shall be selected to ensure that the current carrying capacity will be adequate and that the voltage drop at the equipment served will comply with the Code of Practice for the Wiring of Premises.

1.4 Wiring shall be carried out in PVC insulated cables enclosed in Class B conduit or approved trunking. Alternatively, M.I.M.S., fire resistant cable, or PVCSWAPVC cable may be used where convenient, and where permitted under the section Wiring between Detection Zones hereunder.

1.5 All cables, cable trays, conduits (other than those encased in concrete or chased into walls), and cable trays shall run parallel with, or at right angles to the structure or walls. Their routes shall be co-ordinated with piping and duct systems. They may run on the surface of walls and ceilings in all plantrooms, in ceiling voids and in underfloor voids where permitted by the clause Wiring between Detection Zones. Elsewhere they shall be concealed in an approved manner.

1.6 No cable or electrical conduit shall run within 75 mm of a hot water pipe.

2 WIRING BETWEEN DETECTION ZONES

The control wires or power cables between the control panel, the battery pack, a detection zone or where the wiring of a detector circuit passes through any other detector zone, shall be one of the following:

2.1 Mineral insulated metal sheathed cable which shall be of BICC, Pyrotenax or other approved manufacture complying with BS 6207. The Contractor may be required to demonstrate to the Engineer that he is proficient in making off these types of cables.

2.2 PVC insulated annealed copper wire complying with SANS 1411-2, housed within conduits which are buried into cement or brickwork. Surface conduits between zones will not be permitted.

2.3 Fire resistant cables in compliance with SANS 1411-2 and SANS Method 494 Resistance of cables to Fire Propagation;

2.4 PVCSWAPVC cables and terminations complying with SANS 1411-2.

2.5 Aluminium cables will not be permitted.

3 CABLES AND WIRING

3.1 MIMS cables

MIMS cables shall be mineral insulated copper sheathed and copper core cables equal to pyrotenax of not less than 600 volt grade. Aluminium cables will not be permitted.

Minimum sizes for MIMS cables shall be 1,5 mm² for power and 1,00mm² for control wiring.

Tails shall be sleeved with silicone rubber insulation in appropriate colour.
All cable fixings shall be by means of factory manufactured brass or copper saddles or clips, secured by brass or cadmium plated screws. Clips or saddles shall be provided within 150mm of fittings, accessories or bends, and not more than 600mm apart elsewhere. No more than 4 cables shall be secured by a single saddle.

A straight length of cable shall be left adjacent to termination glands to enable the glands to be readily withdrawn. The cables shall be made-off with approved standard pot-type seals and accessories as applicable.

The minimum bending radius of cables shall be 6 times the cable diameter.

Where a number of cables run parallel, they shall be dressed into a neat symmetrical arrangement, without sagging or distortion. Care shall be taken to avoid flattening or indentation of cable sheaths. Where cables come into contact with dissimilar metals, which may give rise to corrosion, the Contractor shall adequately separate the surfaces with PVC tape or by other approved means.

Where cables pass through holes in metal-work, the holes shall be neatly bushed to prevent damage to the sheath.

Cables shall not be buried directly in plaster, concrete or similar materials. Where installation in these materials is necessary, the cables shall be enclosed in a suitable duct, pipe or conduit, which is provided with bushed ends to prevent damage to the cable sheath.

Cables shall be mechanically protected where they rise from floors in exposed positions and where they may be exposed to accidental damage.

3.2 PVC Insulated Wire

PVC insulated copper wire conductors shall be of South African origin, manufactured to comply with SANS 1411-2.

Where PVC insulated wires are used, the installation shall comprise PVC insulated copper conductors drawn into duct or conduit. Where such wires are drawn into conduits it shall be carried out in accordance with standard electrical practice, and shall be subject to the approval of the Engineer.

No joints in the PVC wires between terminal points will be permitted under any circumstances.

3.3 Fire Resistant Cables

The fire resistant cable shall be constructed of silicon rubber insulated copper conductors housed in a protective PVC sheath bonded to coated aluminium foil. This shall be as per Pirelli General HP60 Fire Resistant Cable or similar approved.

These cables shall be installed in the manner prescribed for MIMS cables, with attention being paid to any special requirements regarding terminations, radius of bends, etc. as prescribed by the manufacture.

No joints in this cable will be permitted.

3.4 Armoured Cables

PVCSWAPVC cables and cable terminations shall comply with SANS 1411-2 and shall be of 660 volt grade.

These armoured cables where permitted, may:

- lay flat on cable trays, fixed with approved ties

- where the cable tray is in the vertical, be held in position by approved straps. Fixing with wire is not permitted.
- be fixed to the masonry with saddles
- fixed to unistrut with the approved fixing saddles

Where the cable is in a ventilation air path (other than the underfloor void of a computer room) the outer PVC sheath is to be removed after fixing if so demanded by the local authorities.

No joints in PVC cables will be permitted under any circumstances.

The PVC cable glands shall consist of the brass cone type with waterproof seal, equal to "DESCO", and shall be suitable for PVCSWAPVC general purpose 660 volt grade cable.

4 CONDUITS

Conduit shall be heavy gauge welded screwed steel conduit to SANS 61035. Where moisture or condensation is to be expected galvanised conduit shall be used. Conduit shall be clean, true and free from internal obstructions. Burrs shall be removed with taper reamer. All free ends shall be fitted with approved bushes.

No conduit shall be less than 25mm nominal diameter.

No surface conduits, PVC conduits or box trunking will be permitted between two separate detection zones or between a detection and a non-detection zone. They can however be used within a single detection or gas protected zone to interconnect the detectors and other equipment housed within that zone.

The entire conduit system shall be watertight and electrically and mechanically continuous.

During installation, the ends of conduits shall be temporarily plugged to prevent the ingress of dirt and moisture.
Conduits shall be securely saddled along the length of the run and saddles shall be provided within 150mm of all fittings or terminations.

Sets and bends shall be made cold with approved bending machines in such a manner that there is no damage to or distortion of the conduit. In locations where it is not practicable to use sets for changes in direction, such changes shall be made by the use of approved screwed fittings. All sets and bends shall be such that they permit cables to be drawn easily into the conduits after installation. All junction boxes provided to facilitate the drawing-in of cables shall be located in positions which will be readily accessible in the completed project. Inspection fittings shall not be used as "Loop-in" points.

The whole conduit installation shall be a "Loop-in" installation.

Conduits shall be installed in such a manner that they are free from mechanical stress.

No threads shall be visible after erection, other than at running joints.

Running threads shall be thoroughly painted.

Final connections to plant (other than in cases where the items can be mounted directly to termination boxes) shall be run to a junction box adjacent to the item of equipment.

Flexible conduit connections are to be installed between the round terminal box adjacent to a ceiling void detector and its ceiling mounted remote indication lamp. The flexible conduit plus the PVC wires contained therein shall be left sufficiently long to allow for the location of the lamp in the centre of a

ceiling tile (which may not fall directly beneath the terminal box). There shall be no stress imposed on the flexible conduit.

Before the drawing in of any conductors the conduit installation shall be complete with lock-nuts, bushes and all other accessories in accordance with standard electrical practice. Conduits shall be cleaned out and swabbed dry internally.

5 CABLE TRAYS

Cable trays shall be of Pyrotenax, Unistrut or other approved manufacture.

The size and gauge of all trays shall be chosen to suit each particular application. They shall be adequately stiffened and braced both traversely and longitudinally, ensuring a true finished run.

All screws, washers, nuts, etc. used in the installation of the trays shall be cadmium plated.

All trays, fittings, brackets, etc. shall be galvanised or electro-tinned and where exposed shall be cleaned and painted with one coat galvanize primer, one coat universal undercoat and two coats of enamel paint to the agreed colour or as per statutory requirements.

All trays shall be supported by brackets at intervals sufficiently small to produce a robust installation and to ensure that there is no perceptible deflection of the finished tray and its associated supports.

All bends, tee-offs, changes in section and changes in direction shall be made with factory finished fittings. All joints shall be made with approved jointing plates. Lapped joints will not be permitted.

6 TRUNKING

Trunking shall be manufactured from galvanised sheet metal of a thickness not less than 1mm for runs, and 1,6mm for bends, off-sets, reducing pieces, etc. Trunking shall comply with BS 4678.

Covers shall be of the same material as the trunking and shall not exceed 1,2m in length.

All screws, nuts, washers, etc. shall be cadmium plated.

The trunking and covers shall be braced as necessary to ensure rigidity, and the open side of the trunking shall be provided with right angled returns to receive the covers. The covers shall be securely fixed to the trunking by means of approved clips or fasteners.

The trunking shall be supported on brackets at intervals sufficiently small to produce a robust rigid installation and to ensure that there is no perceptible deflection of the trunking between supports.

All bends, tee-offs, changes in section and changes in direction shall be made in factory-manufactured fittings. All joints shall be butt joints, made with internal fishplates. Lapped joints will not be permitted. Screws shall be cut off flush with the top of the nuts after erection, and shall be filed smooth and painted.

The trunking is to be cut square where cutting is necessary for jointing etc. Cut edges shall be smoothed off with a file.

Plastic trunking may be permitted at the Engineers discretion and subject to his approval of the specific material offered.

7 SWITCHBOARDS

7.1 General

Switchboards shall comply with BS 5486.

All cubicle metalwork shall have a painted finish. The edges of all cut-outs and openings in the sheet metal shall be smoothed and painted. Each item of equipment shall be labelled as described later in this section. The switchboard shall be wall mounted and constructed in sheet metal of not less than 1,6mm thick, attached by continuous welds to a rigid, welded frame.

In general equipment is to be mounted behind an escutcheon plate fixed to the main body of the cubicle. Relays and fuses are to be mounted inside the lower section of the cubicle on approved steel panels or racks.

Pilot lights, pushbuttons etc. required for operating the system shall be mounted on the escutcheon plate, and shall be to the Engineers approval.

The escutcheon plate is to hinge outward or downward to give access to the wiring. It shall seat on a rubber or neoprene gasket which shall form an effective dust seal, and shall be flush with the face of the cubicle when in the closed position. Hinges shall be fully concealed and the panel held in the closed position by means of an approved key operated barrel lock.

Wiring to equipment mounted on the escutcheon plate shall be neatly loomed to allow the plate to swing open on its hinges. Where the plate hinges downward a suitable chain shall be attached to prevent the escutcheon plate from opening more than 90° to the panel.

The escutcheon plate shall be constructed of rigid sheet steel, and shall lie flat without buckling or bowing, and shall be finished to the Engineers approval.

In general silk screened natural anodised aluminium face plates sandwiched on top of the steel escutcheon plate will be preferred.

Outgoing circuits shall terminate on numbered terminals.

7.2 Labels

Each item of equipment on a switchboard shall be labelled to indicate its function, by means of a label of white traffolyte or equivalent material, bearing black, engraved letters and numbers.

Labels shall be neatly and securely attached to the switchboard close to the equipment designated, with chrome-plated, self-tapping screws or escutcheon pins. The use of adhesive labels will not be permitted.

Where suitable label holders are provided on items of equipment, traffolyte labels may be inserted in them.

All contactors, switches and other items of equipment not mounted on the control panel shall be labelled as described above.

Labelling of the escutcheon plate will be by silk screening or similar approved method.

7.3 Isolators

The isolation switches shall be of the Microgap quick make, slow break type suitable for mounting flush in the control panel. The switch shall have silver contacts.

7.4 Contactors

All contactors shall be fitted with solid silver contacts and shall be free of contact rebound. These shall be designed free of screw and rivet connections and have sturdy magnets. All contactors shall have arc quenching chutes and be rated for the applied circuit voltage. All contactors are to be similar or equal to "Sprecher and Schuh".

All contactors and relays shall be rated for AC-3 duty.

8 CONTROL PANELS

8.1 General

The control panel shall be wired in the factory and not on site. The only connections to be made in the panel on site shall be the interconnection with the field wiring.

All outgoing circuits shall terminate on numbered terminals with approved lugs where the numbers correspond to those reflected on the as-built drawings. Wires within the cubicle shall bear an identification number at both ends. Numbering shall be by approved wiring ferrules securely attached so that they will not slip off when the wire is removed from its terminal. The numbering shall correspond to the drawings. Handwritten numbers or adhesive tape bearing numbers will not be acceptable.

Outgoing circuits may leave the control panel either through the top or bottom, and provision shall be made for the neat attachment of conduit and trunking, or for glanding MIMS or PVC cables. Inside the cubicle wiring shall run in plastic wiring duct, arranged vertically and horizontally.

The Contractor shall submit catalogue information on the general appearance of the control panel offered at the time of tender. Fully detailed shop drawings shall be submitted to the Engineer for his approval prior to the commencement of manufacture of the panel.

8.2 Construction

Modular construction shall be used with plug in panels each capable of handling the required number of detectors per zone.

The control unit shall be wall mounted and of robust and modern construction.

A door covering the full width of the unit shall be provided. Suitable apertures covered with coloured translucent material shall be fitted to coincide with the positions of the alarm lamps in the unit.

To prevent tampering by unauthorised staff a Yale type lock (with two keys supplied) shall be fitted to the door.

8.3 Labelling and Instructions

All zone functions, lamps and controls shall be permanently marked. Marking shall consist of silkscreened lettering, etching, anodising or engraving. Dymo tape or other similar adhesive labels are not acceptable, separate labels may be used but shall be attached by screws or rivets. All labelling shall be in English and Afrikaans.

8.4 Features

The control unit shall provide adequate power for detector and alarm circuits, be capable of receiving and transmitting "FIRE" and "FAULT" conditions and be self-monitoring against equipment failure. Sufficient spare ways for future extensions must be provided.

8.5 **Alarms and Facilities**

The following alarms and facilities shall be provided:

a) A low voltage power supply to each zone to power the detector heads.

b) Monitoring of each zone against open circuit conditions and fault alarm indication

c) Receipt and indication of alarm condition from detector heads

d) A test switch on each plug-in zone module with the following facilities:

- Normal
- Isolate Zone
- Test fault circuit
- Test alarm circuit

e) Alarm and fault indication lamps and alarm bell

f) Monitoring of common audible alarm circuits against open circuitry and indication of fault

g) An alarm, coupled to a bell, on the activation of one detector circuit of a zone

h) If required a coincidence feature whereby another alarm will sound when the second detector circuit of a zone is activated (ie that zone wired for "double-knock" monitoring). This other audible alarm is to be either a siren or warbler.

i) Relays to operate illuminated warning signs, visual lamp indication and audible alarm initiations (if required).

j) Supervision of the automatic system to operate audible and/or visual alarms indicating a failure of the following devices:

- Electrical Supply
- Batteries and/or trickle charger
- Detectors
- Relays
- Illuminated warning signs
- Visual lamp indicators

k) Electrical supply isolation with alarm reset to facilitate maintenance.

l) Lamp test facility to test all lamps and light emitting diodes.

m) Alarm bell silencing facility (Note: The alarm bell shall re-sound should a fresh alarm condition arise).

n) Reset button to reset a zone (or to check the alarm condition).
The buttons or switches provided for the three items above (ie, 15, 16 and 17) shall be non-locking.

o) Facilities to extend "FIRE" and/or "FAULT" alarms to the fire brigade or to another building (if required).

9 POWER SUPPLY

Unless otherwise specified, a 15 amp 220/1/50 (2 wire) separately protected supply (terminating in an isolator in the vicinity of the battery charger) will be provided.

SECTION MFD

MAINTENANCE FOR AN EARLY WARNING DETECTION INSTALLATION

1 GENERAL

The Contractor shall be responsible for carrying out regular inspections of the installation during the term of the 12 month guarantee and maintenance period. Such services shall be at intervals of not greater than 3 months. He shall service all the plant and equipment supplied by him as detailed below and as is normally carried out under a comprehensive maintenance contract as required by the NFPA.

The Contractor shall prepare a detailed inspection service report sheet showing the functions to be carried out and the intervals between such functions to enable records of servicing to be maintained. This sheet shall have spaces for the signatures of both the Contractor's serviceman and the Proprietor to verify that the maintenance duties have been carried out.

Each service is to be undertaken in the presence of a representative of the client or tenant.

2 THREE MONTHLY SERVICE

- Check control equipment
- Check system functions for normal operations
- Check fire brigade signalling (if applicable)
- Check all lamps in visual indicators and control desk
- Check all audible alarms
- Check fire evacuation speech system (if applicable)
- Check battery, electrolyte level of accumulators and charging unit
- Check random detectors and end of line units for operation. At least one detector of each detection circuit is to be tested each 3 monthly service and each detector tested is to be logged on a maintenance sheet in order to ensure that within a 6 month period every detector will have been tested.

3 SIX MONTHLY SERVICE

In addition to the items listed under the 3-monthly works the following is to be undertaken:

- Test all detectors outstanding to ensure all detectors have been tested within the 6 month period.

4 ANNUAL SERVICE

At intervals not exceeding 12 months the following are to be undertaken in addition to the items specified under the two services listed above.

- All detectors to be taken down and cleaned, and tested after reinstallation
- Test the interface controls with the other services.

SECTION MM

OPERATING AND MAINTENANCE MANUALS

1 GENERAL

The Contractor is required to furnish 3 sets of Operating and Maintenance Manuals and supply these to the Consulting Engineers.

2 PREPARATION OF THE MANUAL

The manuals shall be prepared within the contract, and shall be particular to the project. All charges that may be required by manufacturers suppliers for the provision of information and literature shall be included in the contract price.

The manual shall be arranged with an index and referencing system. A matching flysheet will give the names and addresses of the principals involved on the project.

The covers shall be hard bound with a four post loose leaf system. The contract details shall be embossed on the front cover. Numbered card dividers shall be inserted between the sections.

The completed set of manuals shall be provided to the Engineers at practical completion. A draft text of the manual shall be issued for approval.

3 CONTENTS OF OPERATING AND MAINTENANCE MANUAL

The format of the manual shall be in accordance with the following sections, after a preface and index.

Section 1:

This shall comprise the introduction, abbreviations, and any warnings that may be required by the Machinery and Occupational Safety Act, Local Authorities and other such bodies.

Section 2:

A full description of each system, together with the main plant components and locations, plus the mode of operation of automatic control systems associated with such system shall be reflected in this section.

Section 3:

This shall comprise the complete plant technical data of each item of equipment (eg manufacturers name and address, type and size of unit, serial number, bearing pulley and belt details, motor details, unit performance and duty details). This information shall be derived from a site inspection of identification plates together with information obtained from manufacturers.

Section 4:

This section shall describe in detail the operating procedures necessary for starting up, running and shutting down each individual system. This shall include the control panel starter and selection facilities together with any alarm and safety interlocks as identified on the control panels.

Section 5:

This shall comprise the maintenance operations on a daily, weekly, monthly etc basis for each item of plant. The preparation of this section shall be carried out by obtaining from the manufacturer his advice and recommendations for lubrication, adjustment and routine maintenance.

Section 6:

This section shall comprise the emergency procedures to be adopted by personnel engaged on the operation and maintenance of the mechanical and electrical services, with respect to fire, first aid, general failures to water and electrical systems, gas lines, chiller refrigerant pipework, and call-out procedures for maintenance personnel in working hours and out of working hours.

Section 7:

A recommended action on plant malfunction shall be detailed in this section. This is to assist both the user and maintenance engineer in the event of a fault developing in a system by indicating the nature of the fault and the recommended action.

Section 8:

This shall comprise a list of recommended spares and lubricants. The preparation of this section shall be carried out by obtaining the manufacturers recommendations and also incorporate the Clients requirements regarding spares.

Section 9:

A schedule of the record, or as-built drawings together with reduced copies (A4 size) of the record drawings will be inserted in numerical order in this section.

Section 10:

This section shall comprise test certificates and commissioning reports. It shall also contain copies of fan and pump curves with the duty points clearly indicated.

Section 11:

This shall comprise the manufacturers' literature, arranged in alphabetical order to match the manufacturers list. It shall also give the manufacturers (or their local representatives) names, addresses and telephone numbers.

4 COPIES OF RECORD DRAWINGS

In addition to the Record drawings required for the Manuals one electronic copy of these drawings shall be provided within the contract.

SECTION QFD

GENERAL EQUIPMENT SPECIFICATIONS FOR AN EARLY WARNING DETECTION (EWD) INSTALLATION

1 GENERAL

The equipment described in this section is the majority of the specialised equipment associated with an Early Warning Detection or Smoke Detection installation. Mention of an item does not necessarily imply that it is required for this project. The project requirements are as detailed in Part 5 and/or on the drawings.

2 VISIBLE APPROVAL OF FITTINGS

All visible fittings and fixtures, such as detector heads, remote indicator lights etc, shall be approved by the Architect and the Engineer.

The Contractor shall submit identified duplicate samples of all manufactured items. One sample of each item will be signed by the Architect and handed to the builder, who will keep it on site available for inspection.

All fittings used in the installation shall conform to the approved samples.

If it is not practicable to provide samples of some items, detailed drawings accompanied by photographs or manufacturers literature may be submitted.

3 DETECTORS

The detectors shall operate on a 24 V DC power supply, and be suitable for connection in the circuit to the control panel using twin wire.

The detector base section shall be suitable for easy removal and replacement of the detectors, and shall allow for the interchanging of the different types of detectors without any modifications being necessary. The base to be employed shall depend on the special mounting conditions required, and shall be suitable for one or more of the following:

- recess mounting
- surface mounting
- mounting in damp rooms
- suspended mounting
- explosion proof mounting, with intrinsic safety

A visual alarm detection indication lamp shall be incorporated on each detector which shall illuminate or flash on the detector activated. If not visible over 360° the detector shall be orientated so that the indication light faces towards the entrance to the room, or to where it can easily be visible on entry to the space in an emergency.

The following types of detectors shall be used to suit the applications as described, or as detailed on the drawings.

3.1 Ionization Chamber Detector

The detector shall be of the dual chamber type sensitive to visible and invisible combustion products. It shall be designed for ceiling mounting on a standard round electrical outlet box having 50 mm hole centres.

The detector shall operate satisfactorily on a nominal 24 volt DC non-polarised 2 wire system over a voltage range of 15 to 40 volts. The unit shall be factory adjusted but on-site adjustments shall be possible.

The unit shall operate satisfactorily under the following conditions:

- Temperature -20°C to +50°C
- Humidity 20% to 90% RH
- Air Velocity up to 10 m/s

An alarm indicator lamp visible for 360° shall be built into the unit. Provision shall also be made to connect a remote indicator lamp, if required. The supplier shall indicate the radiation level of the radio-active source.

3.2 **Optical Smoke Detector**

This is the photoelectric (optical) cell type which reacts to visible smoke.

It is especially suitable in combination with the ionisation chamber type of detector for monitoring rooms containing electrical and electronic equipment. In areas where PVC cables are prevalent (as in the underfloor void of computer rooms) the smoke detectors shall be installed in the ratio of 3 x ionization to 1 x photoelectric type.

- Temperature -20°C to +50°C
- Humidity 20% to 90% RH
- Air Velocity up to 10 m/s

Detectors shall be capable of protecting an area up to 90 m² and height of 12 metres.

3.3 **Duct Mounted Detectors**

This type of detector shall be designed for mounting in air conditioning ducts and shall operate satisfactorily over air velocities from 2,5 to 25 m/s.

They shall operate when obscurity reaches 2% per 200 mm.

They shall be fitted with an indicator lamp and provided with facilities for connecting to a remote lamp. They shall operate on a nominal voltage of 24 V DC with satisfactory operation from 15 to 40 volts.

The units shall be complete in all respects and ready for mounting in sheet metal ducts.

3.4 **Rate of Rise (or Heat) Temperature Detectors**

The unit shall be of the dual action type responding to both rate of rise and fixed temperature.

The unit shall respond to either or both of the following conditions:

- Temperature rise of more than 8,0°C per minute
- Temperature in excess of 55°C

This unit will be used in areas where ionization detectors are precluded because of deceptive phenomena, such in engine rooms, parking areas, kitchens etc where products of combustion are to be expected.

Detectors shall be capable of proteting an area up to 50 m² at a height not exceeding 7 metres.

3.5 Infra-Red Flame (Radiation) Detectors

The infra-red type shall respond to the flickering of flames.

The detector shall be sensitive to a specific wavelength range emitted by hot carbon dioxide in flame and insensitive to all other wavelenths. It shall achieve a high immunity to deceptive phenomena by means of a second pyro-electric sensor which shall operate on another wavelength by correlation of signals from both sensors. The detector shall be largely immune to artificial light, sunlight and all kinds of heat, ultra-violet, X-ray and gamma radiation.

The detector's response time and sensitivity shall be adjustable.

The detector shall operate from a two-wire 24V DC power supply.

They shall be used in areas containing explosives, etc, in very high rooms where specified, or where specifically indicated.

3.6 Optical Beam Smoke Detector

Optical beam smoke detectors shall comprise transmitter and receiver units and a control unit. Each transmitter unit shall project a modulated infra-red beam on to a receiver unit. Each receiver unit shall analyze the signal, and if smoke is detected an alarm signal shall be transmitted to the control unit. The control unit shall link all sets of beams together for single point control of the entire system.

The detector unit shall provide a fire alarm signal in the form of a set of N/O volt free relay contacts which closes under alarm conditions and resets when alarm conditions cease to exist.

The unit shall be capable of operating on a 24V DC supply system.

The beam shall be effective over a range of from 10 m to 100 m and lateral detection shall be effective up to 7.5 m either side of the centre line of the actual beam.

The unit shall be provided with a self-check function and automatic compensation for dust accumulation, component ageing and temperature changes.

4 REMOTE INDICATOR LIGHTS

Where a detector is hidden from view, a remote indicator lamp is to be provided:

- on the ceiling directly below the ceiling void detector
- on the wall adjacent to a floor void detector
- on the wall adjacent to the detector concealed by ducting, etc.
- or where specifically indicated on the drawings.

5 BATTERIES

These are to be of the nickel cadmium type, and rated for the requirements of the installation. The batteries are to offer a 48 hour reserve to the installation, with 1 hour full load.

The battery terminals shall be protected from accidental short circuiting if not contained in a cubicle to protect them from abuse by the general public.

6 BATTERY CHARGER

An automatic high/low rate charging unit is required to provide continuous trickle charge. It shall be sized to match the battery pack installed and shall operate from a 15 amp, 220 V, single phase supply.

The charger shall have the provision of an automatic change-over to the high charge rate when required.

The charger shall come complete with protection fuses, voltmeters and ammeters, and shall have its own incoming mains double-pole isolator.

7 BREAKGLASS UNITS

Manual breakglass units are to be provided for each zone as indicated on the drawings. These are to be suitable for manual initiation of an alarm for their respective zones.

Each of the different types of mechanical/electrical breakglass units shall be:

- recessed into the wall (unless surface units specifically allowed for a particular project, and mention made to the affect in Part 5 of the specification)
- have a well-illustrated glass front
- where specifically called for, a stainless steel or anodised aluminium lift flap, suitably illustrated on its face shall be provided to cover the breakglass unit to offer additional protection against accidental breakage of the glass.

The types of mechanical/electrical breakglass units are:

1) **Break-to-Activate**

A spring-loaded trigger is retained by the glass front. On the glass being broken, the electrical circuit will automatically be activated. Some form of protection must be given to prevent accidental breakage of the glass. It may not be employed to manually release the gas.

2) **Press-to-Activate**

The electrical circuit will be activated on the button (housed behind the breakglass front) being pressed. This unit should generally be employed in preference to the break-to-activate type.

3) **Pull-to-Activate**

This unit shall have a handle or knob housed behind the glass front which on pulling makes the electrical contact to sound the alarm.

8 STROBE ALARM LIGHTS

1) Strobe alarm light lines shall be electronically supervised for short and open circuits.

2) Strobe alarm lights shall be type Zenon Beacon (or similar approved) with red lens suitable for 24V electrical supply and have a flash energy of 0.5 joule.

9 ELECTRONIC DOOR HOLDERS

1) Electromagnetic Door Holders shall be suitable for operation with a 24V DC power supply.

2) The unit shall be manufactured by either FULLEON as distributed by ARITECH models FE 333 and FE 550 for wall or floor mounting respectively, or alternatively BRITON as distributed by Ingersoll Rand, Models 533/SE or 534.

3) Units shall be suitable for surface fixing with rear (concealed) cable entry.

4) The units shall have sufficient holding force for the application intended.

Units shall be fail safe and complete with reverse polarity protection.

10 ALARMS

Both visual and audible alarms are to be provided in the locations indicated on the drawings.

10. 1 Audible Alarms

1) **Bell**

The unit shall be designed to give a loud penetrating sound (in excess of 85 dB at 3m), be made of high quality steel and be finished in red. If required, the unit shall be flameproof or weatherproof.

It shall be approximately 150mm diameter, and operate on 24V dc drawing minimum power (approximately 15 to 20 mA).

2) **Siren**

This is to be a compact high volume warning sounder. It is to operate on 24V dc, and emit a sound level greater than 85 dB at 3m. It shall be approximately 75mm diameter and be suitable for wall or board mounting.

3) **Warbler Unit**

This unit is required to produce a minimum of 2 distinct sounds, and have the facility to adjust the type of sound for sweep or continuous. The warbler is to have solid state circuitry, with a working voltage of 24 V dc and low current consumption. It shall give a sound level greater than 90 dB at 3m. The unit must be compact; of the order of 100 mm diameter.

10.2 Coincidence Feature - Alarm Sequence

Upon the activation of the first circuit of detection in a zone the alarm bells associated with that zone are to sound together with the visual and audible alarms at the control console. This bell alarm can be silenced through the silence button on the console.

With installations comprising of more than one zone, the silence switch shall only silence the zone activated. A fire being sensed in another zone after silencing the alarms of the former zone but prior to the system being reset must activate the bell alarms within that area.

Upon the activation of the second detection circuit of that zone (ie the double-knock or coincidence feature) the alarm sirens or warblers of that zone are to operate. The silence button is not to switch off these alarms; this only being achieved with the resetting of the system.

10.3 **Visual Alarm Repeater Panels**

If required, these are to be located as indicated on the drawings, and are to provide a visual indication of an alarm in the respective zones.

11 FIRE BRIGADE TRANSMITTER/RECEIVER UNITS

These units are specified to work on the Standard Home Office type of transmission system. Basically they shall comprise of a relay to reverse the polarity of a signal at the transmitting end, with the receiver unit showing:

- a Normal indication when a 24 V dc signal is being received
- a Fault indication where no electrical signal is sensed
- an Alarm signal when the polarity of the 24 V dc input is reversed

The unit offered, and the installation of the receiver unit shall be compatible with the system being utilised by the local Fire Brigade.

If required a radio link between the building housing the protected area and the Fire Brigade can be utilised.

MECHANICAL INSTALLATION AT FORT COX LECTURE ROOMS

FIRE DETECTION INSTALLATION

PART 3: DETAILED TECHNICAL SPECIFICATION

1 SCOPE OF WORK

The Contract, as detailed in these specification documents and the accompanying drawings, comprises of the manufacture, supply, delivery, erection, testing, commissioning, setting into operation, quarterly maintenance and guarantee for a period of twelve months of the complete fire detection & alarm evacuation installation, and fire suppression system. The work comprises the installation of an early warning fire detection & alarm system, and fire suppression system.

2 STANDARDS AND REGULATIONS

a) The work shall be in full conformity with:

- SANS 50054 Part 1 to 5, Part 7, Part 11 as applicable
- SANS 10139 – Edition 3.01-2007
- BS 5839-1:2002. MOD
- NFPA Codes of Practice
- SANS 10142-1:2012
- NOSA General Safety Standards
- Occupational Health & Safety Act 85 of 1993
- STS 9: Standard Technical Specification for an Inert Gas Agent Fire Extinguishing
- STS 10: Automatic Fire Alarm Installation FPO 5E: June 1994
- STS 13: Evacuation Communication Systems: FPO 8E: January 1999
- All other applicable standards and codes of practice and local regulations having jurisdiction

b) All other applicable standards and codes of practice and local regulations having jurisdiction.

3 DRAWINGS

3.1 Tender Drawings

a) The drawings accompanying this Specification as numbered in the drawing schedule, attached shall be deemed to indicate the general layout and requirements only and are not for Construction Drawings.

b) The Tender drawings must be read in conjunction with the detailed specification and Schedules of Quantities. Any discrepancies found must be reported to the Engineer prior to the closing of tenders. Failure to comply will be taken that all requirements have been met and no variations will be accepted.

3.2 Architectural and Structural Drawings

a) The Contractor shall ensure that he is in possession of all information required for the installation of the Works and shall, if necessary, obtain copies of all relevant Drawings from the Architect and Structural Engineer.

4 WORK TO BE CARRIED OUT BY OTHERS

a) The following work is excluded from this Contract and will be carried out by others.

- All builders' work including the forming of holes in walls and making good thereafter.
- The cutting of holes in suspended ceilings and ceiling tiles for the fixing of detector heads, siren and other devices.
- The provision of all wireways and conduits (with draw wires), draw boxes, draw trays, sleeves, trunking etc., where cast into concrete or chased in brickwork or surface fixed, as specifically indicated on the drawings. (Excludes surface flexible conduit)
- The provision of a separately protected 15amp single-phase essential power supply adjacent to the Fire Panel.

b) Final connections between draw boxes and equipment, using Galvanised Metal Sprague shall form part of the Fire Detection Contract.

5 SITE CONDITIONS AND DESIGN CRITERIA

LOCATION

Fort Cox Agriculture and Forestry Training Institute
Cwaru Location
Middledrift
Eastern Cape

GPS Coordinates:
lat 32°46' 57.00"S
lon 27°01' 40.00"E

ACCESS

- Access to this site is via tarred roads.

6 INSPECTION OF SITE

No formal site inspection meeting will be held.
The prospective Tenderers are advised to thoroughly acquaint themselves with the nature and extend of work to be done and make allowance for items obviously intended and necessary for the proper completion of the Works, although not specified. Claims due to lack of knowledge will not be entertained.

7 DESCRIPTION OF EQUIPMENT

7.1 FIRE DETECTION INSTALLATION

7.1.1 Fire Control Panel

a) The Fire control Panel shall be fully addressable and zoned as follows:

b) The panel shall include the following:

- Annunciators
- Power Supply Modules
- Automatic Fault Monitoring Modules
- Module including all necessary relays for switching functions
- Main and Standby Tone Generation Modules

c) The panel shall be of modular construction using solid state components to operate the system. Alarm initiating circuits shall meet the approved requirements for limited energy application and function for the required period of time. The equipment shall function satisfactorily at the normal mains voltage ±10% and within the following parameters:

- With the batteries disconnected.
- With the batteries connected as for normal use.
- With the batteries connected in the discharged condition.

d) A fully discharged cell is defined in terms of final voltage. For the purpose of this specification a battery is considered fully discharged when it is unable to maintain output in excess of the final voltage, measured at one minute intervals, whilst it is subjected to the maximum design load of the system.

e) The panel shall contain all necessary equipment including internal trouble signals with silencing switches.

f) Trouble silencing switches shall be furnished each with its associated pilot lamp so that faults on the alarm initiating circuits and the alarm signal circuits can initiate trouble signals and be silenced independently of each other.

Alternatively, this can be done electronically using one common silence switch. However, using either method, the silencing of one signal shall not prevent further signals from sounding the trouble alarm.

g) Any relays used for critical alarm functions shall have the necessary respective coils electrically supervised and shall alarm in the event of an open circuit.

h) GPRS and/or landline facility to link the system to the local fire station OR teledial system.

7.1.2 Annunciator

a) Annunciator modules shall indicate fire and fault conditions. The fire indication shall be red and the fault indication amber. Initiating devices shall be individually identified on the Annunciator Panel.

b) Clearly identified zone indicators shall be provided for fire and fault conditions. It shall be necessary to restore the alarm-initiating device to normal and manually reset the annunciator indication lights. The Control Panel test switch shall test all circuit components necessary to sound an alarm as well as all the alarm lamps. Provision shall be made for more than one test switch where it is not practical to use one test switch. All field wires connected to alarm initiating devices necessary to actuate an annunciator shall be electrically supervised, and a single short circuit, open or ground fault shall not cause illumination of any fire alarm indicator. The removal of any detector shall cause the relevant zone fault to alarm.

c) The type of zone indicator used for the fire alarm system, and the specified critical alarms shall be one of the following:

- Two lamps connected in parallel associated with each indicator and arranged so that the failure either of the lamps is apparent during the course of a routine test
- Two light emitting diodes (LED's) connected in parallel with each indicator and arranged so that failure of either of the lights is apparent during the course of a routine test. Proprietary LED holder complete with lenses shall be used and the direct soldering of wires to LED connection leads shall not be permitted.
- One lamp associated with each indicator and the circuit arranged so as to give an audible fault warning immediately on the failure of any lamp at any time.

d) For all other auxiliary alarm indicators, it shall only be necessary to have one lamp or one light emitting diode.

7.1.3 Fault Warning

a) An immediate fault warning or trouble signal shall be given by:

- An audible warning from a sounder situated within the indicating equipment.
- A visible indication on the indicating equipment.

b) A fault warning shall be given in the event of any of the following occurring:

- Failure or disconnection of the normal power supply.
- Failure or disconnection of the standby power supply.
- Failure or disconnection of the battery charging equipment.
- Failure or disconnection of the leads to the alarm sounders (fault warning facility per zone).
- Failure of any fuse or protective device.
- Isolation of any of the fire signal circuits.

7.1.4 Interfacing

The Central Control Unit shall interface with the following peripheral device/systems at the positions indicated on the drawings.

- Access Control Installation – release doors in event of fire
- Air conditioning installation

7.1.5 Remote Signal

Facilities shall be provided at each Control Panel, for signalling all fire and fault alarm indication to a remote station via volt free contacts. Remote signal boxes shall be installed in the guard house or where preferred by the User Client. They shall comprise a green and red light for each zone a sounder and a mute button. The green light shall depict zone circuit healthy, red light zone circuit fault. Space for three (3) additional zones shall be allowed for on the remote panels.

7.1.6 Branch Circuits

a) Outputs to any ancillary services powered from the control equipment power supply shall be fused or similarly protected to ensure the safety of the control equipment. In addition, isolation switches shall be provided for maintenance and testing of the following:

- Each fire service signal facility.
- Each remote signal facility.

b) The operation of any of the isolation switches shall initiate the fault warning as described in Clause 2.7.

7.1.7 **Battery and Charger** (24V DC)

a) The normal (main) supply shall be 230/240V AC and a standby supply of 24V DC shall take over immediately upon a failure of the main supply. The changeover shall be automatic and must not interrupt the operation of the fire alarm system.

b) The standby batteries shall be heavy duty sealed lead acid with the required number of cells necessary for the system voltage. They shall have sufficient capacity to supply the largest load placed on them under normal, fire and fault conditions. The batteries shall be rated for a period of 24 hours normal load and 30 minutes fault alarm load for the complete Detection Evacuation System.

c) Battery charging equipment shall incorporate automatic control features with the output designed to charge and maintain the cells within the limits specified by the battery manufacturer. The charger shall be capable of recharging the batteries fully within 12 hours. Under normal charging service, the charger shall charge the batteries at a high rate and automatically switch to a low charge rate when the batteries are fully charged.

d) The charger shall contain a voltmeter, an ammeter and an indicating lamp shall illuminate to indicate the 230/240V AC power source. The battery charger shall be current limited to prevent damage in the event of a short circuit in the battery leads or a reversal of polarity.

e) Fault warnings shall be provided as detailed above

f) The battery shall be housed in a suitable robust ventilated cabinet.

7.1.8 Detectors

a) An indication light on each detector shall indicate when smoke or combustion gas is detected. Extended lights shall be installed where detectors are located above ceilings, or where they are concealed in any way.

b) Infra-red detectors shall not respond to constant infra-red radiation or short flickering phenomenon.

c) Heat sensitive detectors shall incorporate a rate of rise feature as well as a fixed temperature alarm.

d) All the above-mentioned detectors shall utilize a common standard base mounting to ensure uniformity and flexibility with the installation.

e) A Beam detector shall include but not be limited to the following:

- have integral transmitter and receiver
- automatic alignment onto a reflective prism
- automatic contamination compensation
- programmable sensitivity and fire threshold
- minimum range of 20m

7.1.9 Sirens

The siren lines shall be electronically supervised for short and open circuits.

7.1.10 Strobe Alarm Lights

a) Strobe alarm light lines shall be electronically supervised for short and open circuits.

b) Strobe alarm lights shall be type Zenon Beacon (or similar approved), with red lens suitable for 24V electrical supply and have a flashing energy of 0.5 joule.

7.1.11 Relays

a) All necessary relays shall be provided for operating air conditioning/ventilation plants, operating alarms and indicating on panels as specified.

b) The relays shall each be provided with a minimum of one normally open and one normally closed contact rated at 5 amps.

c) The relays shall be mounted in a separate compartment in the control unit and wired to terminals and wiring from the outgoing terminals of the Control Unit to the terminals of the appropriate air conditioning switchboard shall be executed by the Fire Services Sub-Contractor.

7.1.12 Terminals

Terminals shall be provided for each input and output and shall be suitable for DIN rail mounting and each terminal shall be provided with proprietary identification markers. Where a terminal has insufficient capacity for the number of connections, proprietary insulated insertion bridges shall be used. Allowance shall be made for 10% spare capacity with minimum of 10 terminals.

7.1.13 Electronic Door Holders

a) Electronic Door Holders shall be suitable for operation with 24V DC power supply.

b) The unit shall be manufactured by either FULLEON as distributed by ARITECH models FE 333 and FE 550 for wall or floor mounting respectively, or alternatively BRITON as distributed by Ingersoll Rand, Models 533/SE or 534.

c) Units shall be suitable for surface fixing with rear (concealed) cable entry.

d) The units shall have sufficient holding force for the application intended.

e) Units shall be fail safe and complete with reverse polarity protection.

7.1.14 Break glass Units

a) Flush mounted break glass manual alarm units shall be provided where indicated on the drawings. The unit shall be of the normally open type with contacts rated at 5 amperes. The glass front shall only require firm thumb pressure or moderate impact to break it and shall have a transparent plastic film adhered to the glass to prevent injury from glass fragments. A test probe shall be provided with each unit to enable the unit to be tested on site. The front of the unit shall be clearly marked “FIRE/BRAND”.

b) Flush mounted units shall be installed in 75mm x 75mm galvanised back boxes as supplied by Le Grand or Crabtree.

7.1.15 Labels

Engraving, silk-screening or etching on indication lights or adjacent to the lights must be clear and easy to understand. Approval of the method used must be obtained from the Engineer before manufacture commences.

7.1.16 Electrical Wiring

All electrical wiring shall be carried out in accordance with local regulations in fire resistant cables rated at PH60 minutes encased in conduit and trunking to the satisfaction of the Engineers. The cross section of conductor is to be minimum 1.5mm^2.

7.1.17 Conduit

All conduit and trunking shall be supplied and installed by others.

8 COMMISSIONING AND TESTING

The installation shall be commissioned and tested to the satisfaction of the Engineer with the following minimum requirements:

- Each and every trigger device shall be tested.
- The supervision of each applicable circuit shall be tested.
- All the functions of the control unit shall be tested
- All time delays shall be checked for accuracy and that the timers will complete their cycles even though wiring between them and their detector circuits are interrupted.
- The power supply, battery and automatic changeover shall be tested.
- All audible and visual alarm shall be tested.

- All air conditioning plant signals shall be tested in the presence of the respective sub-contractor's representative.

9 MAINTENANCE

a) The Contractor shall include in his tender price for the maintenance of the complete installation for a period of ONE YEAR after first delivery of the entire plant has been taken by the Principal Agent.

b) The Contractor shall visit the installation at regular intervals on an acceptable and agreed day and perform full maintenance on the basis of a proper preventive maintenance programme approved by the Engineer.

c) The Contractor shall report to an official on arriving and again at leaving the premises on the occasion of each visit. Such person, who has been nominated by the engineer, shall sign a Service report giving details of any defects made good, temperature readings taken, etc. A copy of such Service Report is to be submitted to the Engineer liaising with the Consultant Engineer in all cases.

d) A major service shall be executed by the Contractor in the twelfth month of the contract maintenance period.

10 GUARANTEE

The Contractor shall guarantee the materials, apparatus and workmanship delivered by him for a period to twelve months. The guarantee must be valid for a period starting on the date when the Contract is accepted as completed and in working condition. The complete installation must be guaranteed against defects as a result of patent and latent defects of the apparatus as well as against faulty materials and workmanship. Fair wear and tear is excluded from the guarantee. The guarantee must provide for all parts, spares and appurtenances, which become defective during the guarantee period, to be replaced free of charge to the Administrator or to the Engineer. All costs of labour, out of town allowances, materials and transportation required to replace such part of a defective installation shall be borne by the contractor and shall be included in his guarantee. The Contractor shall cede to the Administrator the remainder of any equipment guarantee which he has received from his suppliers and which may extend beyond the period of twelve months mentioned herein.

11 OPERATING AND MAINTENANCE MANUALS.

a) The Contractor shall furnish to the Engineer three bound copies of Operating and Maintenance Instructions prior to the final acceptance of the installation

b) These manuals shall include the following:

- Index
- Description of the System.
- Operation of the System.
- Plant and Equipment – including Model Numbers and Suppliers.
- Test Report.
- Maintenance Instructions.
- Spare Parts List.
- Descriptive Literature.
- Record Drawings (both HARD COPY and ELECTRONIC FORMAT - drawing AutoCAD)
- Service Records

12 TRAINING

a) The Contractor shall provide substantive training to selected staff members in the correct operation and operator maintenance procedures of each item of equipment supplied by himself and requiring such training.

He/she shall issue a register of training conducted to the Engineer for inclusion in the Practical Completion certificates.

SCHEDULE OF EQUIPMENT / MATERIALS OFFERED

PROJECT NAME : FORT COX LECTURE ROOMS

The contractor shall complete the following schedules and submit them with their tender submission.

The schedules will be scrutinised by the Representative / Agent and should any material offered not comply with the requirements contained in the specification, the 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.**

1 DETECTORS

IONISATION CHAMBER DETECTORS:

Make ……

Model No. .....

Country of Origin .....

No of heads included in Bid .....

2 BATTERY UNIT

Make of Batteries .....

Country of origin .....

Size ……

Capacity …….

Type ……

Make of Battery Charger .....

Country of origin .....

Size …….

Capacity ……

3 BREAK GLASS UNITS

Make .....

Model No. .....

Country of origin .....

No of units included in Bid .....

4 AUDIBLE ALARM SIRENS

Make ……

Model No. .....

Country of origin .....

No of units included in Bid .....

5 CONTROL UNITS

Make ……..

Country of origin .....

Size ……

Material ……

Finish ……

Type of relays .....

Type of lights .....

Type of housing .....

6 ANNUNCIATOR PANEL

Make ……..

Country of origin .....

Size ……

Material ……

Finish ……

Type of relays .....

Type of lights .....

Type of housing .....

7 FIRE ALARM REPEATER PANEL

Make ……

Country of origin ……

Size .....

Material ……..

Finish ……

8 EXTENDED LIGHT

Make ……..

Country of origin .....

9 SOLENOID OPERATED DOOR RELEASE MECHANISM

Make ……

Country of origin .....

10 LINE ISOLATOR

Make ……

Model ……

Country of origin .....

C 3.2.5 PARTICULAR SPECIFICATIONS

MECHANICAL INSTALLATION

TABLE OF CONTENTS

PART 1: GENERAL PROJECT SPECIFICATION

1 SCOPE OF WORK

1.1 The work covered by this Contract comprises the supply complete Air Conditioning Installation, including a twelve (12) months defects liability period as further detailed in Parts of this Specification.

2 INSPECTION OF SITE

2.1 The Tenderers are advised to thoroughly acquaint themselves with the nature and extent of work to be done and to make allowance for items obviously intended and necessary for the proper completion of the Works, although not specified. Claims due to lack of knowledge will not be entertained.

3 COMPLIANCE WITH REGULATIONS, STANDARDS AND CODES

3.1 The Contractor shall arrange for the necessary inspection and testing after completion of the Works. All notices fees, including inspection and re-inspection are the responsibility of the Contractor and all relevant costs shall be borne by him.

3.2 Any items not specified, but reasonably assumed to be necessary, for the completion of the Works to recognised standards of workmanship and practice, shall be deemed to be included in the Contract.

3.3 The workmanship throughout the Works shall be to the satisfaction of the Employer and relevant codes of practice. Any materials or workmanship considered to be faulty or incorrectly or inadequately erected or repaired shall be substituted, altered or rectified to the satisfaction of the Employer without additional costs to the Employer.

3.4 The Contractor shall adhere to all the relevant regulations, standards and codes specified in this Tender Document.

4 SUPERVISION

4.1 The work shall at all times, for the duration of the contract, be carried out under the supervision of a competent representative of the Contractor, who should also be an Accredited Person registered as an Installation Technician in terms of the Occupational Health and Safety Act No. 85 of 1993, as amended.

4.2 The representative of the Contractor shall be able and authorised to receive and carry out instructions on behalf of the Sub-contractor.

5 PROGRAMME

5.1 The Contractor shall submit a programme for the Works within 14 days of receipt of the Letter of Acceptance of Tender and / or Letter of Commencement of Works.

5.2 The cost of overtime, additional labour and plant necessary for the completion of the Works in accordance with the Principal Contractor’s programme shall be included in the Contractor’s Tender Price for the Works.

6 SAMPLES AND ALTERNATIVES

6.1 The preferred manufacturer / makers of equipment and / or material are as described in either the Project Specification, the Standard Technical Specifications or as listed in the Schedule of Quantities.

6.2 The Employer reserves the right to specify the equipment and/or materials utilised in the Works. No alternatives to equipment and / or materials are to be used unless written approval is obtained from the Employer, or his Representative.

7 DEFINITIONS

7.1	Supply	To purchase, procure and deliver complete with all related specified accessories
7.2	Erect	To place or mount and fix in position
7.3	Install	To erect, connect up and commission, complete with related accessories
7.4	Indicated shown, Noted	As indicated or shown on drawings
7.5	Approved, Alternative	Approved in writing by the Engineer.
7.6	Similar, Equal	Equal or better in efficiency of performance and compatibility

8 CONFLICT BETWEEN SPECIFICATIONS, SCHEDULE OF QUANTITIES AND DRAWINGS

8.1 The Tender drawings must be read in conjunction with the detailed specification and the Schedules of Quantities. Any conflict shall be considered in the following order of priority:

8.1.1 Project Specifications
8.1.2 Drawings
8.1.3 Standard Technical Specifications
8.1.4 Schedules of Quantities

Any discrepancies found must be reported to the Engineer prior to the closing of tenders. Failure to comply will be taken that all requirements have been met and no variations will accepted.

8.2 Should the Contractor note an inconsistency between the Project Specifications, Standard Technical Specifications, and Drawings, he shall notify the Engineer immediately and obtain clarification or instructions prior to ordering or installing equipment.

9 DRAWINGS

9.1 Design (Tender Document) drawings are issued with this Tender Document, as per the Drawing Schedule. These are for information purposes and are to be read in conjunction with the Schedules of Quantities that form the basis of the Tender. Any obvious discrepancies found are to be brought to the attention of the Engineer prior to the submission of the tender.

9.2 The Air Conditioning Contractor shall read the air conditioning drawings in conjunction with the Architects and other Engineers drawings in order to ensure the correct positioning of outlets, plant and equipment.

9.3 Where room data sheets are provided the Air Conditioning Contractor shall use these as a means of identifying and co-ordinating the air conditioning installation with the other services. He shall

advise the Engineer of any discrepancies between the room data sheets, Air Conditioning and other services drawings prior to installation.

10 MEASUREMENT

10.1 At no time is the Contractor to scale drawings or to make any assumptions regarding measurements / dimensions. If in doubt, the Contractor is to obtain clarification from the Engineer.

11 MOVING OF EQUIPMENT

11.1 The Contractor shall investigate each space through which equipment must be moved. Where necessary, equipment shall be transported in sections of size suitable for moving through spaces available.

12 MISCELLANEOUS

12.1 Labels

12.1.1 Labels shall be installed as required in terms of the relevant codes of practice and as further specified in this Tender Document.

12.1.2 All labels shall be in English with capital letters, in black and on a white background, and a minimum of 4 mm in height. All labels shall be of ivorine or plastic construction and riveted / screwed in place.

12.2 Danger Notices / Signage

12.2.1 The Contractor shall supply and install all danger, sub-station and safety notices and signs in terms of the relevant regulations.

12.2.2 All safety signage installed shall be in accordance with SANS 1186.

13 OPERATING INSTRUCTIONS, MAINTENANCE MANUALS AND RECORD DRAWINGS

13.1 The Contractor shall supply, after approval by the Engineer, three (3) bound sets of operating instructions, maintenance manuals and record drawings for the complete Air Conditioning Installation, including the portions thereof completed by Specialist Contractors.

13.2 The provision of operation instructions, maintenance manuals and record drawings shall be inclusive of the demonstration of the specific portion of the Mechanical Engineering Services Installation by the Contractor and / or Specialist Sub-contractor and training of the Employer's representatives and staff members.

13.3 The Contract will not be accepted as complete until these have been supplied, and approved by the Engineer.

14 INSTALLATION DRAWINGS

14.1 Drawings shall be submitted in triplicate as soon as possible after the signing of the Sub-contract, but in ample time to allow the Engineers to examine and approve before equipment manufacture is started, or material delivered to site.

14.2 Should the Engineers require that any drawing be amended, the Contractor shall make the necessary alterations and re-submit the drawing within two weeks.

14.3 The Contractor shall provide the Principal Contractor and the Consulting Mechanical Engineers with complete layout, installation and shop drawings, together with any necessary descriptions and specifications. Sufficient details shall be given to permit a full appraisal of all parts of the installation and their relation to the building structure.

14.4 Drawings shall give full details of all foundations, ducts, chases, pits and openings and shall set out all lines and levels for the work.

14.5 Delays caused by the submission of drawings or by an error, omission or inadequacy in these drawings, shall not be considered a reason for an extension of the Sub-contract time.

15 TESTING AND COMMISSIONING

15.1 The Contractor shall carry out all tests required in terms of the relevant Acts, SANS Codes of Practice and Local Authority requirements. The Contractor shall provide all the equipment and apparatus required for the purpose of carrying out all necessary tests.

15.2 If any part of the Works fails the test, the Contractor shall be responsible for rectifying, at his own cost, the defective Works and the re-testing thereof to ensure compliance. If in consequence, the Engineers are obliged to attend the further acceptance tests the additional costs incurred by the Engineers shall be payable by the Contractor.

15.3 The Works shall be deemed to be practically complete only when the Engineer has approved all tests and inspections, and a Completion Advice Notice or other relevant completion notice is issued.

16 COMPULSORY FORMS AND CERTIFICATES

16.1 The Contractor shall submit the necessary commencement, compliance and completion forms for the installation as required in terms of the Occupational Health and Safety Act No. 85 of 1993, as amended, the relevant SANS Specifications and the requirements of the relevant Supply Authorities.

17 VARIATION ORDERS

17.1 Variations orders shall be ordered and processed in one of the following ways :

1. Issue of a revised drawing.
2. By Architect’s Instruction.

17.2 The Contractor shall ensure that the above procedures have been followed prior to carrying out any work. Failure to comply may invalidate any claim for work done.

17.3 Unless otherwise agreed with the Engineer, all claims for variation orders shall be approved prior to proceeding with the relevant Works. The Contractor shall submit variation order claims to the Engineer for approval with the preceding monthly payment claim.

17.4 However, the Contractor shall only include the value of approved variation orders in any payment claim or invoice, once approved in writing by the Engineer. Variation order claims, which have not been approved, but are included in the monthly payment claim, will be deducted from the payment claim in question.

18 PAYMENT CERTIFICATES

18.1 The Air Conditioning Contractor shall be entitled to submit monthly payment claims to the Principal Contractor.

18.2 The Air Conditioning Contractor shall submit the monthly payment claim to the Consulting Mechanical Engineer for approval and recommendation, prior to the submission to the Principal Contractor.

18.3 The payment claim shall be set out in accordance with the Price Schedule.

END OF SECTION

STANDARD CONDITIONS IN RESPECT OF THE SUPPLY, DELIVERY AND INSTALLATION OF MECHANICAL EQUIPMENT AND MATERIALS

1 TESTS AND FINAL COMPLETION

1.1 Tests

After completion of the Works and before Practical Completion is taken, a full test will be carried out on the installation for a period of sufficient duration to determine the satisfactory work thereof. During this period the whole of the Works will be inspected and the Contractor shall make good to the satisfaction of the Representative / Agent or Main Contractor, any deficiencies that may arise.

The Contractor shall provide all instruments and equipment required for the testing as well as any water and power required for the commissioning and testing of installations at completion.

The contractor shall provide testing and commissioning data that clearly illustrates the duties and power requirements, as specified, of the installed equipment.

1.2 Final Completion

As prescribed in the JBCC Conditions of Contract for nominated/selected subcontracts shall be twelve months.

2 CONTRACTOR'S LIABILITY IN RESPECT OF DEFECTS

2.1 **Latent Defects Liability Period**

As prescribed in Clause 27 of the JBCC Conditions of Contract

1.1 Maintenance of installations

With effect from the date of the Practical Completion Certificate the Contractor shall at his own expense undertake the regular servicing of the installation during the period stipulated and shall make all adjustments necessary for the correct operation thereof.

If during the said period the installation is not in working order for any reason for which the Contractor can be held responsible, or if the installation develops defects, he shall immediately upon being notified thereof take steps to remedy the defects or faults or to make any necessary adjustments.

Should such stoppages however be so frequent as to become troublesome, or should the installation otherwise prove unsatisfactory during the said period the Contractor shall, if called upon by the Representative / Agent or the Director-General, at his own expense replace the whole installation or such parts thereof as the Representative / Agent or the Director-General may deem necessary with apparatus specified by the Representative / Agent or the Director-General.

3 COMPLIANCE WITH REGULATIONS

3.1 The installation shall be erected and tested in accordance with the following Acts and Regulations:

i) The latest issue of SANS 10142: "Code of Practice for the Wiring of Premises",
ii) The Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended,
iii) The Local Government Ordinance 1939 (Ordinance 17 of 1939) as amended and the municipal by-laws and any special requirements of the local supply authority,

iv) The Fire Brigade Services Act 1993 Act 99 of 1987 as amended,
v) The National Building Regulations and Building Standards Act 1977 (Act 103 of 1977) as amended,
vi) The Post Office Act 1958 (Act 44 of 1958) as amended,
vii) The Electricity Act 1984 (Act 41 of 1984) as amended and
viii) The Regulations of the local Gas Board where applicable

END OF SECTION

PART 1.1
SECTION 1: GENERAL SPECIFICATION FOR AIR CONDITIONING & VENTILATION INSTALLATION WORK AT FORT COX LECTURE ROOMS

1 TESTS

After completion of the works and before first delivery is taken, a full test will be carried out on the installation for a period of sufficient duration to determine the satisfactory working thereof. During this period the installations will be inspected and the Contractor shall make good, to the satisfaction of the Representative / Agent, any defects which may arise.

The Contractor shall provide all instruments and equipment required for testing and any water, power and fuel required for the commissioning and testing of the installations at completion.

2 MAINTENANCE OF INSTALLATIONS

With effect from the date of the First Delivery Certificate the Contractor shall at his own expense undertake the regular servicing of the installation during the maintenance period and shall make all adjustments necessary for the correct operation thereof.

The maintenance period shall be twelve (12) months from the date of the First Delivery Certificate.

If during the said period the installation is not in working order for any reason for which the Contractor is responsible, or if the installations develop defects, he shall immediately upon being notified thereof take steps to remedy the defects and make any necessary adjustments.

Should such stoppages however be so frequent as to become troublesome, or should the installations otherwise prove unsatisfactory during the said period the Contractor shall, if called upon by the Representative / Agent or the Director-General, at his own expense replace the whole of the installations or such parts thereof as the Representative/Agent or the Director-General may deem necessary with apparatus specified by the Representative / Agent or the Director-General.

3 REGULATIONS

The installation shall be erected and tested in accordance with the latest issued and amendments of the following Acts and regulations:

- SANS 1125 : Room air conditioning and heat pumps
- SANS 1238 : Duct work
- SANS 1287-1&2 : Ventilation practices and ducting
- SANS 1424 : Filters
- SANS 10147 : Refrigeration Systems
- SANS 10173:2003 : Installation, testing and balancing Air Con The Occupational Health and Safety Act, 1993 (Act 85 of 1993),
- SANS 5151 : Non-ducted air conditioning and heat pumps
- SANS 10400 : The National Building Regulations
- SANS 10142 Parts 1 & 2 : Code of Practice for the Wiring of Premises
- Local Government Ordinance 1998 (Act 10 of 1998 (Gauteng), municipal by-laws and any special requirements of the local supply authority,
- The Fire Brigade Services Act 2000 (Act 14 of 2000),
- The Post Office Act 1998 (Act 124 of 1998),
- The Electricity Act 1996 (Act 88 of 1996) and
- The Regulations of the local Gas Board where applicable.

4 GENERAL

All workmanship and materials used in the installation shall be of the highest quality.

All plant associated with the installation shall comply with the Code of Practice for "Refrigeration systems including plants associated with air-conditioning" SANS – 1992, as amended.

5 MATERIALS, SAMPLES AND SHOP DRAWING

5.1 The drawings provided with this tender document are general arrangement drawings only. The successful Tenderer shall check all design criteria and submit shop drawings (including builder' for approval which take into consideration available spaces, builders work requirements, access for maintenance purposes etc.

5.2 The requirements for proof of compliance with materials specifications, samples and shop drawings are:

- Material specifications
- Shop drawings

5.3 The contractor shall, on certain occasions, be required to provide samples on request by the Engineer.

6 COMMISSIONING AND TESTING

On completion of the installation, it shall be tested to the satisfaction of the Engineer and all results shall be recorded in the Operating and Maintenance manuals.

All balancing and testing shall be carried out by the Contractor entirely at his own expense, and all test instruments shall be checked for accuracy by the Manufacturers, Suppliers, or an approved Laboratory and certified copies of the certificates showing the degree of accuracy shall be supplied to the Engineer, if requested.

Gauges, thermometers, ammeters, and other instruments which form part of the permanent plant may be used for test purposes provided they are certified as accurate.

The Engineer shall have the right to inspect any item of equipment during manufacture or before delivery to site.

The Contractor shall balance, set, and test the entire plant and shall submit the results to the Engineer who shall then carry out spot checks in the presence of the Contractor.

7 ELECTRICAL WIRING

Unless specifically stated otherwise in the project specification, the Contractor shall be responsible for all electrical work and control wiring associated with the air conditioning installation with the exception of the incoming power which will be provided by others.

All electrical work shall comply with the requirements of the local Municipal Authorities and the Code of Practice for the "Wiring of Premises" SANS 10142, as amended.

8 OPERATING AND MAINTENANCE INSTRUCTIONS

The Contractor shall furnish to the Engineer three bound copies of Operating and Maintenance Instructions prior to the final acceptance of the installation.

The manuals shall include the following:

- Index
- Description of the plant
- Operation of the plant
- Plant and equipment - including model numbers and Suppliers
- Test report
- Maintenance instructions
- Spare parts list
- Descriptive literature
- Record drawings (for all equipment installed and electrical wiring performed by the air conditioning contractor).

9 PAINTING

No untreated metal surfaces shall be permitted on the project. Items which are not galvanised or similarly protected against rust and corrosion, shall be painted.

All black metal work including brackets, hangers, platforms, piping etc. either exposed or concealed shall be thoroughly cleaned, de-scaled and painted with one coat zinc chromate followed by one coat enamel paint, to an approved colour.

Unless specified to the contrary hereafter, all equipment, exposed ducting, pipes, metal parts and insulated and plastered surfaces shall be painted with a primer coat followed by two coats enamel paint, to an approved colour.

10 REFRIGERANT AND REFRIGERATION PIPING

All refrigerant piping will be insulated and vapour sealed with closed cell preformed sections with taped joints; proprietary tape only will be used. The AC Contractor will ensure that the aggregate equivalent suction and liquid refrigerant lines lengths do not exceed the manufacturer's recommended allowances.

All refrigerants are to be R410 A or R32 (ODP zero). If alternatives are proposed they must have an Ozone Depleting Potential of zero.

10.1 Refrigeration piping shall be carried out in phosphoric acid deoxidised seamless copper tubing. The piping for R410A or R32 shall be as follows.

Outside Diameter (mm)	Outside Diameter (in)	Material	Wall thickness (mm)
6.4	1/4	0	0.8
9.5	3/8	0	0.8
12.7	1/2	0	0.8
15.9	5/8	0	1.0
19.1	3/4	0	1.0
22.2	7/8	1/2H	1.2
25.4	1 1/8	1/2H	1.2
28.6	1 3/8	1/2H	1.2
31.8	1 5/8	1/2H	1.2
34.9	2 1/8	1/2H	1.3
38.1	2 5/8	1/2H	1.3

10.2 All piping shall be kept properly sealed against moisture and dirt at all times. Bends in soft drawn material shall be made with long radius using proper tools. If hard drawn piping material is used then only long radius brazed bends may be used.

10.3 The piping shall be correctly sized using the equipment manufacturer’s method or software.

The additional refrigerant charge shall be accurately calculated by the same method. The maximum pipe lengths shall be adhered to.

10.4 All branch connections shall be by means of “proprietary” type joints as supplied by the air conditioning equipment manufacturer. The joints shall be installed with the connections on a horizontal plane or with the direction of flow in a vertical plane.

10.5 Only synthetic oil compatible with the refrigerant shall be used to lubricate any cutting, reaming and flaring tools

10.6 Only phosphor copper brazing rods shall be used without any flux on the piping joints. The pipe work shall be continuously purged with low pressure nitrogen during all brazing operations.

10.7 Simple purging of the refrigerant lines between the indoor and outdoor sections is not acceptable. The lines shall be correctly pressure tested with nitrogen plus a small amount of refrigerant to 3.8 MPa for R410A or R32 and left for 24 hours to ensure pressure does not drop. The piping shall then be purged using a vacuum pump to –100 kPa (for more than 2 hours) and ensure that it holds this vacuum for 1 hour to the satisfaction of the engineer. The system shall then be charged in the liquid state with the calculated amount of additional refrigerant by using an accurate charging scale (charging cylinder cannot be used). Only once the system is correctly charged shall the refrigerant valves on the outdoor units be opened.

10.8 The pipe work arrangement for multiple outdoor units shall be correctly arranged to meet the equipment manufacturer’s requirement.

10.9 No ozone depleting substances are to be associated with the manufacture or composition of all thermal insulants.

Refrigerant insulation shall be of closed cell structure and be of the vapour barrier type.

Its thermal conductivity shall be not higher than 0.037 W/m °C and be fire retardant material of Class 1.

11 AIR CONDITIONING RETICULATION – ROOF VOIDS

11.1 Reticulation positioned within roof voids may be laid on and supported by the existing timber roof trusses. Suitable hold down clamps must be used at intervals not exceeding 3 metres. The hold down clamps must be fixed to the timber roof trusses using a minimum of two x 4 mm stainless steel wood screws or similar. Care must be taken to ensure sufficient clearance around reticulation to allow for the installation of pre formed thermal insulation. To avoid sagging, refrigerant piping shall be supported on cable trays in every 2m interval. No Ozone Depleting substances are to be associated with either the manufacturer or composition of all thermal insulants in the project.

11.2 Where reticulation interferes with other services such as electrical or potable water reticulation the contractor must avoid these services by re-routing the air conditioning reticulation.

11.3 Should the tenderer determine that the existing timber support structure spacing, is not suitable to adequately support the required refrigerant reticulation, the tenderer must make provision for the installation of additional timber battens or supports.

12 AIR CONDITIONING RETICULATION – BUILDING EXTERIORS

12.1 All piping must be supported in steel holder bats (clamps). The clamps must be positioned a maximum distance of 2 (two) metres apart. Clamps must be installed at all changes in direction or elevation.

12.2 Holder bats shall be installed in such a manner as to ensure sufficient clearance to allow for

installation of thermal insulation.

12.3 All externally exposed reticulation including reticulation between the outdoor unit and entrance into the ceiling void must be insulated with thermal insulation. This thermal insulation must be neatly covered using 0,7 mm grade 304 stainless steel cladding. All to the approval of the Engineer or Engineers Representative.

PART 1.2
SECTION 2: SPECIFICATION FOR AIR CONDITIONING & VENTILATION INSTALLATION WORK AT FORT COX LECTURE ROOMS

1 EXTENT OF WORK

1.1 This specification establishes the performance, design and test requirements for the air conditioning and fresh air system installations at Fort Cox Lecture Rooms.

Equipment as indicated on the drawings is to be supplied and installed as described below and on the drawings. This specification has been written in such a manner as to be as generic as possible. Tenderers are to ensure that all pipework, accessories and ancillaries are included to ensure the final installation performs as described below and on the drawings. Tenderers must have a fully equipped repair and maintenance workshop with manufacturer approved staff within 3 hours drive of Fort Cox to support the installation for a minimum duration of the defects liability period.

1.2 This specification relates to the supply, delivery, off-loading, temporary storage, installation, testing, commissioning and handing over in good order all ancillary equipment required to provide fully functional equipment and systems.

1.3 The supply of all Maintenance and Operating Manuals inclusive of “AS INSTALLED” drawings forms part of this specification.

1.4 The major systems included in this specification are as follows:

- Split type air conditioning units
- Split DX to server room
- Fresh air supplies to the above systems incorporated with Ventilation Air Processing Units
- Extraction and Fresh air supply systems

1.5 The outdoor units as described in detail below and shown on the drawings shall be mounted on the roof slab.

1.6 Equipment that is to be supplied/offered by the Contractor is to be approved by the Engineer prior to commencing with any purchase action.

1.7 This section and all standard drawings deal with the General Technical Requirements for ALL installations, the particulars of each system being given in the contract drawings and following sections.

1.8 Tenderers, however, are free to offer alternative equipment that in their opinion would be equal to or an improvement upon that specified.

1.9 Where such alternatives are offered, price variations compared with the main offer shall be clearly stated, as also the advantages claimed for such a substitution. Such price variations shall be shown in a covering letter, separate from the Schedule of Prices.

NOTE: The Contractor must refer to the drawings for the pricing of the Materials. All equipment schedules are clearly incorporated within the drawings forming part of the tender documents.

2. SITE CONDITIONS

2.1 **Location**
Fort Cox Agriculture and Forestry Training Institute
Cwaru Location
Middledrift
Eastern Cape

GPS Coordinates:
lat 32°46’ 57.00”S
lon 27°01’ 40.00”E

2.2 **Access**
Access to the site is via a tired road.

3 PROGRAMME

3.1 The Tenderer shall allow for programming the work in such a manner as to not disrupt the Main Contractor’s programme. Sequence of work to suit the Sub Contractor's requirements will not be guaranteed.

3.2 The Tenderer shall take note of the fact that this is a new building of buildings and as such interruptions and interference with other building contractors and services will occur. Claims arising out of broken work sequences or agreed programmes changed due to on site requirements will not be considered.

3.3 The cost of overtime, additional labour and plant necessary for the completion of the Works in accordance with the programme shall be included in the Air Conditioning Contractor’s tender price for the Works.

4 WORK CARRIED OUT BY OTHERS

The following work is excluded from this Contract and will be carried out by others.

- All builders’ work including the forming of holes in walls and making good thereafter.
- The cutting of holes in suspended ceilings and ceiling tiles for the fixing of air conditioning equipment.
- The provision of a 400/420V 3ph 50Hz electrical supply to the air conditioning outdoor units and ventilation fans.
- The provision of a 230 V 1 Ph 50 Hz electrical supply to all indoor air conditioning units and ventilation fans.
- The provision of a chased in 100 x 50 x 50 back box and conduit with draw wire to the ceiling void above to accommodate installation of hard wired remote controller supplied with each unit.

5 REQUIREMENTS FOR AIR CONDITIONING UNITS / EQUIPMENT SPECIFICATIONS

5.1 The air conditioning systems for the general areas and offices shall be air cooled, split type.

5.2 The refrigeration compressor in the outdoor unit shall be equipped with inverter controller and capable of changing the rotating speed to follow variations in cooling or heating load.

5.3 Air conditioning units shall be ceiling mounted cassette, concealed or wall-mounted type.

5.4 The refrigerant used shall be R410A. The refrigerant piping shall be capable of being extended up to 150m with a 50m level difference without any oil traps.

5.5 The system shall be capable of operating continuously at ambient temperatures between -5°C and 40ºC.

5.6 Both indoor and outdoor units shall be assembled, tested, and charged with refrigerant at the factory.

5.7 The systems shall be provided with potential free contacts to be wired to the fire detection panel and shall shut down in the event of alarm being received.

6 OUTDOOR UNITS.

6.1 The outdoor units shall be factory-assembled units housed in sturdy weatherproof casings constructed from rust proofed galvanized steel panels coated with a baked epoxy powder finish. Outdoor units shall be corrosion protected with Bluechem, Tectyl or engineer approved equal.

6.2 The units shall each have a minimum of two scroll compressors and be able to operate even when one of the compressors is out of order.

6.3 The noise level shall not be more than 60dB(A) at normal operation measured horizontally 1m away and 1,5m above ground. The outdoor unit shall be equipped with a night quiet mode.

6.4 The compressor shall be of highly efficient scroll type and equipped with inverter control capable of changing the speed in accordance to the cooling or heating load requirement.

6.5 The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminium fins to form a cross fin coil. The aluminium fins shall be covered by anti-corrosion resin film,

6.6 The refrigerant circuit shall include liquid and gas shut off valves and a solenoid valves. All necessary safety devices shall be provided to ensure the safety operation of the system. The following safety devices shall be part of the outdoor unit,

- High Pressure Switch
- Overload Relay
- Inverter Overload Protector
- Fusible Plugs.

6.7 The unit shall be equipped with an oil recovery system to ensure stable operation with long refrigerant piping runs.

6.8 Condenser units are suitable for operation at low ambient temperatures

6.9 Evaporator and the condenser are to be protected against freezing of the evaporator coil

6.10 The cooling fins must be protected against hail with suitably sized perforated galvanized material powder coated the colour of the units. All fixings shall be galvanized or stainless steel.

6.11 The outdoor units shall be capable of heating water to be circulated to storage vessels.

7 INDOOR UNITS

7.1 Indoor units shall be of the ceiling mounted cassette, in-ceiling splits or wall mounted type. They shall have electronic control valves, which control refrigerant flow rate in response to load variations of the room. The fans shall be of the multi blade type and statically and dynamically balanced to ensure low noise and vibration free operation. Cassette units shall be so designed as to provide evenly distributed air through 360^{o}. Cassette units shall be supplied complete with spigots on to which fresh air ducting can be connected.

8 CONTROL

8.1 Wired remote type computerized PID controllers shall be used to maintain correct room temperatures and interrogate the system log.

8.2 Each indoor unit shall be fitted with a motion/occupancy sensor to shut down the air conditioning unit in the event of lack of activity.

8.3 Units shall be equipped with a self-diagnostic and logging system for easy and quick

maintenance and service.

8.4 The LCD {Liquid Crystal Display) remote controllers shall memorize the latest malfunction code for easy maintenance, It shall be able of controlling up to 16 indoor units and change fan speeds individually in the group.

8.5 The air conditioning unit shall have provision for manual and automatic switching from heating to cooling and vice versa and for selection of fan only mode; there are at least four selectable fan speeds. The unit control consists of a hard wired control that is to mounted on the wall where to light switch for the room is located – as close as possible to the light switch.

9. CONDENSATE

9.1 Condensate from the indoor unit is to be piped to the outside wall of the room where the unit is situated and then connected to the drain line leading from the condenser.

9.2 In cases where no outside wall is available the condensate is to be piped to the closest internal drain point e.g. basin outlet pipe. In these latter instances the drain line is to be fitted with a loop seal. At no point may these drain lines be surface mounted on internal walls. The drain line is to be run in a 25mm PVC pipe that has been built into the wall and that has an adequate slope to allow the water to discharge down to the drainage point.

9.3 All indoor AC units are to be mounted in such a manner that they do not conduct vibration/noise to the building structure using vibration damping and sound insulation equipment that is commercially available and approved by the Engineer.

9.4 All condensate drain pipes above ceilings shall be insulated.

10 DUCTING

10.1 Ducting is to be externally insulated and every effort is to be made to avoid condensation forming in the ducts.

10.2 Ducting shall be manufactured from galvanized sheet steel in accordance with SANS 10173. SMACNA (Sheet Metal and Air Conditioning Contractors National Association Inc. USA, SANS 1238 All ductwork that carries air temperatures below ambient dew point shall be provided with a vapour barrier seal that complies with SANS 10173.

10.3 Insulation shall be fire retardant 50mm 16 DV SAGEX or approved equal.

10.4 Where exposed to the elements, waterproofing shall comprise a synthetic membrane treated with Pekay F435 acrylic sealer to manufacturers' specification with a final coat of acrylic roof paint.

10.5 Flexible ducts shall not exceed 1,2m in length.

10.6 All supply air ducts shall be pressure tested with a maximum leakage of 5%.

10.7 All duct connections to vibrating equipment shall consist of a flanged joint followed by a flexible connector consisting of a neoprene covered fibre-glass cloth fixed on either side of the joint in a double lock seam to form an airtight flexible joint, with a minimum of 50mm separation between metal edges. Ducting at flexible joints shall be so supported that the ductwork is held square with the adjoining duct and no stress is imposed upon the flexible joint. All Fire Dampers shall be of the spring loaded multi-blade type complete with a fusible linkage and shall be certified fire rating. All fire dampers shall be installed where the ducting penetrates or passes through a fire wall, as shown on the drawing.

11 SUPPLY AIR VENTILATION

11.1 Supply air ducts are to be fitted with suitable sound attenuating devices fitted on either side of the fresh air pre-conditioning unit. Ductwork shall be fabricated and installed in

accordance with SMACNA (Sheet Metal and Air Conditioning Contractors National Association Inc. USA), SANS 1238:2005 and SANS 10173:2003) Standards. Rectangular ductwork shall be regarded as low velocity suitable for pressures up to 50mm wg., and velocities up to 10m/s. All ductwork shall be externally insulated using a double layer of foil faced bubble wrap.

11.2 Primary filters, correctly sizes for air quantity and face velocity, are to be installed in each of the ducts in such a manner that they are clearly indicated as to their location and are easily replaceable or cleanable without unduly disrupting the persons occupying the spaces served by the air conditioning system. Filters shall be of the pleated washable and fire resistant type for standard non-corrodible frame sizes. An air filter differential pressure gauge shall be installed on each filter bank linked to the intelligent controller.

11.3 Fans are to be mounted in such a manner that they do not conduct noise into the building, suitable sound/vibration damping devices are to be used to achieve this. Fresh air supply fans shall be in-line circular duct fans complete with downstream and upstream Sound Attenuators. Fans shall be fitted with integral thermal contacts with automatic resets and they shall be fitted with anti-vibration clamps to prevent transfer of vibration to the duct.

11.4 The sizes and duties of fans are indicated on drawings and bill of quantities.

11.5 All grilles shall be anodised aluminium of the sizes shown on the drawings and shall be complete with filter media. The colour of grilles shall be advised.

12 EXHAUST VENTILATION

12.1 The rooms indicated on the drawings shall be ventilated by negative pressure (exhaust ventilation) systems. Air shall be drawn through undercut doors or door grilles at low level and exhausted to atmosphere.

12.2 The air shall be extracted from the rooms by means of ceiling mounted extractions vents that are connected to duct systems as indicated on the drawings. Ductwork shall be fabricated and installed in accordance with SMACNA (Sheet Metal and Air Conditioning Contractors National Association Inc. USA, SANS 1238:2005 and SANS 10173:2003) Standards. Rectangular ductwork shall be regarded as low velocity suitable for pressures up to 50mm wg., and velocities up to 10m/s. The round duct will be used as shown in the drawings.

12.3 Points where extraction air is discharged to atmosphere shall not be nearer than 3m from the points where air intake points are located. Extracted air shall not be discharged directly in from of intake air positions.

12.4 The extractions fans operate continuously with isolators being positioned in close proximity to the fan units in clear line of sight and not further than 2m from the units.

12.5 Fans are to be mounted in such a manner that they do not conduct noise into the building, suitable sound/vibration damping devices are to be used to achieve this. Exhaust fans shall be in-line circular duct and multi-box fans complete with downstream and upstream Sound Attenuators. Fans shall be fitted with integral thermal contacts with automatic resets and they shall be fitted with anti-vibration clamps to prevent transfer of vibration to the duct. Multi box fans shall be fitted with EC-motors or equal to allow them to consume less energy while in operation.

12.6 Areas as indicated on the drawing for the will be ventilated as indicated for the buildings. Ducts in the ceiling voids will extract air and vent to atmosphere in such a manner that the air cannot be drawn back into the buildings.

12.7 The sizes and duties of the fans are indicated on the drawings and bill of quantities.

13 DIFFUSERS, GRILLES ETC.

13.1 Air distribution shall be by means of ceiling diffusers, grilles and disc valves as detailed

in the project specification.

13.2 Ceiling diffusers shall be of “Rickard", “Trox", or equal and similar manufacture, specified. Ceiling diffusers shall generally be connected to the main duct system by means of flexible connections. Diffusers shall be manufactured from steel and epoxy powder coated white finish. The diffusers shall be fit into 600x600 ceiling grille and shall be constant flow type.

13.3 Return air grilles shall be hinged filtered ideal for return air with a non-vision 45 degree fixed blade core. The return air grilles shall be suitable to fit into 600x600 or 600x1200 ceiling grid. The grilles shall be selected to have an average synthetic dust arrestance of 85%. They shall be manufactured from extruded aluminium with anodised or powder coated finish.

13.4 Door grilles shall be of the v-type with telescopic flanges, manufactured from extruded aluminium with anodised or powder coated finish.

13.5 Outside weather louvers shall be manufactured from extruded aluminium with anodised or powder coated finish.
Louvers used for outside air intakes shall be fitted with opposed blade dampers having blades no less than 100mm deep. All outside weather louvers shall be fitted with a vermin proof galvanised wire screen behind the blades.

13.6 Exhaust and Supply air valves shall be circular adjustable type and complete with air gap seal. They shall be manufactured from powder coated steel and colour shall be white.

13.7 Flexible ducting for air conditioning and fresh air supply shall be insulated and shall have Class 1 fire rating. The supporting documentation for the Class 1 fire rating shall be provided on the request of the Engineer.

13.8 Flexible ducting for exhaust/extract ventilation shall not be insulated and shall have Class 1 fire rating. The supporting documentation for the Class 1 fire rating shall be provided on the request of the Engineer.

13.9 Volume control dampers shall be butterfly type. The contractor shall be responsible for measuring and balancing of the supply air flows.

END OF SECTION

PART 2: STANDARD TECHNICAL SPECIFICATION

AIR CONDITIONING INSTALLATIONS

GENERAL TECHNICAL SPECIFICATION

G GENERAL

1.1 All workmanship and materials used in the installation shall be of the highest quality.

1.2 The entire installation shall comply with the Machinery and Occupational Safety Act of 1983, as amended.

1.3 All electrical work associated with the installation shall comply with the requirements of the Municipal Authorities and the SABS Code of Practice for the "Wiring of Premises" SANS 10142, as amended.

1.4 All plant associated with the installation shall comply with the Code of Practice for "Refrigeration systems including plants associated with air-conditioning"
SANS 10400 as amended.

ACC AIR COOLED CONDENSING UNITS.

1.1 Air cooled condensing units shall be suitable in all respects for outdoor location and shall comprise the following components:

- Refrigeration Compressor(s)
- Condenser Coil
- Condenser Fans and Motors
- Electrical Switch panel

1.2 Unit casing shall be constructed of not less than 1.2mm thick mild steel panels which shall be easily removable to provide access to all internal parts. The panels shall be painted and suitably treated for protection against rust.

1.3 One or more compressor of the Hermetic or Semi-hermetic type shall be provided. The compressor(s) shall be direct driven at a speed not exceeding that of a four pole motor, and shall be complete with low oil protection and crankcase heaters.

1.4 The condenser coil shall comprise either copper tubes with aluminium fins, or copper tubes with copper fins as detailed in the project specification. The coil shall be encased in a heavy gauge galvanised steel casing.

1.5 Condenser fans shall be of the propeller type with either vertical or horizontal discharge, with weather proofed protective wire guards. The fan blades shall be of aluminium construction.

1.6 A weather-proof electrical switch panel shall be incorporated within the unit, and shall house the safety controls and switchgear.

ACC-1

AHU AIR HANDLING UNITS.

1.1 Air handling units shall be either horizontal draw-through or vertical type, consisting of the following:

Supply Air Fan(s)
Direct Expansion or Chilled Water Cooling Coil
Washable Air Filters.

1.2 Unit casings shall be constructed of not less than 1.2mm thick mild steel panels which shall be easily removable to provide access to all internal parts. The panels shall be internally insulated with “Sonic-liner” or equivalent non-combustible material. The panels shall be painted to the standard colour of the Manufacturer.

1.3 Supply air fan(s) shall be double inlet double width forward curved centrifugal type with steel shaft and grease lubricated ball or roller bearings. Fans shall be driven by a common motor by means of vee belts.

1.4 Cooling coils shall comprise copper tubes with aluminium fins, or copper tubes with copper fins as detailed in the project specification. The coil shall be encased in a heavy gauge galvanised steel casing with a stainless steel drip pan.

1.5 Filters shall be of the pleated type with washable media.

AC AUTOMATIC CONTROLS.

1.1 Provide, install and set in operation all automatic controls required for the correct performance of the plant.

1.2 Generally, plants shall be switched ON and OFF automatically by means of an electrically operated time switch with spring or battery reserve. The time switch shall be interlocked with a rotary “manual/off/auto” over-ride switch so that the plant may be operated manually, or switched off on Public Holidays without interrupting the programme of the time switch. In cases where it is called for in the project specification, a time switch over-ride “timer” shall be incorporated to enable the plant to run for up to 2 hours after the time switch has switched off. The “timer" shall be activated by a push button.

1.3 Fire safety thermostats shall be mounted in the return air stream of each unit, or behind the common return air opening to the plant rooms, to shut down the system should the return air temperature exceed 40°C. These safety thermostats shall be of the manual reset type.

1.4 “No air flow” devices shall be installed in each unit to switch off the refrigeration system should the fan fail for any reason.

C/T COMMISSIONING AND TESTING.

1.1 On completion of the installation, it shall be tested to the satisfaction of the Engineer and all results shall be recorded in the Operating and Maintenance manuals.

1.2 All balancing and testing shall be carried out by the Sub-Contractor entirely at his own expense, and all test instruments shall be checked for accuracy by the Manufacturers, Suppliers, or an approved Laboratory and certified copies of the certificates showing the degree of accuracy shall be supplied to the Engineer, if requested.

1.3 Gauges, thermometers, ammeters, and other instruments which form part of the permanent plant may be used for test purposes provided they are certified as accurate.

1.4 The Engineer shall have the right to inspect any item of equipment during manufacture or before delivery to site.

1.5 The Sub-Contractor shall balance, set, and test the entire plant and shall submit the results to the Engineer who shall then carry out spot checks in the presence of the Sub-Contractor.

D/G DIFFUSERS, GRILLES.

1.1 Air distribution shall be by means of ceiling diffusers or grilles as detailed in the project specification.

1.2 Ceiling diffusers shall be of “Rickard", “Trox", or equal and similar manufacture, specified. Ceiling diffusers shall generally be connected to the main duct system by means of flexible connections.

1.3 Side blow outlets shall be of “Natal Aluminium", “Trox",or equal and similar manufacture, and shall be either double or single deflection as specified, manufactured from extruded aluminium with anodised or powder coated finish. Outlets shall be fitted with opposed blade dampers.

1.4 Return air grilles shall be either of the egg crate, or fixed blade type, as detailed in the project specification. They shall be manufactured from extruded aluminium with anodised or powder coated finish.

1.5 Door grilles shall be of the v-type with telescopic flanges, manufactured from extruded aluminium with anodised or powder coated finish.

1.6 Outside weather louvres shall be manufactured from extruded aluminium with anodised or powder coated finish.
Louvres used for outside air intakes shall be fitted with opposed blade dampers having blades no less than 100mm deep. All outside weather louvres shall be fitted with a vermin proof galvanised wire screen behind the blades.

EW ELECTRICAL WIRING.

1.1 Unless specifically stated otherwise in the project specification, the sub-Contractor shall be responsible for all electrical work and control wiring associated with the air conditioning installation with the exception of the incoming power which will be provided by others.

1.2 All electrical work shall comply with the requirements of the local Municipal Authorities and the Code of Practice for the “Wiring of Premises” SANS 10142 as amended.

EB EQUIPMENT BASES.

1.1 Inertia bases shall comprise a reinforced concrete base of mass 1,5 times that of the equipment to be mounted on it. The concrete shall be contained within a welded mild steel tray.
The base shall be positioned on a 75mm high plastered plinth with anti-vibration pads.

1.2 Floating steel bases shall be fabricated from mild steel with welded joints, of a size to suit the equipment to be mounted on it.
The base shall be positioned on a 75mm high plastered plinth with anti-vibration mountings.

EF-1

F FANS.

1.1 Propeller Fans.

1.1.1 Propeller fans shall be equal or similar to “Donkin” manufacture, and shall be of the direct coupled, motor driven type with mounting rings or plates. Impellers shall have steel or aluminium hubs.

1.1.2 Motors shall be totally enclosed with “E” class insulation.

1.1.3 Where fans are not located within ducting or plenums, they shall be fitted with wire guards.

1.2 Axial Flow Fans.

1.2.1 Axial flow fans shall be equal or similar to “Donkin” manufacture, with manually adjustable pitch aluminium bladed impellers.

1.2.2 Fans shall be either direct coupled or belt driven, as called for in the project specification.

1.3 Centrifugal Fans.

1.3.1 Centrifugal fans shall be equal or similar to “Donkin” manufacture, with multi-vane, forward or backward curved blades, and of single or double inlet, as called for in the project specification.

1.3.2 Large fans shall have split casings to permit installation through available openings in the building.

F-1

FT FILTERS.

1.1 Unless specifically stated otherwise in the project specification, air filters shall be of the Polypleat type, 50mm thick, with a permanent washable Viledon media, sized for a face velocity of 2,6m/s and a maximum initial resistance of 80pa.

1.2 Air filters shall be fitted into holding frames designed to allow a negligible quantity of air to bypass the filter.

I-1

I INSTRUMENTS.

1.1 Provide and install instruments where indicated on the drawings.
Generally instruments shall be of the circular dial type of 75mm to 100mm diameter, oil filled.
All panel mounted instruments shall be for flush mounting. Instruments shall be provided with pointers or have painted on the dial, a green line to indicate the normal operating position, and red lines to indicate minimum and maximum limits.

1.2 Air and water temperatures shall be measured with thermometers having a range suitable for the service and not exceeding 50% above or below. Stems or bulbs in piping shall be fitted into oil filled wells.

1.3 Inclined manometers shall be installed over all filter banks. The manometer shall be fitted with a spirit level and pointers shall be fitted to indicate when the filter media should be cleaned.

MD MACHINERY DRIVES.

1.1 Direct drive couplings shall be equal to “Fennaflex” as manufactured by Fenner, and shall be rated at least 125% of the driving motor kw.

1.2 Vee belt drives shall have a minimum of two belts, and pulleys should preferably be of the Taperlock type as manufactured by Fenner. Variable pitch pulleys which are standard on Packaged units are acceptable, but aluminium pulleys will not be permitted.

M/S MAINTENANCE AND SERVICE.

1.1 The sub-Contractor shall guarantee all plant and equipment, and shall maintain and service the entire plant for a period of 12 months from the date of the Acceptance Certificate.

1.2 Unless specifically stated in the project specification, during the maintenance period the plant shall be serviced at bi-monthly intervals, when it shall be necessary for a responsible person nominated by the Owner, to sign a service report, a copy of which shall be sent to the Engineer.

M MOTORS.

1.1 All electric motors on the installation shall be of one make unless it forms an integral part of equipment, and shall not operate in excess of 1500rpm, unless it has been approved in writing by the Engineer.

1.2 Three phase motors shall be squirrel cage induction type with special high torque motors being used on high inertia loads such as large centrifugal fans.

1.3 Starting methods for three phase motors shall be in accordance with local regulations.

1.4 The nameplate rating of electric motors shall be at least 15% greater than required.

O/M OPERATING AND MAINTENANCE INSTRUCTIONS.

1.1 The sub-Contractor shall furnish to the Engineer three bound copies of Operating and Maintenance Instructions prior to the final acceptance of the installation.
The manuals shall include the following:

Index
Description of the plant
Operation of the plant
Plant and equipment - including model numbers and Suppliers
Test report
Maintenance instructions
Spare parts list

Descriptive literature
Record drawings.

PAC-1

PAC PACKAGED AIR CONDITIONING UNITS - AIR COOLED

1.1 Air cooled packaged units shall comprise the following:

Compressor(s)
Air cooled condenser coil(s)
Condenser fan(s)
Direct expansion cooling coil
Supply air fan(s)
Cleanable air filters
Refrigeration piping
Electrical switchpanel.

1.2 Unit casings shall be constructed of not less than 1,2mm thick mild steel panels which shall be easily removable to provide access to all internal parts. The panels shall be internally insulated with “Sonic-liner” or equivalent non-combustible material. The panels shall be painted to the standard colour of the Manufacturer.

1.3 One or more compressor of the hermetic or semi-hermetic type shall be provided. The compressor(s) shall be direct driven at a speed not exceeding that of a four pole motor, and shall be complete with low oil pressure protection and crankcase oil heaters.

1.4 Each compressor shall be provided with an air-cooled condenser coil. The coil shall comprise either copper tubes with aluminium fins, or copper tubes with copper fins as detailed in the project specification.

1.5 Condenser fans shall be of the propeller type with either vertical or horizontal discharge, with weather-proof protective wire guards. The fan blades shall be of aluminium construction.

1.6 Direct expansion cooling coil(s) shall comprise either copper tubes with aluminium fins, or copper tubes with copper fins as detailed in the project specification. The coil shall be encased in a heavy gauge galvanised steel casing with a stainless steel condensate drip pan.

1.7 Supply air fan(s) shall be double inlet, double width, forward curved centrifugal type with steel shaft and grease lubricated ball or roller bearings. Where a single fan is used it shall either be direct driven by the electric motor, or by means of vee belts.
Where multiple fans are used, they shall be driven by a common motor by means of vee belts.

1.8 Filters shall be of the pleated type with washable media.

1.9 Refrigerant pipework shall be of seamless, bright, clean refrigerant quality copper tubing, and shall incorporate replaceable core driers, sight glass, thermostatic expansion valves, and suction line insulation.

1.10 An electrical switch panel shall be incorporated within the unit, and shall house the safety controls and switchgear.

P-1

P PAINTING

1.1 No untreated metal surfaces shall be permitted on the project. Items which are not galvanised or similarly protected against rust and corrosion, shall be painted.

1.2 All black metal work including brackets, hangers, platforms, piping etc. either exposed or concealed shall be thoroughly cleaned, de-scaled and painted with one coat zinc chromate followed by one coat enamel paint, to an approved colour.

1.3 Unless specified to the contrary hereafter, all equipment, exposed ducting, pipes, metal parts and insulated and plastered surfaces shall be painted with a primer coat followed by two coats enamel paint, to an approved colour.

RP-1

RP REFRIGERATION PIPING.

1.1 Refrigeration piping shall be carried out in seamless, bright, clean, refrigeration quality copper tubing. All pipe cuts shall be reamered and cleaned prior to making joints.

1.2 Liquid lines shall incorporate the following components.

Replaceable core filter drier.
Sight glass.
Solenoid valve.
Thermostatic expansion valve.
Diaphragm type isolating valves.

1.3 Suction lines shall be insulated with “Armaflex” or equal insulation. Insulation shall not be secured with “cable ties” unless a suitable galvanised sheet metal sleeve is applied around the insulation to prevent damage by over tightening of the tie.

SA-1

S SWITCHPANELS.

1.1 Switch panels and Control panels shall be supplied and positioned as indicated on the drawings.

1.2 The Sub-Contractor shall submit to the Engineer for approval two copies of Wiring Diagrams, Control Diagrams, and dimensioned panel layout drawings, before commencing with the manufacture or installation.

1.3 The system fault level for all components shall be selected for 10ka.

1.4 Panels generally shall be fabricated from 2mm thick mild steel and shall be finished with Orange enamel on the outside, and White enamel on the inside.

1.5 Wall mounting switchboards shall be of the surface type. Floor standing switchboards shall be mounted on channel iron bases.

1.6 All equipment such as operating handles, catches, switches, instruments, etc. mounted on the front panels are to be either black or chromium plated finish. All bolts, nuts, and set screws shall be chromium plated.

1.7 The Air Conditioning Sub-Contractor shall liaise with the Electrical Sub-Contractor and make all necessary provisions to facilitate the Electrical Sub-Contractors method of connecting supply cables to the Air Conditioning switchboards.

1.8 All equipment inside and outside the switchboards shall be clearly labelled, employing Traffolite strips secured to the panels in an approved manner. (fixing with adhesive will not be acceptable).

1.9 All switchboards shall be dustproof and hose proof in accordance with IEC 144 Classification IP65.

1.10 Switchboards shall be complete with sections not exceeding 1,5m in length and shall be complete with incoming section consisting of a door interlocked, triple pole, main fused switch complete with HRC fuses, a neutral link and copper busbars mounted on paxalin or epoxy-resin type insulators.

1.11 Switchboards shall be delivered to site fully wired and tested , all internal wiring being neatly run between equipment and clearly labelled terminal blocks. All All control wiring shall be colour coded.

1.13 Where space for future equipment is called for, the cover shall be correctly punched out, approved blanking dummies or covers provided and the chassis and busbars shall be extended and pre-fitted for the reception of the specified future equipment.

1.14 Each switchboard shall be supplied complete with three spare fuses for each different size and type of fuse installed in the switchboard. Spare fuses shall be mounted in Terry clips within the switchboard.

1.15 Interlocking control wiring between switchboards and switchboard sections must be isolated and the live side terminals shall be suitably shrouded.

1.16 All controls for motors shall be so arranged, that if the main supply to a motor is disconnected, controls are de-energised.

1.17 Wherever any signal is to be relayed to a location remote from the switchboard, provide a relay in the switchboard with both normally open and normally closed contacts and wire these separately to potential free outgoing terminals.

1.18 All motors and heater banks shall have pilot lights on their respective switchboards. Green lights shall indicate when motors are running. Yellow lights shall indicate when heaters are switched on. Only one light is required per heater bank. Red lights shall indicate when the heater safety thermostats, motor overloads or low flow circuits trip, or when alarm conditions occur.

1.19 All safety circuits shall be automatically reset after power is restored without using reset buttons.

1.20 Where heaters or other phase to neutral loads are used, neutral bars are to be not less than half the cross-sectional area of phase busbars, but not less than 25mm x 6mm, and are to be mounted on paxalin or epoxy-resin type insulators.

1.21 Where neutral bars are purely on the control side, 15mm square brass bars with 2 tapped holes per way may be used. The neutral bars shall be mounted on bakelite or equal insulators.

1.22 For floor type panels in sections, a copper earthing strip of not less than
25mm x 6mm shall run the full length of the complete panel either at the top or bottom of the panel. It must be securely bolted to the framework to ensure good continuity. For wall mounted panels an earthing brass bolt of not less than 10mm diameter shall be drilled and brazed to the main panel case.

1.23 Panel Wiring: Control wiring shall be a minimum of 1,5mm sq. 250 volt grade PVC covered stranded wire with bare ends soldered. Power wiring shall be a minimum of 2,5mm sq. PVC covered stranded wire 600 volt grade phase coloured Red, White, Blue, and Black for neutral.

1.24 Starter overloads must be thermal bimetal overload units of the manual reset type complete with single phase protection. Inherent type will not be accepted unless approval is obtained from the Engineer.

1.25 All switchgear shall be subject to the approval of the Engineer.

C 3.2.6 PARTICULAR SPECIFICATIONS

COMMUNICATION SYSTEMS WORK SPECIFICATIONS

SECTION 6: COMMUNICATION SYSTEMS WORK

SPECIFICATION FOR COMMUNICATION SYSTEMS WORK

INSTALLATION DETAILS

This document covers the total ICT Infrastructure and IP Telephone specifications as required by Fort Cox College. All new network infrastructure installations as well as upgrades to existing infrastructures must fully comply with this specification as a minimum.

This specification is intended to provide the best solution for Fort Cox College. The tenderer must provide a solution which addresses the ICT services, in terms of IP system. The solution must also cater for the local area connectivity (LAN) as well as telephony and wireless access points.

1 NOTICE TO TENDERERS

The contractor shall provide only skilled labour to complete work within the agreed upon time frame.

The contractor is responsible for the provision of all tools required to fulfil his installation obligations in accordance with task at hand at his cost.

By means of the submission of a quotation and the acceptance of the relevant order number, the contractor is solely responsible for the successful delivery of all documentation pertaining to installed components e.g. Floor plans, excel sheets and test results to the Fort Cox ICT department staff member and the relevant engineer responsible for the project and NO OTHER person, unless such an agreement has been made with the aforementioned responsible persons.

The contractor is solely responsible for the thorough pre-tender inspection and installation evaluation of the project for which a quotation is submitted. Any oversight on the part of the contractor are for his account.

2 EXTENT OF WORK

The work covered by this Contract comprises the complete communication systems installation, **(including a 12-month defects liability period)**, as further detailed in this specification.

Contractor to refer to the attached drawings detailing the scope of all the work required. The communication systems Contractor shall include for all items necessary to complete the work. The contractor is to allow for the stripping of the existing installation when required.

The work covered by this contract comprises the supply, installation, testing, commissioning and three (3) months guarantee, of the complete communication systems engineering services installation, in working order, as shown on the drawings and as per this specification.

The Works involved and for which the communication systems contractor must allow is briefly as follows, namely:

- Preliminary and General Items.
- Supply and install Cat6e UTP and multi-mode Fibre Optic Cabling
- Supply and install ICT infrastructure
- Supply and install VoIP telephones
- Provisioning of Servers, Storage and Networking related equipment
- Supply, deliver, install, commission, upgrade, maintain, monitor and provide related services for the Servers, Storage, Network and monitoring
- Build fault tolerant failure resilient servers Infrastructure
- Install latest software, firmware and latest patches
- Documentation and Handover
- Quality Assurance
- Submission of 3 sets of “As Built" information, operational- and maintenance manuals for the additional work.

All other materials, equipment, labour and services necessary for the complete, safe and efficient operation of the Works in full accordance with the specifications as laid down in this document.

The following work is excluded and shall be executed by others, namely:

- Provision of sleeves larger than 50mm diameter and manholes (electrical, telephone and communications installations)
- Patching and plastering conduit chases.

3 COMPLIANCE WITH REGULATIONS

The installation shall be erected and tested in accordance with the following Acts and regulations:

- SANS 10142: "Code of Practice for the Wiring of Premises",
- The Occupational Health and Safety Act, 1993 (Act 85 of 1993),
- The Local Government Act 1998 (Act 10 of 1998), municipal by-laws and any special requirements of the local supply authority,
- The Fire Brigade Services Act 2000 (Act 14 of 2000),
- The National Building Regulations and Building Standards Act 1996 (Act 29 of 1996),
- The Electricity Act 1996 (Act 88 of 1996),
- The Regulations of the local Gas Board where applicable,
- The Relevant SABS publications (such as for example SABS 252 parts 1 and 2, SABS 400, etc.)

4 SITE CONDITIONS

Location

Fort Cox Agriculture and Forestry Training Institute
Cwaru location
Middledrift
Eastern Cape

GPS Coordinates:
lat 32°46’ 57.00”S
lon 27°01’ 40.00”E

Access

Access to the site is via a tired road

5 SUPPLY AUTHORITY

The Communication Authority is Telkom. The ICT Contractor shall liaise with this Authority as necessary.

6 PROGRAMME

The ICT Contractor shall submit a programme for the Works, within 7 days of receipt of the Letter of Acceptance of Tender and / or Letter of Commencement of Works.

The contract period is per the balance of main contractor’s agreement.

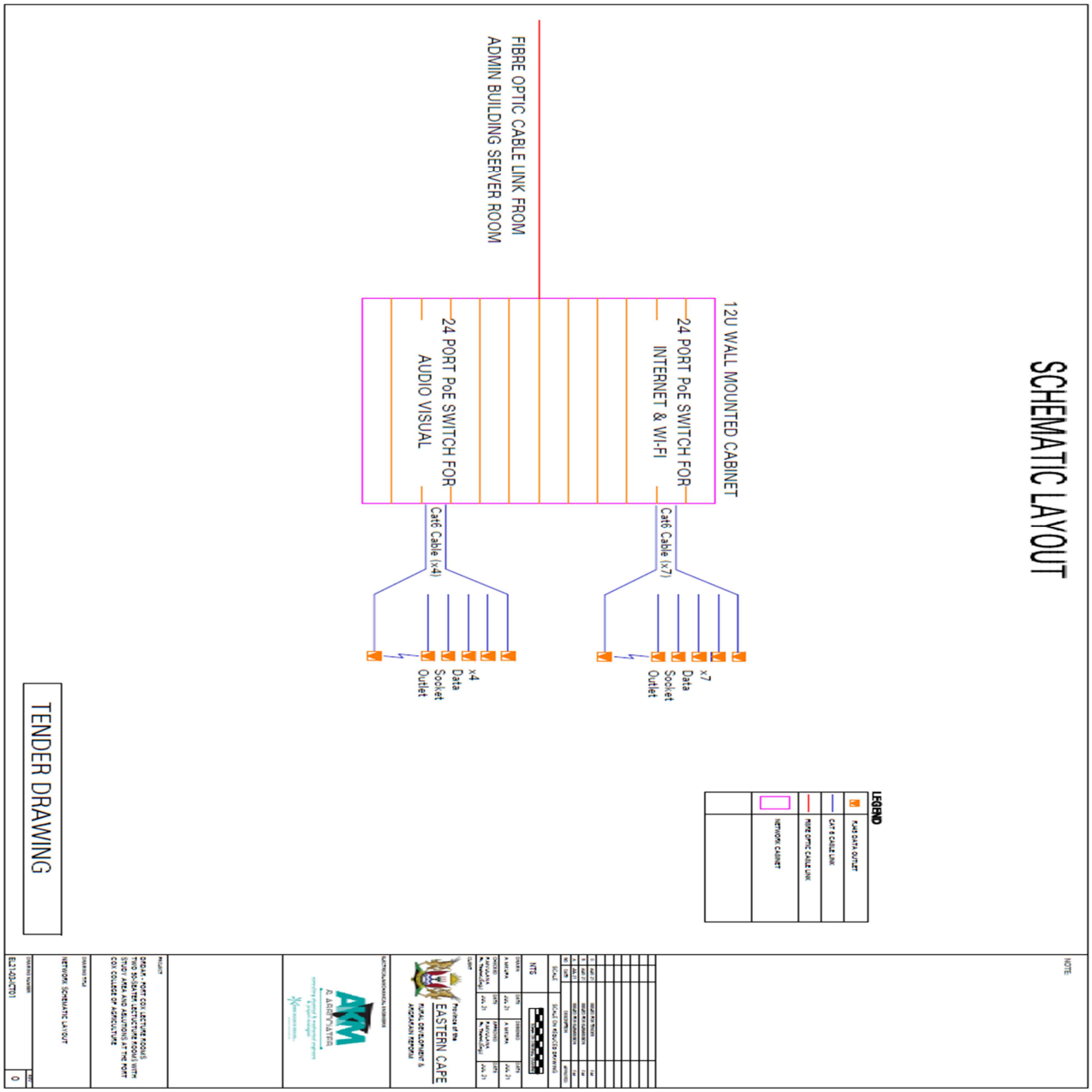
The ICT Contractor will be expected to comply with the Main Contractor’s programme.

The cost of overtime, additional labour and plant necessary for the completion of the Works in accordance with the programme shall be included in the ICT Contractor’s tender price for the Works.

7 DESCRIPTION OF BUILDINGS

All buildings are indicated on the site plan.

8 ICT SITE CONFIGURATION



9 BASELINE REQUIREMENTS FOR ICT

Baseline requirements for ICT			
	Quantity	**Specification**	**Additional**
INCOMER FIBRE OPTIC CABLE			
Fibre	1	Provision of 100m 4 Core multimode 50/125u HDD fiber optic cable from Telkom kiosk to saver room • pig tails, mid couplers • Gbic(sfp)connectors X2 • Splice Tray ST-LC fibre patch leads Fibre X2	(From Admin building server room to new lecture halls store room)
SERVER ROOM (FIRST FLOOR)			
Cat6 network point	10	A network point will consist of a cable run up to 50 meters and must include the fly-lead, patch-lead, routing. Flush mount must be used. Grey patch leads for data	Inclusive of 4 network points for Wireless Access Points.
Patch Panel	2	24 Port Patch Panel Cat6	
Fibre	1	Fibre Patch Panel, Splice tray, mid couplers, ST-LC fibre patch leads (X8) , pigtails, all other accessories, brush panels, blanking units, Gbic(sfp) connectors X6	
Switch	2	1 x 24 Port PoE Switch	
Brush Panel	2	Brush Panel long base	
12 U wall mounted	1	12U Floor standing cabinet 600mm deep with glass door, lock and removable side panels. Must include the following: • 1X 5 way PDU • 1XFans low noise • Blanking plates (for all unused slots)	

10 VOIP TELEPHONE

The Fort Cox College is looking to implementing a voice over IP telephony solution. The telephony solution has be able to integrate with the local area network being implemented it would be preferable if the telephony and local area network could be provided by the same vendor. This will assist the Department with support and maintenance, having one point of contact. Aside from voice calls the solution must also provide a voicemail service and must be bundled into one device. The solution must include a receptionist handset and account for extension handsets for other offices.

11 NETWORK CABLING

This work must be done according to the latest versions of the following specifications and Documentation:

- SANS10340-1 - Installation of telecommunication cables Part 1: Fibre optic cable in buildings
- SANS10340-2 - Installation of telecommunication cables Part 2: Outdoor fibre optic cables
- SPC-00583 - Specification for optical fibre accessories
- SPC-00575 - Specification for the planning and erection of self-supporting optical fibre cable on traction masts
- SPC-01279 - Specification for the erection of wooden telephone poles for the support of optical fibre cables

11.1 Fibre Optic Backbone

A multi Core Single mode Fibre optic infrastructure shall be provided linking specified buildings distribution closures to the data centre. The fibre optic backbone shall allow for a minimum of 1 Gigabit transmission speeds.

The fibre optic backbone cabling installation is a structured cabling system comprising:

- Data Enclosures & splice trays for termination of fibre links from the computer room.
- Allows for the installation of fibre panels within all floor data racks and the computer room.
- Backbone between the various data enclosures within buildings with multiple fibre cores to the computer room.
- Patch cords and all connectors.
- Factory moulded Patch cords and all connectors.

Each link shall comprise of a Heavy Duty Duct (HDD) fibre optic cable multi-mode to suit equipment requirements and conforming to the following:

Optical Multi Mode (OM2)	50/125 um 850 nm and 1300 nm	(1 Ghz)

On completion of a fibre link an acceptance testing of a fibre link with an O.T.D.R. or a light source and power meter shall be performed from both ends. The readings shall then be recorded and the bi-directional event and average link lost shall be calculated. The test results shall be stored in both hard and soft copies for the acceptance documentation.

11.2 Copper Data Cabling

Category 6: cables and connecting hardware specified up to 250Mhz. The performance of Category 6 corresponds to Class E as specified in ISO/IEC 11801 Ed.2:2002 or to a specification certified as an equivalent specification by the CLIENT.

The UTP (Unshielded Twisted-Pair) data installation shall be a structured cabling system conforming to Category 6e cabling standards suitable for Class E computer installations/applications. The UTP installation shall allow for a single Data outlet for the data network area.

Cabling between the patch racks shall be Cat6e Systimax or Molex cable. Cabling shall be fully terminated, tested and documented. Test results shall be submitted for all links from rack to final outlet.
All products installed shall be branded indicating the manufacture's name and the product category, while all cables shall be stamped with the following details:

- Name of manufacturer.
- Specification it has been tested to (TSB 568B or ISO/IEC 11801, etc).
- Name of testing laboratory that verified conformance to specification.
- Cable rating (CAT 6).

Each link shall comprise of a Heavy Duty Duct (HDD) fibre optic cable multi-mode to suit equipment requirements and conforming to the following:

Proposed Patch-Lead colour utilisation:

Data Normal	Grey
Telephone	Black
Radio	Green
Cross Over	Blue
1 Gbps Uplink	Orange
1 Gbps Server Uplink	Lilac
100 Mbps Server Uplink	Yellow
100 Mbps Uplink	Red

Cable separation distances:

	Without Divider, or with Non-Metallic Divider	Aluminium Divider	Steel Divider
Unscreened power cable and unscreened IT cable	200mm	200mm	50mm
Unscreened power cable and screened IT cable	50mm	20mm	5mm
Screened power cable and unscreened IT cable.	30mm	10mm	2mm
Screened power cable and screened IT cable	0mm	0mm	0mm

12 SERVER ROOMS

The server room shall conform to these minimum requirements as per the requirements below.

The fibre optic backbone cabling installation is a structured cabling system comprising:

- All new server rooms should be a minimum of 12 square meters in size and be housed with duel power skirting on at least 3 of the walls and have a minimum of 6 dedicated UPS plug sockets.
- A fire proof door must be fitted with access control and an automatic door closing mechanism.
- An approved fire detection system as well as an approved fire dampening system (Co2 or Norse gas system) must be installed as specified previously.
- The fire detection system must have a manual / auto switch on the outside of the new server room door this is for safety purposes when entering the server room to prevent the release of the fire detection gas.
- All new server rooms must be fitted with a minimum of a 12000 BTU Air conditioner which will be of a “split unit type”
- A minimum of 4 network points per server room mounted on the power skirting
- A minimum of a 5kVA UPS system must be installed in all new server room with (on line serves)
- A dedicated electrical DB must be installed and only the equipment in the new server room must run off this.
- Were possible a raised floor needs to be installed and must be of the fire proof type and be at least 250mm in height and have a tile lifter.
- Access into the new server room must be a minimum 110mm PVC pipe, if access is coming for outside of building and if access is from the ceiling then a cable tray of a minimum of 300mm wide and must be mounted the correct way with P2000 and this must be installed from the ceiling to floor level and as close as possible to the new network cabinet.
- Access control must be feed from the dedicate UPS supply and have an exit button mounted on the inside door wall.
- The new server room must be sealed off correctly to prevent dust from entering the room.
- A heavy duty lockable security gate must be fitted to the external entrance of the room
- Ideally windows should not be provided but, if so, heavy duty burglar bars must be fitted on the inside
- A burglar alarm system must be fitted
- Access into the room must not be possible via the ceiling.
- Where possible the ceiling must be solid concrete or heavy gauge mesh must be securely fitted to prevent access
- The server room must be situated in an area which is away from the general public and areas used by patients

13 NETWORK CABINETS

The tenderer shall procure approved equipment for use in ICT installations from a list of department specification.

- ISO 9001:2000 – Quality management systems
- IEC 297 1975 - Dimensions Of Mechanical Structures Of The 482.6mm (19in) Series
- BS 5954:1980 - Specification for dimensions of panels and racks for electronic equipment

13.1 Network Equipment

The image below indicates the typical layout of equipment that would be used in a network cabinet for access points that allow users to connect to the network (different configurations are allowed but this must be approved by the Employer’s technical representative):

9U Cabinet layout of Equipment Found in a Network Cabinet:

1U Blanking Panel
24 Port Patch Panel
Brush Panel
24 Port Switch
1U Blanking Panel
1U Blanking Panel
1U Blanking Panel
Brush Panel
Fibre Panel

14 PROJECTOR SPECIFICATION

Type of display	Poly-silicon TFT active matrix
Resolution	**BrightLink 480i**: 1024 × 768 pixels (XGA) **BrightLink 475Wi/485Wi**: 1280 × 800 pixels (WXGA)
Lens	F= 1.80 Focal length: 3.71 mm
Color reproduction	Full color, 16.77 million colors
Brightness	**BrightLink 475Wi**: Normal Power Consumption mode: White light output 2600 lumens (ISO 21118 standard) Color light output 2600 lumens ECO Power Consumption mode: White light output 1800 lumens (ISO 21118 standard)
	BrightLink 480i: Normal Power Consumption mode: White light output 3000 lumens (ISO 21118 standard) Color light output 3000 lumens ECO Power Consumption mode: White light output 1800 lumens (ISO 21118 standard)
	BrightLink 485Wi: Normal Power Consumption mode: White light output 3100 lumens (ISO 21118 standard) Color light output 3100 lumens

	ECO Power Consumption mode: White light output 1800 lumens (ISO 21118 standard)
Contrast ratio	3000 to 1 with Auto Iris on and Normal Power Consumption mode
Image size	**BrightLink 480i**: 55.9 to 93.2 inches (1.42 to 2.37 m) **BrightLink 475Wi/485Wi**: 60 to 100 inches (1.52 to 2.54 m)
Projection distance	13.7 to 23.5 inches (0.35 to 0.60 m)
Projection methods	Front, wall or ceiling-mounted
Optical aspect ratio (width-to-height)	**BrightLink 480i**: 4:3 **BrightLink 475Wi/485Wi**: 16:10
Focus adjustment	Manual
Zoom adjustment	Digital
Zoom ratio (Tele-to-Wide)	1:1.35
Internal sound system	16 W monaural
Noise level	35 dB (Normal Power Consumption mode) 28 dB (ECO Power Consumption mode)
Keystone correction angle	Vertical: ± 5º Horizontal: ± 5º
USB-B port compatibility	USB 1.1 and 2.0 compliant for USB display or external mouse
USB-A port compatibility	One USB 1.1 and 2.0 compliant port for USB device input or EPSON document camera display

14.1 Projector Screen

- Self-Locking system is easy to use
- Screen stays wrinkle-free
- Flame retardant and mildew resistant
- Black framed
- Black backed screen
- Screen gain 1 with matt white fabric
- View 2030x1520mm and Ratio is 4 to 3

15 AUDIO VISUALS

15.1 Interactive Lecturn Solution

- Built-in 3 sub-woofer loudspeakers
- One treble speaker, with rated output power 60W
- Built-in 60W amplifier
- Built-in microphone and desk lamp
- Includes one VHF handheld wireless microphone and one Lapel microphone
- One line input, two microphone inputs,
- One line output and one record output
- Ideal for rooms up to 80m^2, additional speakers can be added for larger rooms.

15.2 LED Interactive Touch Screen

- 65” 4K multi-touch screen takes presentations, lessons and collaborative discussions to the next level.
- Increase your audience’s participation through this multi-media interactive display and ensure information retention through increased focus.
- Interact with your up-to-date content through annotations, gesturing or manipulations. Working or learning has never been more fun.

15.3 Visualizer Presenter Deluxe

- High Preformance
- 8M Pixel
- 1/4" Cmos Sensor
- Full HD Sensor
- Max Resolution 1080p via HDMI output
- 30fps
- 100 x Digital zoom
- Record presentations and save via SD card
- Compatible with 20-34mm microscope eyepiece
- Auto Focus
- Easy to connect to Projectors, Touch Screens, Interactive Whiteboards, Wireless Tablets and Wireless Mouse.
- Ideal to share information from text books, journals, models or 3D objects
- Large image capture (Max A3)
- Built in LED lights for low-light conditions
- Rotating Camera Head

16 EARTHING AND BONDING

The contents of these standards are regarded as the minimum requirements.

- All material which for part of earthing and bonding shall conform to SANS 10142-1:2003

16.1 Communication Earth

A communication earth with an earth impedance of not more than 5 Ohms shall be installed at all the Network and PABX Rooms.

The earth shall be connected with a 70mm² flexible insulated copper conductor to an 8 way earth bus-bar to be fitted inside the Network and/or PABX Room. The 70mm² insulated copper conductor shall be cad-welded to the earth mat or earth rods.

A communication earth of less than 50 ohm impedance shall be installed outside all buildings where an underground cable has to be terminated. The earth shall be connected with 16mm² flexible insulated copper conductor to the metal back mount frame of the Krone frame/ box installed in a building. The 16mm² insulated copper conductor shall be cad welded to the earth mat or rod and a crimped lug shall be fitted at the other end for connection to the frame / box.

After installation of the earth system the contractor shall measure the resistance of the earth and record it.

Verticals of a Krone wall mounted distribution frames shall be earthed to each other with at least a 16mm² insulated flexible earth cable.

The screens of all the underground cables terminated on the MDF shall be connected to verticals of the MDF.

The screens of underground cables terminated on intermediate frames/ boxes in buildings shall be connected to each other and not be earthed.

The screens of all the other underground cables shall be connected to the earth via an 110V metal oxide arrestor.

All data cabinets shall be earthed with a 4mm² flexible insulated copper conductor to the ground bar of the power distribution board and a crimped lug shall be fitted at the other end for connection to the cabinet. The lug shall be fastened onto the cabinet with a bolt, nut and cerated washer.

All metal pathways shall be earthed with a 4mm² flexible insulated copper conductor to the ground bar of the power distribution board and a crimped lug shall be fitted at the other end for connection to the metal pathway. Where an earth pin is not available, the lug shall be fastened onto the metal pathway with a bolt, nut and cerated washer

The metallic structure of the raised floor shall be electrically bonded to the ground to minimize static build-up. The floor panels shall have conductive contact with either the framing pedestals, or both for positive electrical grounding.

The bolted-stringer raised floor is considered by the National Electrical Code (NEC) to be electrically bonded to itself. This type of raised floor need only be interconnected to the building steel, electrical safety ground, and any other metallic structure that penetrates the perimeter of the floor to meet the required specifications.

A raised-floor structure that does not have bolted stringers shall be circled with a bonding conductor connected to the top cap area of the pedestals, routed from pedestal to pedestal, in as short a route as possible. According to the NEC, the conductor shall be bare copper wire not smaller than 16mm.

END OF SECTION

C 3.2.7 PARTICULAR SPECIFICATIONS

HEALTH AND SAFETY SPECIFICATIONS

1. INTRODUCTION

In terms of the Construction Regulation 5(1) (b) of the Occupational Health and Safety Act, No.85 of 1993 and Construction Regulation 2014, Department of Rural Development and Agrarian Reform, as the Client and/ or its Agent on its behalf, shall be required to compile a Health & Safety Baseline Specification for any intended project and provide such specification to any prospective contractor who is making a bid or appointed to perform construction work for the Client and/or its Agent on its behalf with the same.

1.1. The Construction Health and Safety Specification

This Health and Safety Specifications document is governed by the Occupational Health and Safety Act, 1993, (Act No. 85 of 1993), hereinafter referred to as " The Act. Furthermore, although the definition of Health and Safety Specifications, stipulated a documented specification, of all health and safety requirements pertaining to associated works on a construction site, so as to ensure the health and safety of person, it is required that the entire scope of the Labour Legislation, including the Basic Conditions of Employment Act, be considered as part of the legalcompliance system. With reference to this specification document this requirement is limited to all health, safety andenvironmental issues pertaining to the site of the project as referred to here-in. Despite the foregoing it is reiteratedthat environmental management shall receive due attention.

1.2. Implementation of the Construction Health and Safety Specification

This specification forms an integral part of the contract, and the Contractor is required to use it at pre-tender phase when drawing up its project-specific construction phase health and safety plan. The Principal Contractor shall forwarda copy of this specification to all Sub-Contractors at their bidding stage so that they can in turn prepare health and safety plans relating to their operations.

This Construction Health & Safety Specification is published in terms of the Occupational Health & Safety Act of 1993 (OHS Act), Construction Regulations 2014, Regulation 5(1)(b).

The Health and Safety Specifications does not replace the Construction Regulations, 2014, but is a supplementary specification as required in terms of the Regulations. Partial references to or quotes from the Regulations do not imply that the sections not referred to or quoted from are of lesser important or are not applicable.

The Principal Contractor is, at all times required to and will remain responsible to fully address all requirements and standards of the Occupational Health and Safety Act, Regulations and the full Construction Regulations in the Health and Safety Plan and the implementation thereof.

The client is committed to ensuring that the highest standards of health and safety prevail and this Construction Health and Safety Specifications may contain standards which are more onerous that the statutory standards. This Health & Safety Specification may be supplemented during the project with further specific Construction Health & Safety Specifications which deal with health & safety issues as these arise. The client has appointed an Agent who will (inter alia) be responsible for the approval of all Principal Contractors' H&S Plans, for the auditing of the

Principal Contractors' implementation thereof, and for maintaining the document control associated with the Construction Health and Safety Specifications.

This Construction Health and Safety Specifications forms an integral part of the Contract, and Principal Contractors are required to make it an integral part of their contracts with subcontractors and suppliers.

The Principal Contractor shall ensure that the H&S plan contains sufficient evidence of:

a) Adequate provision for the cost of health and safety measures.
b) The principal contractor's access to and intention to appoint persons with the necessary competencies to carry out the construction work safely.
c) The principal contractor's access to the necessary resources to carry out the construction work safely and without risk to the health of the workers.

d) The principal contractors' planning of construction activities within the special requirements emanating from personnel deployment, traffic- and time constraints and deployment of small and medium enterprises and local labour.

The Contractor shall confirm in writing that he has familiarised himself with the content of the Construction Healthand Safety Specification and that he will comply with all obligations in respect thereof.

Each contractor and sub-contractor shall confirm in writing that he has familiarised himself with the content

of the Construction Health and Safety Specification and that he will comply with all obligations in respect thereof.For this purpose, Contractors appointment as per this document must be signed by each contractor and placed inthe H&S plan of the contractor or sub-contractor.

1.3. Health and Safety Specifications Statutory Compliance

This health and specifications document is a legal compliance document drawn up in terms of the OHS Act and aretherefore binding. All Contractors entering into a Contract shall, as a minimum, comply with the;

- Occupational Health & Safety Act and Regulations (Act 85 of 1993). A current, up to-date copy of the OHS Act andConstruction Regulations must be available on site at all times.
- Compensation for Occupational Injuries & Diseases Act (Act 130 of 1993). The principle Contractor will be required to submit a letter of Registration and "good-standing" from the Compensation Insurer before being awarded the Contract.
- All Contractors shall comply with the "Integration Labour Law " and regulations
- All relevant Municipal bylaws and National Building Regulations
- The Immigrations Act 2002 as amended and shall further ensure that no illegal aliens are employed on theconstruction site**.**
- All Contractors shall comply with the National Environmental Management Act (Act 107 of 1998).
- Traffic accommodation as stated by the South African Road Traffic Signs Manual (SARTSM), Volume 2, Chapter 13,
- Protection of Personal Information Act,2013 (POPI) amended 01 July 2020.

1.4. Definitions

- **Act:** means the OH&S Act (85 /1993)
- **Accident/Incident**: A Sudden, uncontrollable, unplanned, undesirable occurrence which disrupts the normal functioning of persons and causes, or has a potential to produce or cause unintended injury, death, property damage or business interruption.
- **Client**: means any person for whom construction work is being performed

- **"building"** includes -
- any structure attached to the soil;
- any building or such structure or part thereof which is in the process of being erected; or
- any prefabricated building or structure not attached to the soil;
- **"Chief executive officer",** in relation to a body corporate or an enterprise conducted by the State, means the person who is responsible for the overall management and control of the business of such body corporate or enterprise;
- **"danger"** means anything which may cause injury or damage to persons or property;
- **"employer"** means, subject to the provisions of subsection (2), any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerate him, but excludesa labour broker as defined in section 1(1) of the Labour Relations Act, 1956 (Act No. 28 of 1956);
- **"hazard"** means a source of or exposure to danger;
- **"health and safety equipment"** means any article or part thereof which is manufactured, provided or installed in the interest of the health and safety of any person;
- **Hazard**: The inherent potential of an activity, substance or situation to cause injury or damage to people's health, or result in loss of property.
- **Health & Safety Specification**: a documented specification of all health & safety requirements pertaining to the associated works on a specific construction site, so as to ensure the health & safety of persons
- **Health & Safety File**: a file or other record in permanent form containing the information as contemplated in the regulations and health and safety specifications.
- **Health & Safety Plan:** a documented plan that addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified.
- **"incident"** means an incident as contemplated in section 24 (1);
- **"mandatary"** includes an agent, a contractor or a subcontractor for work, but without derogating from his status in his own right as an employer or a user;
- **"occupational health practitioner"** means an occupational medicine practitioner or a person who holds a qualification in occupational health recognised by the South African Medical and Dental Council as referred to in the Medical, Dental and Supplementary Health Service Professions Act, 1974 (Act No. 56 of 1974), or the South African Nursing Council as referred to in the Nursing Act, 1987 (Act No. 50 of 1978);
- **"risk"** means the probability that injury or damage will occur. The combination of the likelihood of a hazardous event and the severity of the injury or damage that the event causes to the health of people or property **Safe Working Procedure:** Work activities highlighted in the risk assessments as "High Risk" will require safe work procedures (SWP) **"safe"** means free from any hazard;
- **"certificate of competency"** or **"certificate"** means certificate of competency as a mechanical or an electricalengineer, as the case may be, issued in terms of regulation 2 (1);
- **"agent"** means a competent person who acts as a representative for the client;
- **"client"** means any person for whom construction work is performed;
- **"competent person"** means a person who—has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must beregarded as the required qualifications and training; and is familiar with the Act and with the applicable regulations made under the Act;
- **"Contractor"** means an employer who performs construction work;
- **"fall prevention equipment"** means equipment used to prevent persons from falling from a fall risk position, including personal equipment, a body harness, lanyards, lifelines or physical equipment such as guardrails,

screens, barricades, anchorages or similar equipment;

- **"fall arrest equipment"** means equipment used to arrest a person in a fall, including personal equipment such as body harness, lanyards, deceleration devices, lifelines or similar equipment.;
- **"Fall protection plan"** means a documented plan, which includes and provides for-
  - all risks relating to working from a fall risk position, considering the nature of work undertaken;
  - the procedures and methods to be applied in order to eliminate the risk of falling; and
  - a rescue plan and procedures;
- **"hazard identification"** means the identification and documenting of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or tobe executed;
- **"health and safety file"** means a file, or other record containing the information in writing required by these Regulations;
- **"health and safety plan "** means a site, activity or project specific documented plan in accordance with the client's health and safety specification;
- **"health and safety specification"** means a site, activity or project specific document prepared by the client pertaining to all health and safety requirements related to construction work;
- **"medical certificate of fitness"** means a certificate contemplated in regulation 7(1)(8);
- **Occupational safety:** A condition or state of being resulting from the medication of human behavior, and/or designing of the physical environment to reduce the possibility of hazards, thereby reducing accidents.
- **"principal contractor"** " means an employer appointed by the client to perform construction work;
- **"risk assessment"** means a program to determine any risk associated with any hazard at a construction site, inorder to identify the steps needed to be taken to remove, reduce or control such hazard;
- **"structure"** means—
  - any building, steel or reinforced concrete structure (not being a building), railway line or siding, bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, bulk mixing plant, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;
  - any false work, scaffold or other structure designed or used to provide support or means of access during construction work; or
  - any fixed plant in respect of construction work which includes installation, commissioning, decommissioning or dismantling and where any construction work involves a risk of a person falling;

Abbreviations:

CV	**C**onstruction Vehicle
EMS	Emergency Medical Services
FPP	Fall Protection Plan
HSF	Health & Safety File
HSS	Health & Safety Specification
MP	Mobile Plant
MSD	Material Safety Data Sheet
OH&S	Occupational Health & Safety
OSHACT	Occupational Health and Safety Act 85 of 1993

PC	Principle Contractor
PPE	Personal Protective Equipment
SABS	South Africa Bureau of Standards
SWP	Standard Working Procedures

2. Scope of Work

2.1. SCOPE OF WORK

The scope of this Occupational Health, Safety and Environmental (SHE) Specification is to address the reasonable and foreseeable aspects of occupational health, safety and environmental management, which will be affected by the contract work.

The specification will provide the requirements that the Principal Contractor and other Contractors shall comply with in order to reduce the risks associated with the contract work, and that may lead to incidents causing injury and/or ill health or degradation of the environment, to a level as low as reasonably practicable and possible.

Fort Knox College through the Department Rural Development and Agrarian will do construction works as follow:

The Scope of Works are as follows:

- Building of a lecture Hall
- External Works
- Electrical Installation
- Mechanical Installation
- Road and parking area
- ICT Installation

Scope of Works	Potential Hazards of Scope
Establishment of Site	Site Entrance, Fencing, Security, housekeeping, vehicle and equipment movement and off loading
Electrical Works	High Mask Working At heights Installation of DB Board Installation of new light fittings
Bulk Excavation	Excavation, Plant, Equipment, Operators, Underground cables and pipes
Installation of new sanitation and water pipes	Manual Labour Ergonomics Diseases Open trenches
New Building Works	Brick works, Excavation, Working at heights, Concrete works, plastering,
Install new Roof Sheets	Working at Heights Ergonomics Cuts from Roof sheets Fall and trips Ladder work Weather Conditions

	Life line (stability) Scaffolding
Upgrade of Fire System	Metal works, Confined spaces, Working at heights, Equipment used
Paving	Dust,Ergonomics, Manual Labour, Cutting of paving blocks
Installation of Steel Security Bars	Welding Cutting Galvanized. Steelwork
Concrete Works	Hazardous Chemicals Dust Ergonomics Spillage of Concrete Flow of Concrete works waste Eye injuries
Tree Felling	Using of Chainsaw Falling of Tree branches on people and building Diseases Ergonomics Environmental Disturbance
IT Works	Working at heights dangers Hand tool injuries Specialist Works Electrical Work SWP.

2.2. Project Location

Fort Cox College of Agriculture and Forestry is located in the Eastern Cape, fall under Raymond Mhlaba Local Municipality, District of Amathole District Municipality. Location of Building will be CWARU Road, Middledrift,5685.

3. CONTRACTORS AND SUB-CONTRACTORS

3.1. Principle Contractor and Contractors' Requirements Construction Regulations 7

Department of Rural Development and Agrarian Reform must ensure that all Contractors appointed by them comply with these Specifications as well as the OHS Act, Construction Regulations (July 2014), and other relevant legislation that may relate to the activities directly or indirectly. The Principle Contractor, when appointing other Contractors as 'Sub-contractors', shall mutatis mutandis ensure compliance as if it was The Principal Contractor.

Department of Rural Development and Agrarian Reform, may only allow a Contractor to begin work on site after approving The Principal Building Contractor's health & safety plan in writing. Principle Contractor must audit each ofits contractors on a monthly basis, with audit reports filed in the health & safety file on site. The audit must include an administrative assessment as well as a physical inspection of the site Activities.

(2) NOLWANDLE QS must stop any Contractor from carrying out construction work that is not in accordance with the CLIENT and/or Contractor's health & safety specifications or if there is an immediate threat to the health and safety of a persons.

NOLWANDLE QS shall take all reasonable steps necessary to ensure co-operation between all contractors to enable each of those contractors to comply with the provisions of these regulations;

Principle Contractor shall take all reasonable steps to ensure that each contractor's health and safety plan is implemented and maintained on the construction site: Provided that the steps taken shall include periodic audits at intervals mutually agreed upon between the CLIENT and contractors, but at least once every month;

Principle Contractor must ensure that where changes are brought about to the design and construction, that sufficient health and safety information and appropriate resources are made available to contractors to allow themto execute the work safely;

Principle Contractor must ensure that every contractor is registered and in good standing with a recognized compensation fund or with a licensed compensation insurer prior to work commencing on site;

NOLWANDLE QS must ensure that potential contractors submitting tenders have made provision for the cost of health and safety measures during the construction process;

Principle Contractor shall discuss and negotiate with Principle Contractor the contents of the health and safety plan and shall finally approve that plan for implementation;

The Principal Contractors hall hand over a consolidated health and safety file to the client upon completion of the construction work and shall include a record of all drawings, designs, materials used and other similar information concerning the completed structure;

Department of Rural Development and Agrarian, shall only appoint a contractor to perform construction work unless the CLIENT is reasonably satisfied that Principle Contractor he or she intends to appoint, has the necessarycompetencies and resources to perform the construction work safely.

The Construction Regulations 7 (c)(ii) states that the Principal Contractor ensure that potential contractors submitting tenders have made sufficient provision for health and safety measures during the construction process. Construction Regulations 7 (c)(iii) states that Principal Contractor ensure that no contractor is appointed to perform construction work unless the principal contractor is reasonably satisfied that the contractor that he or she intends toappoint, has the necessary competencies and resources to perform the construction work safely.

The Contractors must therefore submit the following documentation for perusal and verification by the Client,

- Management Structure as envisaged at tender (organogram);
- Current Letter of Good Standing
- Proof of management training on the Occupational Health & Safety Act and other related training;
- Competency Profile of company.

3.2. Costs for OHS- Compliance

All parties bidding to work on this construction project must ensure that they have made provision for the cost of complying with these specifications as well as with the OHS-Act 1993 and incorporated Regulations as a minimum requirement in their tender documentation. It must also be taken into consideration that time is money. That impliesthat sufficient time must be allowed for the implementation of the minimum OHS standards. No additional claims willbe entertained at a later stage if a compliance requirement was prescribed in the OHS Act, 1993 and incorporated regulations or this specifications document.

3.3. Principle Contractors' Health & Safety Plans - Construction Regulations 7(1)(a)

Under the Construction Regulations [7(1)(a)], Principle Contractor is required to develop the Health and Safety Plan foreach site before work commences on site and to keep it up to date throughout the Construction Phase.

The Principal Contractor shall ensure compliance to the Act and its Regulations, and document each record in the Health and Safety File. The Principle Contractor (CR 7 (1)(vi) must take reasonable steps to ensure that each contractor's health and safety plan contemplated in CR sub-regulation (2)*(a)* is implemented and maintained on the construction site;

CR 7(1) (viii) stop any contractor from executing construction work which is not in accordance with the client's health and safety specifications and the principal contractor's health and safety plan for the site or which poses a threat to the health and safety of persons;

4. MINIMUM ADMINISTRATIVE REQUIREMENTS

4.1. Notification of Construction Work

The principle contractor shall notify the local relevant Provincial Director of the Department of Labour, before commencing with construction work of the intended work in the form of Annexure 2 of the Construction Regulations of 2014.

A Copy of the Completed Annexure 2 of the Construction Regulations, as well as proof of notification shall be included in the Health and Safety Plan.

A Copy of the Completed Annexure 2 is to be kept on site by the Principle Contractor.

4.2. Occupational Health and Safety Policy

The Principal Contractor and all other Contractors shall submit to the Client and to the Engineer, a copy of their organisation's Health and Safety Policy signed by their Chief Executive Officer. Each policy must include a description of the organisation and state the Health and Safety objectives and how they will be achieved and implemented by the organisation. Copies of these policies shall be attached to the Health and Safety plan

4.3. Legal Appointments on Site

4.3.1. Competency for Contractor's Appointed Competent Persons

Contractor's competent persons for the various risk management portfolios shall fulfill the criteria as stipulated under the definition of Competent in accordance with the Construction Regulations (February 2014). Proof of competence for the various appointments must be included in the health and safety plan. Definition of "competentperson" (expressed by Construction Regulations, 2014:)

"means a person who-

(a) has in respect of the work or task to be performed the required knowledge,

training and experience and, where applicable, qualifications, specific to that work or task: Provided that

where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training;"

All Legal appointments will be signed and on file and stored on site. See Annexure B of this document.

4.4. Health and Safety Organogram

Principle Contractor and all contractors must prepare an organogram, outlining the site health & safety management structure and appointed competent persons. In cases where appointments have not been made, the organogram shall reflect the intended positions. The organogram must be updated when there are changes in the Site Management Structure, and dated accordingly. Organogram is to be displayed on site notice board.

4.5. Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA)

Principle Contractor and Contractors must also hold proof of workman's compensation assurance registration in the form of a letter of good standing and forward a copy to CLIENT before they begin work on site. A copy should also beavailable on site.

4.6. Medicals

All employees that will work on the project must be declared fit to do the work. The Medical certificate as prescribed in the New Construction Regulations (2014) must be done through an Occupational Health Practitioner. Proof of the Medical surveillance certificates must be available in the Health and Safety File. Failing to submit the medical on the prescribed form, will result in work not to commence / or be temporally suspended.

4.7. Mandatory Agreement 37.2

The OHS Act of 1993 states in section 37. ACTS OR OMISSIONS BY EMPLOYEES OR MANDATARIES (2) The provisions ofsubsection (1) shall mutatis mutandis apply in the case of a mandatory of any employer or user except if the parties have agreed in writing to the arrangements and procedures between them to ensure compliance by the mandatory with the provisions of this Act.

Section 37(2), on the other hand, deals with the conduct of contractors, and states that the above provisions of section 37(1) will apply unless the parties agree in writing to the arrangements between them with respect to compliance by the contractor, to the OHS Act. As per the OHS Act, this arrangement is known as

the 37.2 Agreement. The purpose of the 37.2 Agreement is:

· to confirm that the contractor will be regarded as an employer in their own right;
· stipulate the obligations of the contractor in terms of the OHS Act and applicable Regulations;
· that the contractor must comply with all of the on-site health and safety rules.

Section 37 (3)

(3) Whenever any employer or mandatory of any employer or user does or omits to do an act which it would be an offence in terms of this Act for the employer or any such user to do or omit to do, he shall be liable to be convicted and sentenced in respect thereof as if he were the employer or user.

4.8. Preliminary Hazard Identification and Risk Assessments

Every Contractor performing Construction work shall, before the commencement of any Construction work or work associated with the aforesaid Construction work and during such work, cause a Risk Assessment to be performed by a competent person, appointed in writing, and the Risk Assessment shall form part of the Health and Safety Plan and be implemented and maintained as contemplated in the Construction Regulations 9(1).

The Risk Assessment shall include, at least:

- The identification of the risks and hazards to which persons may be exposed to
- The analysis and evaluation of the risks and hazards identified
- A documented plan of safe work procedures to mitigate, reduce or control the risks and hazards that have been identified
- A monitoring plan and
- A documented review plan Based on the Risk Assessments, Principle Contractor must develop a Site Specific OHS rules that will be applied to regulate the Health and Safety aspects of the Construction.

See Annexure D for Baseline Risk assessment.

Record Keeping

Principle Contractor and all Contractor must keep and maintain Health and Safety records to demonstrate compliance with these Specifications, with the OHS Act 85/1993, and with the Construction Regulations (February 2014). The Client must also ensure that all records of incidents/injuries, emergency procedures, training, planned maintenance inspections, monthly contractor audits, etc. are kept in the health & safety file(s) held in the site office. The P.C. must ensure that every Contractor keeps its own health & safety file, maintains the file. Such Contractor safety files must be audited by the appointed OHS agent for the CLIENT.

4.9. Inspection and checklist

Checklist can be used as an aid in assessing and reviewing the management of health and safety in your workplace. The checklist is not an exhaustive list of items to be addressed and will not necessarily be comprehensive for all work situations. Ensure All Checklist are completed and stored on file. Checklist/ Registers are evidence of competency and maintenance on Plant and Equipment.

4.10. Injury/ incident Reporting and Investigation

Injuries are to be categorized into first aid; medical; disabling (lost day); and fatal. When reporting injuries to the Client, these categories shall be used.

All contractors must investigate **all** injuries, with an annexure 1 report being completed and filed. All Contractors must report on the categories of injuries to the CLIENT at least monthly. Contractors must investigate injuries and incidents involving their employees and forward a copy of the annexure 1 investigation report to the CLIENT forthwith. Principle Contractor and all contractors must report all injuries to the Client in the form of an injury report, at least monthly.

All incidents reportable in terms of the provisions of Section 24 of the OHS Act, 1993 must be reported to the local Dept. of Labour in the prescribed manner. All Contractors must report all incidents where an employee is injured onduty to the extent that he/she

- Dies
- Becomes unconscious
- Loses a limb or part of limb
- Is injured or becomes ill to such a degree that he/she is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he/she was usually employed

Or where:

- A major incident occurred
- The health or safety of any person was endangered
- Where a dangerous substance was spilled
- The uncontrolled release of substance under pressure took place
- Machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- Machinery ran out of control

Principle contractor is required to provide the client with copies of all internal and external accident/incident investigation reports including the reports contemplated above within 7 days of the incident occurring

4.11. Safe Work Procedure & Method statements

The following Safe Work Procedures are to form part of the HSE Plan and must be compiled for all the above-identified activities, and that is:

➢ Brick Building Works	➢ Painting
➢ Plastering	➢ Ablutions Facilities
➢ Roof Work	➢ Air-conditioning Installation
➢ Electrical Works	➢ IT-Installations
➢ Tree Felling	➢ Mechanical Works
➢ Tiling	➢ Fire Services
➢ Working at Heights	➢ Fencing
➢ Installation of Steel Security Bars	➢ Concrete Works
➢ Internal Wall finishing's,	➢ Ceilings
➢ Waste management	➢ Paving
➢ Aluminum Windows	➢ Installation of seating

The safe work procedures must address the following elements:

- The work method to be followed to conduct work safely
- Control measures implemented to mitigation & reduce the risks
- Responsibilities of competent persons
- Required personal protective equipment
- Correct equipment/tools/machinery to be used
- Completed Risk Assessment
- Signed by Competent Person
- Completed Risk Assessments

4.12. Preparation of Health & Safety Documentation

It is the duty of Principle Contractor to ensure that all documentation that is required during the project life cycle arekept safely and updated at all times, during the construction process and must be consolidated into one set of documents that must be handed over to the Client upon completion of the construction work. This should include instructions from the design team that will required for the continued safe operation and maintenance of this new structure(s), COC's, Drawings, Concrete Results, Lab Results on Materials, Medical Records, Audit Reports, Site Inspection Reports, Incident Investigation Reports, All Registers and Checklist, Method statement, Policies and procedures, etc.

4.13. Emergency Procedures

The Principal Contractor shall submit a detailed Emergency Procedure for approval by the Client prior to the commencement on site. The procedure shall detail the response plan including the following key elements:

i. List of key competent personnel
ii. Details of Emergency services
iii. Actions or steps to be taken in the event of the specific type of emergencies
iv. Information on hazardous material / situations

Emergency procedures shall include, but shall not be limited to fire, spills, accidents to employees, use of hazardous substances, bomb threats, major accidents / incidents, political events, weather etc.

The Principal Contractor shall advise the Client in writing forthwith of any emergencies, together with a record of actions taken. A contact list of all service providers (Fire department, Ambulance, Police, Medical and Hospital etc.) must be maintained and available to site personnel.

The Principal Contractor must develop a **Site Emergency Evacuation Plan** detailing specifications for the appropriateappointments for the firefighting team, bulk first aid and the emergency coordinating team. In addition to which, mustering points must be identified and depicted using the appropriate symbolic signage (SANS Approved).

The Emergency Evacuation Plan must be approved by in consultation with the Client, or Client's Agent. Should the early warning fire alarm system not be integrated, each zone / area must, by definition be accommodated in the site Evacuation Plan (ref. Section 9 – Environmental Regulations of the OHS Act 85/1993)

The Site Manager must conduct an emergency identification exercise and establish what emergencies could possibly develop. He / she must then develop a detailed contingency plan and emergency procedure, considering any emergency plans that may in place. The Contractors must hold regular practice drills of the contingency plans and emergency procedures to test them and to familiarize employees with them. The Principal Contractor must appoint a competent person to act as Emergency Controller / Coordinator.

A contact list of all emergency providers (Fire Department, Ambulance, Police Medical and Hospital) must be maintained and available to all site personnel. An emergency situation which is likely to require outside emergency assistance, may attract mass circulation written media or electronic media attention ad be harmful to the Client's reputation. No person may comment on the incident on site without prior approval of the Client.

4.14. Personal Protective Equipment (PPE) and Clothing

The Principal Contractor shall ensure that all workers are issued and wear hard hats, safe footwear and overalls or any other Personal Protective Equipment that may be required due to the nature of the work. The Principal Contractor and all Sub – Contractors shall make provisions and keep adequate quantities of SANS approved PPE on site at all times. The Principal Contractor shall clearly outline disciplinary procedures to be taken when PPE or clothing is:

- Lost or stolen
- Worn out or damaged
- Not weared by employee

The above procedure applies to Sub – Contractors and their contractors, as they are all Employers in their own right. The Principal Contractor and Sub – Contractor are to train all employees on how to use PPE on site. Training records of these sessions should be kept on file.

Employees must sign for all PPE issued to them.

4.15. Security

The Contractor acknowledges that its employees and vehicles may be subject to search at any time and that the Contractor shall ensure that its employees co-operate fully with such arrangements.

The Principal Contractor shall ensure a written acknowledgment from each agent, Sub – Contractor and service provider that its employees and vehicles will be subject to search at any time and the Principal Contractor shall ensure that its agent, Sub – Contractor and service providers co-operate fully with the arrangements.

5. CLIENT IDENTIFIED HAZARDS AND POTENTIALLY HAZARDOUS SITUATIONS

5.1. Client identified Hazards

Hazard Identification Control means a documented plan, which identifies hazards, assesses the risks and details the control measures and safe working procedures which are to be used to mitigate and control the occurrence of hazards and risks during construction or operational phases.

See attached Annexure 'D' for more details surrounding hazards already envisaged by the Client and it should be used as a starting point for Principle Contractor and Contractors so as to elaborate on their own risk assessments in termsof Section 8 of the OHS Act and General Safety Regulations 2(1).

5.2. Unforeseeable Hazards

Principle Contractor must immediately notify other Contractors as well as the Client, in writing, of any construction activities so that the necessary precautions may be taken. A Daily Safety Task Instruction Sheet will be done daily to eradicate and identify new hazards and daily task hazards per site task.

6. SITE OPERATIONAL REQUIREMENTS

6.1. Construction Health & Safety Officer (CR 8.5)

Full time OHS Officer that is registered with SACPCMP will be on site due to High Risk Project. .

6.2. Construction Manager (CR 8.1)

The Principal Contractor's CEO (or his duly assigned employee) shall appoint (in writing) one full time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in the absence of the construction manager an alternate mustbe appointed by the principal contractor. The construction manager must (in writing) appoint construction supervisors responsible for construction activities and ensuring occupation health and safety compliance on the construction site. Construction Manager (CR 8.1) must have an understanding of the OHS Acts and Regulations, legal Liability. The construction manager shall be appointed in writing and each of the tasks in this chapter shall be included in (1) the H&S plan and (2) the signed letter of appointment.

6.3. Health and Safety Representatives(s) (Section 17)

Principle Contractor and all Contractors must ensure that Health and Safety Representative(s) are appointed under consultation with the employees and trained/informed to carry out their functions. The appointments must be in writing. The Health and Safety Representatives could carry out monthly inspections, keep records and report all findings to the Responsible Person or safety officer forthwith and at monthly health & safety meetings.

At least one Health & safety representatives is required by all Employers. (Appoint one for the first 20 employees and additional one for each group of up to 50 employees on site).

6.4. Health and Safety Training

6.4.1. Induction

The Principal must ensure that all site personnel undergo a site-specific health & safety induction training session before any worker starts work. The induction must include the General duties of the employer and the employees. Arecord of attendance shall be kept in the health & safety file, as well as a copy of the contents of the said induction. Principle Contractor will be required to induct all contractors' employees. Workers must carry some sort of proof of inductions on their persons.

6.4.2. Awareness

Principle Contractor must ensure that, on site, periodic toolbox health & safety talks take place at least once every two weeks. These talks should deal with risks relevant to the construction work at hand. Records of attendance mustbe kept in the health & safety file.

6.4.3. Competence

All competent persons must have the knowledge, experience, training, and qualifications specific to the work they have been appointed to supervise, control, and carry out. This must to be assessed on a regular basis e.g. training, evaluation, and periodic audits by the Client, progress meetings, etc. Principle Contractor is responsible to ensure that Competent Contractors are appointed to carry out construction work.

6.5. Construction Welfare and Facilities

On each site where existing facilities are not present, at least one sanitary facility shall be erected for every 30 male workers, at least one sanitary facility one shall be erected for every 30 female workers, shower for every15 workers, a changing facility for each sex and sheltered eating areas.

If mobile toilets are installed at the site, cleaning of buckets shall be arranged with the Client. Chemical toilets shall be used where applicable.

Eating facilities shall be made available in the form of a shaded net, table and chairs or acceptable eating facilities.

This will take COVID-19 regulations into account. For sites in remote areas, transport shall be made available for workers to and from sites.

6.6. Health & Safety Audits, Monitoring and Reporting

Monthly Audit by Client

OHS Agent, appointed by the client, will be conducting a monthly Audit to comply with Construction Regulation 2014 to ensure that Principle Contractor has implemented, and is maintaining the agreed and approved Health and Safety Plan. Principle Contractor is obligated to conduct monthly audits on all Contractors appointed by him and keep audit reports in its health & safety file. Contractors must audit their sub-contractors and keep records of these audits in *their* health & safety files, made available on request. Contractors scoring less than 90% will have to stop work till thefile is updated. Principle Contractor is required to withhold payment if the minimum safety standard is not maintained.

6.7. First Aid Boxes and First Aid Equipment

Principle Contractor and all Contractors shall appoint First Aider(s) in writing. Principle Contractor must appoint at least one First Aider who must be certificated. Copies of valid certificates are to be kept on site. Principle Contractor

must provide at least 1 (one) first aid box, adequately stocked at all times. All Contractors with more than 5 employees shall supply their own first aid box. Contractors with more than 10 employees must have their owned trained, certifiedfirst aider on site at all times.

The Contingency Plan of Principle Contractor must include the arrangements for speedily and promptly transporting injured persons to a medical facility or securing emergency medical help to persons that may require it.

6.8. Public and Site Visitor Health & Safety

The Principle contractor, Sub-Contractor, delivery vehicles and visitors are not allowed to disturb or roam around on the college grounds during construction stage. The Principle Contractor will be held responsible and liable for disturbance and unrest, caused by any sub-contractor or delivery vehicles during the construction period.Public walkways and roadways must be kept clean and free of excessive construction materials to prevent a negative impacton the public.

Roadways and walkways must be cleaned on a regular basis – daily inspections to be conducted by the P.C. with action to be taken without delay.

Site visitors must be briefed on the hazards they may be exposed to as well as what measures are in place or should be taken to control these hazards. As per the Construction Regulations, a record of these 'inductions' must be kept on site. It is advised that a visitor book with site rules leaflet be kept at the gate or at reception/site office and all visitors to be directed to such point where they must read through the site safety information and sign the visitor book.

6.9. Access to Site

The Construction site must be fenced off with entrance and security at entrance. Students are not allowed on the construction site, contractor must liaise with the college and ensure disciplinary procedure are followed. The Principle contractor and all Sub-Contractor are not allowed to disturb or roam around on the college grounds during construction stage. Where any permits are necessary from the College and local authorities, this will be the responsibility of the P.C. Any road signage must be inspected by a designated person on a daily basis and the requiredcleaning and maintenance of signs will be the responsibility of this designated person. The road surface of all public and private roadways and pavements/pedestrian walkways must remain in a reasonably clean state, free of excessivesand, stone, water or other construction related materials.

6.10. Traffic and Diversions

Provision by means of a method statement must be made for any traffic diversions to conduct your construction activities as well as any loading and off- loading of materials and waste.

The method statement must include a drawing indicating traffic signage and the like.

The Principal Contractor shall ensure that all persons in its employment, all subcontractors, and all those that are visiting the site are aware and comply with the site speed restriction(s). Separate vehicle and pedestrian access routesshall be provided, maintained, controlled and enforced.

6.11. Housekeeping

All Contractors are to ensure that:

- Housekeeping is continuously implemented
- Scrap, waste & debris are removed regularly
- Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to free movement of pedestrian and vehicle traffic
- Waste & debris not to be removed by disposing from heights, but by chute or crane
- Where practicable, Construction sites are fenced off to prevent access of unauthorized persons
- An unimpeded work space is maintained for every employee
- Every workplace is kept clean, orderly and free of tools etc. that are not required for the work being done.

6.12. Stacking & Storage (Construction Regulations 28)

THE PRINCIPAL CONTRACTOR/Employer must ensure that a competent person is appointed in writing to superviseall stacking and storage on a construction site.

- Adequate storage areas are provided and demarcated
- The base of any stack is level and capable of sustaining the weight exerted on it by the stack
- The items in the lower layers can support the weight exerted by the top layers.
- Cartons and other containers that may become unstable due to wet conditions are kept dry
- Pallets and containers are in good condition and no material is allowed to spill out.
- Stability of stacks are not threatened by vehicles or other moving plant and machinery
- Stacks are built in a header and stretcher fashion and that corners are securely bonded
- Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.

6.13. Fire Extinguishers and Fire Fighting Equipment's

Principle Contractor and relevant Contractors shall provide adequate, regularly serviced firefighting equipment located at strategic points on site, specific to the classes of fire likely to occur. The appropriate notices and signs mustbe posted up as required. A minimum of four 9kg dry chemical powder fire extinguishers must be available in and around the site office establishment and stores. Wherever 'hot work' is taking place, additional fire extinguishers mustbe on hand. Contractors are responsible for ensuring compliance with hot work procedures and must be in possessionof method statements detailing the safe working procedures. 'Hot work' includes all work that generates a spark or flame and may therefore result in a fire.

6.14. Severe Weather Plan

6.14.1. When high wind creates a hazard to craftsmen or work being performed, i.e., instability in elevated areas, limited visibility due to dust or particles in the air, unmanageable materials, etc., supervision will stop work activities, re-assign work and area, properly store and secure material which might blow away, injure or damage.

6.14.2. When rain creates a hazard to workers at work being performed, i.e., un-stable footing conditions due to slippery muddy and flooded work environments, unstable trenches or excavations, poor visibility due to rain or eye protection, supervision will stop specific work due to hazard, re-assign work duties and/or areas,and obtain further instructions from Project Management.

6.15. Excavations, Shoring, Dewatering or Drainage

The Principal Contractor and any relevant Subcontractors shall make provisions in their tender for shoring, dewateringor drainage of any excavation as per this specification The Contractor shall make sure that excavations are inspected before every shift, each occurrence of rain, or change to the excavation / shoring and a record is kept.

6.16. Barricading and Demarcation

The construction site shall be fenced completely to prevent pedestrians and vehicles to enter the construction area.

Protection around the site must be in the form of a physical barrier and appropriate signage, to prevent public from entering the area.

A physical barrier will be a fence at least 1 meter high. Danger tape is not considered a physical barrier. Danger tape is considered as a signage only.

It is advised to use 1.2m high Day-Glo Mesh (barrier netting) to prevent pedestrians on pavements to enterthe construction area.

6.17. Transport of Workers

The Principal Contractor and other subcontractors shall not:

a) Transport persons together with goods or tools unless there is an appropriate area or section to store them
b) Transport persons in a non-enclosed vehicle e.g. truck, there must be a proper canopy (properly covering in the back and top) with suitable sitting area. Workers shall not be permitted to stand or sit at the edge of the transporting vehicle.

6.18. Environmental Management

Management will commit to safety work procedures. Environmental and Waste Management Policy will be review annually and Signed by management.

6.18.1. Dumping

a) Receipts for hazardous waste disposal shall be copied to the Clients, OHS Agent.
b) Any proposal to dispose of building waste products such as rubble or concrete or similar such products as part of backfill or landscape shaping shall require a Method Statement.

6.18.2. Litter and refuse

a) Waste and litter shall be disposed of into scavenger- and weatherproof bins. Principle Contractor shall then remove the refuse collected from the working areas, from site at least once a week.
b) Refuse must be disposed at a site approved by the Environmental Manager.
c) Principal Contractor shall make provision for workers to clean up Principle Contractor's camp and working areas at least once a week.

6.18.3. Recycling

a) Whatever possible, materials used or generated by construction shall be recycled?
b) Containers for glass, paper, metals and plastics shall be provided. Office and camp areas are particularly suited to this form of recycling process.

c) Where possible and practical, such as at stores and offices, waste shall be sorted for recycling purposes. Recycling protocols shall sort materials into the following categories:
   i. Paper / Cardboard
   ii. Aluminium
   iii. Metals(other than Aluminuim)
   iv. Organic waste
   v. Glass

6.18.4. Waste water management

a) A surface water management plan has been prepared and approved before construction commences. It has considered the following:
b) Appropriate cut-off drains to separate potentially contaminated flows from the open drainage system.
c) Containment of polluted flows.
d) Settling ponds/sludge dams/evaporation ponds for water with high suspended solids (e.g. batching, crusher, and sand washing areas).
e) Principle Contractor should take precautions to minimise water pollution as shall be required.
f) All wastewater should comply with pre-determined standards as set out in the National Water Act, Act 36 of 1998, Government Notice No 398 and No 399 DWAF General Authorisations in terms of Section 39 of the National Water Act, Act 36 of 1998 and the South African Water Quality Guidelines for Fresh Water Second Edition, 1996, before it can be released into the environment.
g) Water quality monitoring shall be undertaken as described in the relevant section of this CEMP.P
h) Principle Contractor shall notify the Environmental Manager immediately of any pollution incidents on site.

6.18.5. Washing areas

a) Wash areas shall be placed and constructed in such a manner to ensure that the surrounding areas, which include groundwater, are not polluted.
b) A Method Statement shall be required for all wash areas where hydrocarbon and hazardous materials, and pollutants are expected to be used. This includes, but is not limited to, vehicle washing, workshop wash bays, paint wash and cleaning.
c) Wash areas for domestic use shall ensure that the disposal of contaminated “grey” water is sanctioned by the Environmental Manager.

6.18.6. Spillages:

a) Streams, rivers and dams and underground water will be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products, Chlorine.
b) In the event of a spillage during the construction phase, the responsibility for spill treatment will lie with Principle Contractor will be liable to arrange for competent assistance to clear the affected area.
c) Principle Contractor will compile and maintain environmental emergency procedures, to ensure that there willbe an appropriate rapid response to unexpected or accidental environment-related incidents throughout the life cycle of the project.
d) The individual responsible for, or who discovers a hazardous waste spill must report the incident to the Environmental Manager.
e) The Environmental Manager will assess the situation in consultation with Principle Contractor and act as required. In all cases, the immediate response will be to contain the spill. The exact treatment of polluted

soil/water will be determined By Principle Contractor in consultation with the Environmental Manager. Areas cleared of hazardous waste will be re-vegetated according to the Environmental Manager's instructions.

f) Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice must be sought for appropriate treatment a remedial procedure to be followed. The requirements for such input will be agreed with the Environmental Manager. The costs of the containment and rehabilitation will be for Principle Contractor's account, including the costs of specialist input.

g) No person shall be allowed to approach a spill unless he/ she is equipped with the personal protective clothing.

h) The risk involved shall be assessed before anyone approaches the scene of the incident with the emergency response plan.

i) Any known or discovered spillage of toxic substances into a stream or river should be followed by immediate monitoring of the receiving streams and rivers.

6.18.7. Fuels/Flammables/ Hazardous Materials stores

Fuels stores are kept 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 & 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.

7. PLANT, MACHINERY AND EQUIPMENT

7.1. Hired Plant and Machinery

The Contractor shall ensure that any hired plant and machinery used on site is safe for use and complies with the minimum legislated requirements. The necessary requirements as stipulated by the OHS Act and Construction Regulations (July 2014) shall apply.

The Contractor shall ensure that operators hired with machinery are competent and that certificates are kept on site in the health & safety file.

Any load test requirements and inspections in terms of legislation must be complied with and copies of load test certificates and inspections must be kept in the health & safety file. All relevant contractors must ensure the same.

7.2. General Machinery

The Contractor and relevant contractors must ensure compliance with the Driven Machinery Regulations and General Machinery Regulations, which includes carrying out risk assessments on the machines, inspecting machinery regularlyappointing a competent person to inspect and ensure maintenance, issuing PPE and relevant clothing, and training those who use machinery.

8. OCCUPATIONAL HEALTH and SAFETY CONTROLS

8.1. Health Hazards

Health hazards include chemical hazards (solvents, adhesives, paints, toxic dusts, etc.), physical hazards (noise, radiation, heat, etc.), biological hazards (infectious diseases), and ergonomic risk factors (heavy lifting, repetitive motions, vibration).Exposure of workers to occupational health hazards and risks is very common in any work environment, especially in construction.

Occupational exposure is a major problem and all Contractors must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards. Prevent inhalation, ingestion, and adsorption through the skinof hazardous chemicals substances. Conduct regular inspections of all operations, equipment, work areas and facilities. Have workers participate on the inspection team and talk to them about hazards that they see or report.

Be sure to document inspections so you can later verify that hazardous conditions are corrected. Take photos or videoof problem areas to facilitate later discussion and brainstorming about how to control them, and for use as learning aids

8.2. Noise induced Hearing Loss

Noise induced hearing loss is a highly underrated occupational condition. Occupational noise emitted by construction machinery and power tools must be controlled as far as possible by implementing engineering solutions such as noise dampening, regular maintenance, servicing and inspection, screening off the noise, and reducing the number of persons exposed.

It is generally accepted that all employees on a construction site will be exposed to varying degrees of noise. In view of this, Principle Contractor shall ensure full compliance with the above- mentioned regulation; furthermore, provideproof of assessment of noise levels. Those noise zones must be clearly marked with appropriate PPE signs. Principle Contractor is advised to pay particular attention to section 12 of the “Noise Induced Hearing Loss Regulation.’’

8.2. Ergonomics

Ergonomics is the study of how workers relate to their workstations. We advise Principle Contractor and Contractorsto take this into consideration when conducting risk assessments, thereby improving the worker-task relationship, which will in turn improve productivity and reduce chronic conditions such as back strains, joint problems and mentalfatigue, amongst others.

8.3. Hazardous Chemical Substances (HCS)

Principle Contractor must ensure that the use, transport, and storage of HCS are carried out as prescribed in the HCS Regulations. The P.C. and contractors must ensure that all hazardous chemicals on site have Material Safety Data Sheets (MSDS) on site and the users are made aware of the hazards and precautions that need to be taken when using the chemicals.

The First Aiders must be made aware of the MSDS’s and how to treat HCS incidents appropriately. Copies of the MSDS’s must be kept in the first aid box and in the store. All containers must be clearly labeled.

Flammable substances must be stored separately, away from other materials, and in a well-ventilated area (appropriate cross ventilation). A competent person should be appointed to be in control of this portfolio. Spill Kit must be available on site in case of any chemical spillage. Fuel storage tanks must conform to the general environmental legislation and Environmental Management Plan. The necessary safety signage must to be posted up

on the tanks – ‘no naked flames’, ‘no smoking’. Two 9kg DCP fire extinguishers must be placed near to fuel tanks, butnot within 5m of the tanks. These extinguishers are over and above the minimum four required for the offices and stores.

8.4. Alcohol and other Drugs

No alcohol and drugs will be allowed on site. An Alcohol Abuse policy will be signed by CEO and Review annually. Policy must be communicated to all workers. No person may be under the influence of alcohol or any drug while on the construction site. Any person on prescription medication must inform his/her superior, who shall in turn report this to the Client’s Agent forthwith. Any person suffering from any illness/condition that may have a negative effect on his/her /anyone else’s health or safety performance must report this to his/her superior. Any person suspected ofbeing under the influence of alcohol or other drugs must be sent home immediately.

8.5. Dust Control

Principle Contractor shall be solely responsible for the control of dust arising from Principle Contractor operations.

a) Principle Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Environmental Manager.
b) Removal of vegetation shall be avoided where possible and similarly exposed surfaces shall be re-vegetated or stabilised as soon as is practically possible.
c) Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or whena visible dust plume is present.
d) During high wind conditions, the Environmental Manager will evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will ceasealtogether until the wind speed drops to an acceptable level.
e) Where possible, soil stockpiles shall be located in sheltered areas where they are not exposed to the erosive effects of the wind. Where erosion of stockpiles becomes a problem, erosion control measures shall be implemented at the discretion of the Environmental Manager.
f) Vehicle speeds shall not exceed 40km/h along dirt roads or 20km/h when traversing unconsolidated and non-vegetated areas.
g) Appropriate dust suppression measures shall be used when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather in winter. Such measures may also include the use of temporary stabilising measures (e.g. chemical soil binders, straw, brush packs, chipping

Principle Contractor should prepare and submit a Dust Control Method Statement. As a minimum, the statement should address the following:

8.6. Electrical Works

Only Competent person will work on electrical task. Identify all sources of energy to the equipment using drawings, diagrams, and identification tags and field verification. Utilize an approved energy control procedures (ECP).

Lockout systems and signboards must be used at all times.

Ensure that the following:

- Provide qualified or licensed (where required) personnel.
- Assist with program administration, implementation and verification of compliance with regulatory requirements and the requirements in this procedure.
- Assess program status and verify that procedures comply with regulatory requirements, site needs and observations.
- COC for all works must be provided.
- No fuses and no safety protection equipment may be bridged out.
- If circuit breaker or contractor is replaced it must be a permanent job.
- Harness must be worn when working above 2 meters from ground level.
- Safety goggles must be worn when working with, electrical cleaning solvents and grinders
- The zero adjustment on a generator may not be moved without permission form Foreman / Engineer.
- Overload protection on switchgear must be according to motor specs.
- All covers on motors must be secured

8.7. Bulk Mixing Plant (construction Regulations

Competent person will be appointed in writing to supervise this task work. The following procedures will be following regarding Batch Plant as per the Construction Regulations 2014.

- Concrete must be mixed only in an area demarcated for this purpose, ideally on an impervious surface (e.g. cement mixing pit).
- Batching operations to take place in a designated area, which will be kept clean at all times.
- All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site.
- After all concrete mixing is complete; all waste concrete must be removed from the batching area and disposedof at an approved dumpsite.

- Ensure separation of clean and dirty water from batching plant.
- Storm water must not be allowed to flow through the batching area. Water laden with cement must be collectedin a retention area for evaporation and not allowed to escape the batching area.
- Operators must wear suitable safety clothing.
- Wastewater from batching operations to be suitably disposed of.
- Waste concrete and cement sludge to be removed on a regular basis (to prevent overflowing) and to be disposed of at a suitable facility.
- Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.
- Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately at a licenced waste disposal facility.
- Limit concrete batching to single sites where possible.
- Concrete transportation will not result in spillage.
- Cleaning of equipment and flushing of mixers will not result in pollution, with all contaminated wash water entering the waste water collection system.
- Concrete mixing strength test records will be kept on file.

8.8. Working at Heights (Construction Regulations 10)

The implementation and maintenance of a safe work environment is the collective responsibility of all employees, contractors, and visitors to the jobsite. Contractor will submit working at heights policy. Policy will be communicated to all persons working at heights. All employees must go for special medical assessment for working at heights. All employees working at heights must be provide prompt medical treatment when a worker is injured on the jobsite. Todo this, workers may have to perform a working at heights rescue to bring down a worker who has fallen and is suspended in a safety harness.

Contractor may use ladders, scaffolding to perform their duties according to task. A Clear Safe Work Procedure and Method statement will be done. Signed by contractor construction manager and competent working at heights supervisor.

A fall protection plan with a rescue plan will be submitted with the OHS File. Competent (unit standard -229994 NQF leverl 4) Fall protection plan developer will sign of the FPP. All employees working at heights must have medical examination done and training on working at heights.

Fall arrest equipment will be inspected on site daily as well as all harnesses, lanyards, safety line,etc.

8.9. Excavation Works (Construction Regulations 13)

Excavation work is hazardous. Competent person will be appointed in writing. This guideline provides information on the potential hazards involved in excavation work so that workers and employers can work together to create a safe, injury and fatality free work site.

Extra precaution procedures will be developed at the TARDI as this construction works is close to the clinic, which is a high risk item.

8.10. Lock Out Procedures (General Machinery Regulations)

A lockout, tag and test procedure describes the requirements to ensure that all machinery or equipment with the potential for unexpected operation, movement, release of energy or the release of hazardous materials, have been locked out prior to work being performed on it. The Contractor shall familiarise himself with the procedure and shall at all times adhere to its requirements. The Responsible Representative of the Municipality must first be notified and approval granted before any equipment that comprises part of the finished work can be put into operation or energised.

Lock-out and tag-out procedures will be applied for the servicing and maintenance of machines and equipment in which the unexpected energising or start-up of the machines or equipment or the release of stored energy could cause injury or death to any personnel. An energy source includes any source of electrical, mechanical, hydraulic, chemical, thermal, stored, ionising and non-ionizing, or other energy.

The Responsible Representative of the Client is to identify all sources of energy which need to be locked out and communicate this to the Contractor Supervisor.

The Contractor must only use locks made by a reputable manufacturer when locking out any energy source at facilities. The Contractor will be responsible for the supply and control of all locks needed for lock-out.

All locks used for lock out at the facility will require a hard plastic tag. All lock-out tags will require the following information; Danger, Lockout, Contractor Company Name, Contract Supervisor Name, Contractors Site Phone Number. The Contractor will be responsible for supplying all tags needed for lockout.

The unauthorised removal of Lock-out locks is considered a serious safety violation and will be regarded as a breach of contract.

No work shall be performed on electrical equipment that is energised. Such equipment must be “locked out” priorto working on it. Only grounded equipment shall be used for power supply. Plugs and cords shall be maintained ingood repair. Where conditions dictate a ground fault interruption protection power supply shall be used.

Under no circumstance shall a connection be made to any power outlet except through an approved plug. Insertionof bare wires into any power outlet is strictly prohibited.

8.11. Permit to Work

A Permit to Work system will be authorized by Client, Contractor and Municipality. All requests for Permits to Work shall be channelled through the Responsible Representative appointed in writing. The Contractor must ensure that allPermits to Work are properly completed and duly authorised by the appropriate signatories before commencing withthe work in question. All requirements stated in the Permit must be fully complied with. Activities that require a permit to work include but are not limited to:

hot work;

- working in confined spaces;
- working at heights;
- excavation work;
- site clearing;

8.12. Confined Spaces (General Safety Regulations)

A "confined space" may be generally defined as any area which has limited means of egress and is subject to oxygen deficient atmosphere or to the accumulation of toxic or flammable gases or vapors. A Competent person will be appointed to work in areas defined as confined space. Medicals will be done for all workers performing task in confined spaces. Safe Work Procedures will be done with Confined space checklist and lock-out procedures. High Risk task and must be supervised.

8.13. Tree Felling

When it comes to tree removal by using a chainsaw, preparation is key. Deploy warning signs if you know that aroad crosses the forestry area or that a lot of people pass by on a daily basis.

A Method statement must be approved by the engineer. Clear around the tree about 45 degrees in both directions.

When you have cleared the area, put up your warning signs and decide on the tree's direction of fall and your path of retreat. Only competent persons are allowed to work with the chainsaw. Check list should be done beforeusing chain slings and equipment to ensure all is in perfect order. Appropriate PPE must be worn for the task.

Note: If you notice that the timber is discoloured and soft or if the lower part of the trunk looks swollen or diseased, you need to be very careful. This is an indication that the tree is infested with rot and that means the wood fibres are weakened. When this happens, fell in the tree's natural direction of fall and use a winch if you are unsure. Rot infestation usually subsides higher up in the tree, so one option might be to fell the tree with an extra high stump.

8.14. Paving

Preparation of paving will effect dust. Preparation must be done to safely prepare for working with sand and crusher dust. Appropriate PPE must be worn. A method statement must be done before work start and communicated to all employees. Ergonomics must be taken in to account for repetitive movements during bending and laying of paving

9. ANNEXURE – A

(1) Primary Health and Safety Compliance

Principle Contractor and Contractors must submit compliance with Annexure 'A' within two weeks (10 working days) of receiving these Health & Safety Specifications. Compliance with Annexure 'A' must be maintained and proven to the Safety Agent at audits.

HSS Item No.	Requirement	Legal Reference	Compliance required by:
A1	Health & Safety Plan (Health and Safety plan)	Constructions Reg. 2(a)	Prior to work commencing
A2	Signed Policies: OHS Policy Alcohol abuse policy, Fall protection Policy, Disciplinary Procedures, Environmental Policy, PPE Policy. Quality Policy, HIV/Aids Policy. Hazchem Policy, Pandemic Policy		Together with Health and Safety File
A3	Notification of Intention to Commence Construction Work	Complete Schedule 1 (Construction Reg.)	Before commencement on site
A4	Assignment of Responsible Persons to Supervise Construction Work Manager	OHS Act Section Construction Regulation 8(1) CV, Competency	Before commencement on site
A5	Competence of Responsible Persons in the form of CV's, related work history of CR 8 (7) and CR 8 (8) appointees	OHS Act Construction Work Supervisor CR 8(7) Sub- ordinate supervisors CR 8.(8)	Together with Health and Safety File
A6	Compensation for Occupational Injuries and Diseases – proof of registration	COIDA : Letter of Good Standing (Valid)	Together with Health and Safety File
A7	Health and Safety Organogram showing all safety management portfolios and positions	Client Requirement	Together with Health and Safety File
A8	Initial Hazard Identification and Risk Assessment document	Construction Reg.	Together with Health and Safety File
A9	Safe Work Procedures for task as per the Scope of Works	OHS Act and Regulations	Together with Health and Safety File
A10	COVID-19 OHS Action Plan	Disaster Management Act and OHS Act and Regulations	Together with Health and Safety File
A11	Budget for OHS and COVID-19	Disaster Management Act and OHS Act and Regulations.	Together with Health and Safety File

HSS = health & safety specifications OHS Act = occupational health & safety Act CR = construction regulations
COIDA = compensation for occupational injuries and diseases Act

10. ANNEXURE - B

Assignment of duties by Principle Contractor and Contractors' responsible persons
The Contractor must make all the Management appointments as set out below
(Further appointments could become necessary as the project progresses).

No	OHS Act Ref.	Appointment	Name of Appointee
1	Section 16.(1)	Overall Authority and Accountability	
2	Section 16.(2)	Assignment of Duties	
3.	CR 8 (1)	Construction Manger	
4	CR 8 (5)	Health and Safety Officer	
5.	CR 8 (2)	Construction Assistant manager	
6	DM Act	COVID-19 Officer	
7	CR 8.(7)	Construction Supervisor	
8	CR 8.(8)	Subordinate Construction Supervisor	
9	GMR 2(1)	Supervision of Machinery (not for construction sites)	
10	Section 17	Health and Safety Representative	
11	CR 16.(1))	Scaffold Erector, Inspector (separate appointments)	
12	CR 13(1)	Excavation Inspector	
13	GSR 3(4)	First Aiders	
14	CR 29(h)	Fire Equipment Inspector	
15	EMR 9	Portable Electrical Tool Inspector	
16	CR 17(8)(a)	Materials Hoist Inspector	
17	DMR 18(5)	Lifting Machinery and Equipment Inspector	
18	HSC Reg	Hazardous Chemical Substances Inspector	
19	GSR 3	Emergency Procedure Coordinator	
20	CR 23(j)	Construction Vehicle and Mobile Plant Inspector	
21	CR 28(a)	Stacking and Storage Supervisor	
22	CR 10	Fall Protection Plan Developer	

23	CR 10	Fall Protection Supervisor	
24	GSR 5	Confined Space Supervisors	
25	GMR	Lock-out and Tag-Out Representative	
26	CR 18	Rope Access Work Inspector	
27	CR 20	Batch Plant Supervisor	
28	CR27	Housekeeping Supervisor	
29	GSR 13a	Ladder Supervisor	
30	FR	Facilities Supervisor	
31	EIR - MR	Electrical and Mechanical Supervisor	
32	CR 9	Risk assessor	
33	GAR 9	Incident Investigator	

CR	=	Construction Regulations
ER	=	Environmental Regulations
GSR	=	General Safety Regulations
HSC	=	Hazardous Chemical Substances Regulations
GMR	=	General Machinery Regulations
FR	=	Facilities Regulations
DM	=	Disaster Management Act

11. ANNEXURE – C

GENERAL COMPLIANCE REQUIREMENTS

Principle Contractor and Contractors must comply with but not be limited to the requirements tabled below: Prove compliance with annexure 'C' at audits conducted by the safety agent.

OHS Act Section/Regulation	**Subject**	**Requirements**
Construction. Regulation 4(1)	**Notice of carrying outConstruction work**	Department of Labour notified Copy of Notice available on Site
General Admin. Regulation 4	**Copy of Health andSafety Act (Act 85 of 1993)**	Updated copy of Act & Regulations on site. Readily available for perusal by employees.
COID Act Section 80	**Registration with Compensation Insurer**	Written proof of registration/Letter of good standingavailable on Site
Construction. Regulation 5 (b)	**Health and Safety Specification**	Health and Safety Specifications received from Client and/orits Agent on its behalf
Section 16.(1)	**Overall Authority andAccountability**	Overall Responsibility
Section 16.(2)	**Assignment of Duties**	Responsible for Contract management of the projectCV on file Legal Liability and HIRA training on file
Construction Regulation 8(1)	**Construction Manager**	Responsibility of complying with the Health and Safety Actassigned to other person/s by S 16.2. CV on file Legal Liability and HIRA training on file

Construction. Regulation 8 (7)	**Designation of Person Responsible on Site**	Competent person appointed in writing as Construction Supervisor with job descriptionCV on file
Construction Regulation 8(5)	**Safety Officer**	Competent person appointed in writing as Registered with SACPCMP / barcoded letter from SACPCMPCV on file
Section 17 & 18 General Administrative Regulations 6 & 7	**Designation of Health &Safety Representatives**	More than 20 employees - one Health and Safety Representative, one additional Health and Safety Rep. foreach 50 employees or part thereof. Designation in writing, period and area of responsibilityspecified in terms of GAR 6 & 7 Safety Representatives name to be displayed on site noticeboard Meaningful Health and Safety Rep. reports.Reports actioned by Management.
Section 19 & 20 General Administrative Regulations 5	**Health & Safety Committee/s**	Health and Safety Committee/s established. All Health and Safety Reps shall be members of Health andSafety Committees Additional members are appointed in writing.Meetings held monthly, Minutes kept. All safety meeting schedules are to be displayed on sitenotice board Actioned by Management.
Section 37(1) & (2)	**Agreement with Mandatories/ (Sub-)Contractors**	Written agreement with (Sub-)ContractorsList of Sub Contractors displayed. Proof of Registration with Compensation Insurer/Letter of
	Principle Contractor	Letter of Good Standing Construction Supervisor designated Health and Safety Reps & Health and Safety CommitteeWritten arrangements re. First Aid

Section 8(2)(d) Construction. Regulation 9(1)	**Hazard Identification &Risk Assessment**	Hazard Identification carried out/Recorded Risk Assessment and – Plan drawn up/UpdatedRisk assessor to have HIRA Training RA Plan available on Site Risk assessments to be signed off by risk assessor andContract manger Method statement to be done for each activity which istaking place on site. All risk assessments to be done as per method statementsEmployees/Sub-Contractors informed/trained
Section 24	**Reporting of Incidents(Dept. of Labour)**	Incident Reporting Procedure and man-hours to be displayedon site notice board. All incidents in terms of Sect. 24 reported to the Provincial Director, Department of Labour, within 3 days. (Annexure 1)(WCL 1 or 2) and to the Client and/or its Agent on its behalf Copies of Reports available on SiteRecord of First Aid injuries kept
General Admin. Regulation 9	**Investigation and Recording of Incidents**	All injuries which resulted in the person receiving medical treatment other than first aid, recorded and investigated byinvestigator designated in writing. Appointed person to have formal incident investigatortraining Copies of Reports (Annexure 1) available on SiteTabled at Health and Safety Committee meeting

Construction .Regulation 28 General Safety Regulation 8(1)(a)	**Stacking & Storage Supervisor.**	Competent Person/s with specific knowledge and experiencedesignated to supervise all Stacking & Storage Written Proof of Competence of above appointee availableon Site

Construction. Regulation 29 Environmental Regulation 9	**Designation of a Person to Co-ordinate Emergency Planning And Fire Protection**	Person/s with specific knowledge and experience designated to co-ordinate emergency contingency planning and execution and fire prevention measures Emergency Evacuation Plan developed: - Drilled/Practiced - Plan & Records of Drills/Practices available on Site Fire Risk Assessment carried out All Fire Extinguishing Equipment identified and on register. Inspected weekly. Inspection Register kept Serviced annually
General Safety Regulation 3	**First Aid**	Every workplace provided with sufficient number of First Aid boxes. (Required where 5 persons or more are employed) First Aid freely available Equipment as per the list in the Health and Safety Act. One qualified First Aider appointed for every 50 employees. (Required where more than 10 persons are employed) List of First Aid Officials and Certificates Name of person/s in charge of First Aid box/es displayed. Location of First Aid box/es clearly indicated. Signs instructing employees to report all Injuries/illness including first aid injuries
General Safety Regulation 2	**Personal Safety Equipment (PSE)**	Items of PSE prescribed/use enforced Records of Issue kept PPE matrix to be displayed Undertaking by Employee to use/wear PSE PSE remain property of Employer, not to be removed from premises GSR 2(4)
Hazardous Chemical Substances (HCS) Regulations Construction Regulation 25	**Control of Storage & Usage of HCS and Flammables**	Competent Person/s with specific knowledge and experience designated to Control the Storage & Usage of HCS (including Flammables) Hazardous chemical servvre to be conducted Risk Assessment carried out Register of HCS kept/used on Site

Electricity Act of1984 no 41 Electrical Installation Regulation s	Electrical and Mechanical Installation	Competent Person appointed in Writing. All competency Certificates on file Scheduled log book of installations and wiring Medical Report of Fitness Daily inspections of tools and electrical equipment COC must be submitted after each new installation Calibration Certificate must be submitted after each installation
Construction .Regulation 23	**Construction Vehicles&Earth Moving Equipment**	Operators/Drivers appointed to: - Carry out a daily inspection prior to use - Drive the vehicle/plant that he/she is competent to operate/drive - All plant to be fitted with revolving lights - Plant to be fitted with Fire extinguishers Written Proof of Competence of above appointee available on Site. Medical Report available for each operator available on site Record of Daily inspections kept
Construction Regulations 10	Working at Heights	- Competent Fall protection Plan Developer - Fall protection plan communicated to all employees - Fall Arrest Plan communicated to everyone. - All Harness to be 1.2m building is 4.2 meter high - All people working on heights must have medicals approved - Risk assessment done

12. ANNEXURE – D

(2) HAZARD IDENTIFICATION

Risk Rating: 1-3 Low Risk 4-7 Meduim Risk 8-10 High Risk

Task / situation	Personal protective equipment	Risk to safety	Risk to health	Risk to Environment	Risk Rating
Site Establishments	Overalls, hard hats, safety shoes, ear plugs	Exposure to movingmachinery and vehicles Injury Property damage	Exposure to hazardousmaterials	EnvironmentalDamage of current habitation	6
Excavation	Overalls, hardhats, safety shoes	Injury on body parts	Back strains while manually shoveling andplanting	Disturb Environment	7
Campus	Overalls, hard hats, safety shoes, ear plugs, Gumboots	Employees andstudents at risk	Noise, Dust, and heavyvehicle movement	Dust and noise	5
Confined Space	Overalls, hard hats, safety shoes, ear plugs, Gumboots	Installation of mechanical works	Difficulty Breathing, Dehydration, Dizziness,Air Pollutions Asphyxiation, intoxication, fatality	Air Pollutions dueto oxygen deprivation or release of hazardous air quality	10
Working at Heights	Overalls, hard hats, safety shoes, ear plugs, harness,fall arrest equipment	Slip, fall from height,Dizziness Roof work injury of steel sheetson hands.	Blood pressure unstable, Dizziness, unstable health, Breathing difficulty,Anxiety	Equipment fall and break, chemicals, oils falland destroy environment	8
Lifting Equipment (Lifting of Pumps and Steel pipes)	Lifting of Pumps andSteel pipes	Fall, Slip, Back Injury ,Body injury. Equipment can fall-foot injury. Slings break,	Dizziness	Equipment fall andbreak, destroy environment and have huge financial implications	8
Manual Lifting	Overalls, hardhats, safety shoes, ear plugs, harness	Fall, Slip, Back Injury ,Body injury. Equipment can fall-foot injury. Slings break,	Dizziness, Dehydration	Equipment fall andbreak, destroy environment and have huge financial implications	9

Building works/ Wet Works	Overalls, hard hats, safety shoes, ear plugs, harness	Unsupervised work,Faulty Equipment, Incompetent Persons Eye injury. Working at heights, Scaffolding work (incompetent person)	Skin allergies, dermatitis, Eye damage, Health issues, Lung disease	Spillage of chemicals, harmfull environment,	
Hazardous Chemicals	Overalls, hard hats, safety shoes, ear plugs, harness,		Skin allergies, dermatitis, Eye damage, Health issues, Lung disease	Spillage of chemicals, harmfull environment ,	9
Electrical Works	Overalls, hard hats, safety shoes, ear plugs, harness, fall arrest equipment	Unsupervised work,Faulty Equipment,Fire Resulting from electrical fault. Incompetent Persons	Electrical Shock, Fatigue, working at heights, cramped working conditions,	Fire, Blast, damage property, expensive equipment replace	10
Installations of Pipes	Overalls, hard hats, safety shoes, ear plugs, harness, fall arrest equipment	Faulty ropes untested ropes, Pipes fall on feet, injury of legs,feet, body parts,		Financial implication if pipes fall, damage of equipment and environment	5
Concrete Works	Overalls, hard hats, safety shoes, ear plugs, harness,	Injury to eyes, bodily harm,	strain on back muscles, Skin Allergies (Dermatitis), Vibration of pokers, Noise from cement mixer, Exposure to silica	Spillage of concrete. Hazardous Chemical and very bad for environment. Protection sheet must be use.	8
Paving	Overalls, hardhats, safety shoes, ear plugs, Lifting Equipment out of Water Bed	Hand injury, foot injury. Grinders work	Dust control, Ergonomic control, repetitive work.	Air Pollutions, Dust Work	10

Carting of Materials	Overalls, dustmasks, hard hats, safety shoes, gloves,ear muffs	Manual carting: bodyinjury, muscle injury, fall of materials on body parts	Spillage of chemicals,	Damage of environment if spillages or materials fall disturbing natural habitat	8
Load & Unload byHand	Gloves	Back and handinjuries			5
Working in wet/muddyconditions	Overalls, hard hats, safety shoes, gloves , goggles, Mask, Raincoats	Slipping, falling injuryof workers, body injury	Illness, loosing oflimbs	Disturbing of natural habitat	9
Tree Felling	Helmet with shield, Shoes, gloves, goggles, mask, Overalls	Cutting with chainsaw, falling on people or buildings. Injury of hands, arms, legs. Falling	Dust , Allergies, Dermatitis. Loosing oflimb	Disturbing of natural habitat	9

(3) EQUIPMENT RISKS

Activity / Situation	**Personal Protective Equipment**	**Risk to Safety**	**Risk to Health**	**Risk to Environment**	**Risk Rating**
Constructio n Vehicles andPlant	High visibility bibs, hearing protection, safety shoes	Accidents	Noise, dust	Oil spillage of vehicles, fuel spillage of vehicls	8
Electrical works	Overalls, Safety Shoes, Face Shields,gloves, goggles	Damage equipment or tools, wire not safe. Not supervised,not competent.	Electrocute on unsafeequipment, Shock on unsafe wire or equipment	Tree damage property or other endangered species, Fire due tounsafe equipment	8
Extension Leads	Hard hats, safeshoes, goggles	Electrical shocks, trips and falls, Wet conditions shocks orelectrocution		Fire due to unsafe wire of illegal wiring	8

Hot Works (welders, grinders,etc)	Hard hats withhelmets and shields, special gloves, shoes, overall. Mask	Eye injury, Burns, Electrocution, bodyharm. Radiation burns to the eyes	Inhale of gas, Dust,Fumes,	Gas leaks, fly sparksfire.	9
Hand Tools	Overalls, hard hats,safety shoes, goggles, aprons	Cuts, bruises		Damage ofproperty	7
Electrical Power Tools, grinders, drills, heat gun,	Overalls, Safety Shoes, Face Shields,gloves, goggles, ear plugs. Masks	Damage equipment or tools, wire not safe. Not supervised,not competent.	Electrocute on unsafeequipment, Shock on unsafe wire or equipment	Tree damage property or other endangered species, Fire due tounsafe equipment	8

PHYSICAL RISKS

Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Risk to Environment	Risk Rating
Tripping Hazards	Foot wear, ramps and walk ways with rails.	ankle & knee injuries and foot injuries, etc		Housekeeping very importants	6
Noise (General Machinery)	Ear plugs, earmuffs		Noise induced hearing loss	Noise pollution	7
Snakes	High Boots, Leather Gloves	Poisonous Snakebite	May result Fatality	Do not kill any snakes call help line	4
Insect Bites	Insect Repellent	Allergies,	Allergies, Sickness, Certain illness		5
Dust	Dust Mask, Goggles		Long Disease, Allergies, Eye injuries	Dust Pollutions	7
Weather	Raincoats, hats, goggles, sun hats,	Wet weather, slip and fall, windy weather danger working with particles	Injury of body parts, illness, fatality, dizziness, dehydration	Damage of equipment and environment is severe weather conditions	9
Sun exposure	Sun block, Hat, Sun screens,	Dizziness, Fall, collapse	Exposure to sun rays causing heat stroke, dizziness, skin Disease	Fire Destroy Environment	8
Fire Prevention	Overalls, hard hats, safety shoes,	Reduce the risk of personal injury arising from fire ignition from electrical assets. Maintain compliance with relevant legislation	Field fire trap employees, fatalities, etc	Destroy environment.	9

Waste Management Process/activity	Mask, Shields, Goggles, SafetyShoes	Bottles and Wastematerials could hurt employees due to poor housekeeping. Waste material could also endanger animalspecies.	Toxic Waste could death of animals and destroy habitat and endangered species.	Potential non-compliance to relevant environmental legislation. Potential legalproceedings and litigation. In terms of the Environment Conservation act, regarding the disposal of waste. The National Environmental Management act, regarding the avoidance of pollution. The National Water act, regarding the measures taken to prevent water pollution. potential non-compliance to the Hazardous Substances act as well as Public Health by-laws relating to the disposal of waste.	9

ERGONOMIC RISKS

Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Risk to Environment
Visual Workplace	Goggles, Mask	Tripping over materials. Not good housekeeping. Injuryof body parts	Environment with plantscan cause allergies	Damages to environment all activities must have approvalof Project manager
Awkward Postures	Body strap,	Back injuries, etc	Health complicationfrom unnatural postures	
Heavy Manual Lifting	Safety shoes, gloves,	Back injuries, etc		

13. ANNEXURE – F Budget

Items to be (but not limited) budgeted and priced under Occupational Health and Safety and total to be carried forward to item 76 of the P & G's for inclusion in pricing of the BOQ.

ITEMS COSTED	
1	Health and Safety Plan inclusive of Fall ProtectionPlan (Full Health and Safety File)
2	PERSONAL PROTECTIVE EQUIPMENT
	Overalls
	Hard hats
	Safety boots / shoes
	Gloves (take note of different task)
	Ear plugs or Ear Muffs
	Respiratory Equipment
	Mask
	Goggles / Safety Glasses
	Safety Harness
	Rescue Equipment
	Hazchem Spill Kit
	Shield helmet (welding)
	Certified Chain slings
	Other
TOTAL (NO COST TO BE INSERTED HERE) **COST/PRICE TO BE INCLUDED IN PRELIMINARY & GENERAL SECTION –**	
ITEMS COSTED	
3	FIRE FIGHTING EQUIPMENT
	Fire extinguishers (take note of different risk)
	Other
TOTAL (NO COST TO BE INSERTED HERE) **COST/PRICE TO BE INCLUDED IN PRELIMINARY & GENERAL SECTION –**	

ITEMS COSTED	
4.	HEALTH AND SAFETY PERSONNEL
	Safety Manager
	Full time safety officer
	Full time safety representative
	First aider
	Hazchem Supervisor

	Fall Protection Planner
	Fall Protection Supervisor

TOTAL (NO COST TO BE INSERTED HERE) **COST/PRICE TO BE INCLUDED IN PRELIMINARY & GENERAL SECTION –**

ITEMS COSTED	
5.	LIFTING MACHINERY AND EQUIPMENT
	Annual inspections and load testing as per legalrequirement
	Certification of all lifting gear during the course ofthe project
	Third party inspection
TOTAL (NO COST TO BE INSERTED HERE) **COST/PRICE TO BE INCLUDED IN PRELIMINARY & GENERAL SECTION –**	

ITEMS COSTED	
6.	INSURANCES
	COID cover for the project
	Liability insurance
TOTAL (NO COST TO BE INSERTED HERE) **COST/PRICE TO BE INCLUDED IN PRELIMINARY & GENERAL SECTION – SEE ITEMS**	

ITEMS COSTED	
7.	TRAINING
	Health and safety representatives
	H & S Supervisory training
	First aid training
	Fire fighting
	Legal liability training
	Risk assessment training
	Working at Heights Training
	HAZCHEM Training
TOTAL (NO COST TO BE INSERTED HERE) **COST/PRICE TO BE INCLUDED IN PRELIMINARY & GENERAL SECTION**	

ITEMS COSTED	
8.	SIGNAGE
	All signage as required by law: regulatory,warning and information
	Posters for awareness

ITEMS COSTED	
9.	ELECTRICAL
	Locks required for lockouts
	Tags
	Permit books

This list is not exhaustive and contractors may expand all levels to include all relevancy H & S expenditure

(4) The Clients Principal Agent Approval:

Name: _____

Signature: _____

Date: _____

FOR PRINCIPAL CONTRACTOR

Principal Contractor Representatives Acceptance: Name: _____

Signature: _____

Date: _____

14. Annexure G

(5) CONTENTS AND NUMBERING SYSTEM FOR THE HEALTH AND SAFETY FILE

1.	Index of OHS File
2.	Letter of good standing COIDA
3.	Department Of Labour Notification of Construction Work
4.	Occupational Health and Safety Policy and other policies
5.	Health and Safety Plan
6.	Mandatory Agreement 37(2) between Client and the Principal Contractor
7.	Client Health and Safety Specifications and Baseline Risk Assessment + COVID-19 OHS Specifications and Baseline Risk Assessement
8.	COVID-19 Action Plan and Risk Assessment
9.	Organogram and All Signed Legal Appointments with Evidence of Competencywith Duties and Responsibilities with Medical Certificates of Fitness of all employees
10.	Induction Programme for employees,visitors and Sub-contractors
11.	Risk Assessments and Risk Matrix and Review Process and Evidence of Facilitation
12.	Updated list of Sub-Contractors and 37(2) Agreement between Principle Contractor and Sub-Contractor
13.	PPE Procedure and Evidence of Control
14.	Principal Contractor H&S management processes (method statements or operating procedures)
15.	Safe Work Procedures and Evidence of Facilitation
16.	Emergency Procedure and Evidence of Facilitation
17.	Fall Protection Plan
18.	Incident and Accident Procedures and Evidence of Facilitation
19.	Security Process and procedures with Evidence
20.	Safety Inspections/ Safety Registers
21.	Tool Box Talk Programme and Evidence of Facilitation

22.	OHS Act no 85 of 1993 and Construction Regulations 2014

RURAL DEVELOPMENT & AGRARIAN

THE CLIENT's

OCCUPATIONAL HEALTH AND SAFETY

COVID-19 SPECIFIC SAFETY SPECIFICATION FOR

(a) CONSTRUCTION OF A TWO 50-SEATER FURNISHED LECTURE THEATRES AT

THE FORT COX COLLEGE OF AGRICULTURE.

OHS COMPANY: SHE-SHAY SOLUTIONS

Tel: 081 324 517

E-mail: tessa@sheshay.com

Contact Person: Tessa Jacobus

1 INTRODUCTION TO ADDENDUM

On March 11, 2020, the World Health Organization (WHO) declared that an outbreak of the viral disease COVID19 – first identified in December 2019 in Wuhan, China – had reached the level of a global pandemic. Citing concerns with “the alarming levels of spread and severity,” the WHO called for governments to take urgent and aggressive action to stop the spread of the virus.

The regulations seek to ensure that we, as a country, implement appropriate measures to contain the outbreak of COVID-19. These measures have far-reaching implications for employers.

On March 15, 2020, the Minister of Co-Operative Governance and Traditional Affairs, designated under Section 3 of the Disaster Management Act, 2002 (act No.57 of 2002), published in Government Gazette No. 43096 the Regulations, setting out the necessary steps to prevent an escalation of the disaster or to alleviate, contain and minimise the effects of the disaster. In April the Minister signed a Disaster Pandemic Guide, Government Gazette No.43257 dated 29 April 2020, COVID-19 Occupational Health and Safety Measures in Workplaces 2020.

Furthermore, the Department of Employment and Labour has appealed to employers to use the prescriptions of the Occupational Health and Safety (OHS) Act of 1993 in governing workplaces in relation toCoronavirus Disease 2019 COVID–19.

The Department wishes to appeal to employers who have not prepared for pandemic events to prepare themselves and their workers as far in advance as possible of potentially worsening outbreak conditions. The Department advises employers to “go back to basics" by conducting hazard identification and risk assessment to determine the level of risk exposure and communicate to all workers.

International human rights law guarantees everyone the right to the highest attainable standard of health and obligates governments to take steps to prevent threats to public health and to provide medical care tothose who need it. Human rights law also recognizes the context of serious public health threats and public emergencies

This Covid 19 Specification will therefor assist the Principal Contractor & Contractors to comply with new Covid 19 Legislation and assist in the fight against the spread of the Virus.

NB:

- **This Epidemic is unprecedented & therefor this document is not an exhaustive & further revision can be expected as guidelines are changed & received.**
- **There are very few Carona Virus / Covid 19 Experts in the world, This document has been written ONLY as a guide to assist The Principal Contractor & Contractors is advised to continue with work & mitigate the risk of the virus entering & spreading in the workplace.**
- **By following these guidelines, does not by any means guarantee that any Employee / visitor are unable to contract the virus.**
- **Where this document & Regulations Conflict, Regulations should receive preference.**

2 KEY REFERENCES

- Occupational Health and Safety Act No. 85 of 2003 and Regulations (as amended)
- Compensation for Injury and Occupational Diseases Act No. 100 of 1993 (as amended)
- GN R.398 of Government Gazette 43148 under section 3 of the Disaster Management Act, 1957 (Act 57 of 2002) as amended on 25 March 2020 wherein essential services are defined in Annexure B (see Addendum 1)
- Department of Employment and Labour: Covid-19 Guideline
- World Health Organisation (WHO)
- National Institute for Communicable Diseases (NICD) (South Africa) Centre for Disease Control and Prevention (CDC) Criteria for Return to Work for Healthcare Personnel with Confirmed or Suspected COVID-19 (Interim Guidance).
- US Centre for Disease Control. Available from: https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/hcp-return-work.html (accessed 30 March 2020)
- NICD COVID-19 PUI criteria for testing: http://www.nicd.ac.za/diseases-a-z-index/covid-19/
- (Version 11, 2 April 2020)
- NICD Clinical management of suspected or confirmed COVID-19 disease Version 3 (accessed 30 March2020) van Someren Gréve F, Ong DSY. Seasonal respiratory viruses in adult ICU patients. Netherlands Journal of Critical Care. 2017;25(6):198-204.
- Risk assessment and management of exposure of health care workers in the context of COVID-19 Interim guidance. World Health Organization.19 March 2020. Available from: https://apps.who.int/iris/bitstream/handle/10665/331496/WHO-2019-nCovHW_risk assessment-2020.2-eng.pdf (accessed 30 March 2020)
- Gazette 43400: Consolidated COVID-19 Direction of Health and Safety in the Workplace Issued by theMinister in terms of Regulation 4(10) of the National Disaster Regulations. Published 4th June 2020.

https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus

https://www.cdc.gov/coronavirus/2019-ncov/prepare/transmission.html

https://www.npr.org/2020/03/13/815307842/research-coronavirus-can-live-for-a-long-time-in-air-on-surfaces

https://www.return2work.co.za/business-resources/

https://sacoronavirus.co.za/

https://www.nicd.ac.za/diseases-a-z-index/covid-19/

http://www.health.gov.za/index.php/outbreaks/145-corona-virus-outbreak/465-corona-virus-outbreak

http://www.nioh.ac.za/covid-19/covid-19-training-per-presenter/

3. ABBREVIATION AND DEFINITIONS

Abbreviation	Description
BCEA	Basic Conditions of Employment Act, 75 of 1997
COVID-19	A disease – usually a respiratory tract illness – caused by the SARS-CoV-2 virus.
Disaster Management Act	Disaster Management Act, 57 of 2002.
DHET	Department of Higher Education and Training.
DoH	Department of Health.
ECDC	European Centre for Disease Prevention and Control.
Essential Services	Essential services mean services, by whomsoever rendered and whether rendered to the government or any other person, the interruption of which endangers the life,health or personal safety of the whole or part of the population
Engineering Controls	Isolating the person from the hazard through physical or mechanical means.
HCW	Health Care Workers.
Incubation period	Time from exposure to contracting the disease.
Isolation	A period during which someone who is suspected or confirmed to have COVID-19 isseparated from healthy people. The period stops if they test negative or, if they test positive, they remain in isolation until they are well.
OHS	Occupational Health and Safety.
OHS ACT	Occupational Health and Safety Act, 85 of 1993
NICD	National Institute of Communicable Diseases.
PPE	Personal Protective Equipment.
PCR	Polymerase Chain Reaction, a test to diagnose COVID-19.
Physical distancing (also referred to associal distancing)	Measures taken to restrict the possible spread of infectious diseases and includeincreasing physical distance between individuals.
Quarantine	According to the WHO's International Health Regulations (2005) "quarantine" meansthe restriction of activities and/or separation from others of suspect persons who are not ill OR of suspect baggage, containers, conveyances or goods in such a manner as to prevent the possible spread of infection or contamination. The purpose of quarantine is to prevent the transmission of diseases. Quarantine canbe applied to: □ An individual or a group of persons who were exposed to someone who isconfirmed to have COVID-19. □ This is usually for a period of 14 days in the case of COVID-19 and can be involuntary if demanded by the State.
SARS-CoV-2	A novel respiratory virus first identified in Wuhan China in December 2019 and responsible for a global pandemic.
Screening	A process to identify individuals who may have an infection from SARS-CoV-2; usually ascertained by a symptom questionnaire.

Isolation	The International Health Regulations (2005) define “isolation” as the separation of ill or contaminated persons or affected baggage, containers, conveyances, goods or postal parcels from others in such a manner as to prevent the spread of infection or contamination. In the context of the COVID-19 pandemic, isolation may include, amongst others: • Isolation at a person’s home. • Isolation in a health facility.
	• Isolation at a designated facility.
SLA	Service Level Agreement.
SOP	Standard Operating Procedure
Social Distancing	To remain out of crowds and maintain 1.5 meters from one another
Source	Infected person
Surveillance	The process of determining the proportion of the population who have a recent past infection with SARS-CoV-2.
Virus	SARS-CoV-2 virus.
WHO	World Health Organisation

4. PURPOSE OF THE COVID-19 OCCUPATIONAL HEALTH & SAFETY SPECIFICATION

To provide standard requirements and protocol to as far as reasonably possible mitigate and control the COVID-19 hazard and spread of COVID-19.

Provide standard operational procedure for companies of employees returning to work as per the phased re-integration plan following the COVID-19 South African lockdown. The standard operational procedure address possible exposure to SARS-CoV-2 the virus responsible for COVID-19 and subsequent illness, isolation, and quarantine, in addition to the usual return to work procedures.

At this time, it is necessary for Contractors to implement a policy and protocol to manage COVID-19 in the workplace and on site.

Employers need to remain agile and flexible as this issue continues to develop. Contractors who are proactive and forward-thinking in terms of their plans for business continuity will ensure that they contain, asfar as possible, any negative impact on their businesses, and spread of the virus to their employees.

The COVID-19 is an addendum to the Health & Safety Specification issued as a guideline to the Contractor, tounderstand the virus, to implement his policies, plans and procedures, as precautionary and vital measures on his project, and in his workplace, to ensure that the Corona Virus is not contaminated and / or spread amongst his, not limited to, workplace and employees

For this purpose, this Covid-19 Health & Safety Specification, but not limited to, requires the contractor touse it to plan, identify, compile and implement a Covid-19 plan.

Advice and example of documents as well as approval of OHS plan, such as hazard identification and risk assessments, or any other form of communication from the Client shall be construed as acceptance by the Client of any obligation that absolves the Principal Contractor from achieving the required level of performance and compliance with legal requirements. Furthermore, there is no acceptance of liability by the Client, which may result from the Principal Contractor failing to comply with this Covid-19 PSHSS, i.e. the Principal Contractor remains responsible for achieving the required performance and Health levels

The Health and Safety COVID-19 Specifications ***highlights*** *the aspects* to be considered, over and above theminimum requirements of current guidelines and regulations set-out by legislature, governance and organisations as listed in key references above.

Requirements may be changed should new risks or issues are identified, or proposed.

The implementation of the proposed contingency plan shall remain at review continuously, since it is an outbreak of a virus still under scientific scrutiny, and each case (of infection, symptoms or outbreak) is dealt with individually and or independently.

Any new legislation or standards that are promulgated or accepted during the contract is automatically applied to your contract and or project.

CONTRACTORS RIGHTS, ROLES & RESPONSIBILITES INCLUDING OCCUPATIONAL HEALTH & SAFETY

The Contractor is expected to incorporate a **Support Team for Covid-19** to maintain his Covid-19 planimplementation.

Whilst the CEO (16.1) remains responsible at all times, the President of South Africa, has mandated every citizen to maintain diligence and cautious precautionary measures to “flatten the curve” of the outbreak.

On these projects, it is expected that the CEO (16.1), Project Manager (16.2), safety officer, first aider, construction work supervisor, emergency co-ordinator, SHE representatives and construction managers, with the appointments of the COVID -19 Compliance Manager and COVID-19 Compliance Officers etc. would makeup this team and they should be included in the compilation of the Covid-19 plan, and the **Health & Safety Organogram** extended to include the Covid-19 Reaction/Support Team

Every worker / Team member is identified at the front line of any outbreak response and as such are exposed to hazards that put them at risk of infection with an outbreak pathogen (in this case COVID-19).

Hazards include pathogen exposure, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence.

This document highlights the rights and responsibilities of all workers, including specific measures needed to protect occupational safety and health.

The mandate of these role-players is crucial, and the initial Health & Safety Specification, Contractors Plan should be taken into consideration when putting this team together, and identifying role-playing, planningand procedures etc.

The information relative to the scope of the project, the works etc. are to be considered when further instituting roles & responsibilities.

There shall be no contradictory appointments to the appointments already in place, and no infringement of anyone’s willingness or right to not participate, unless otherwise it is a “normal” requirement of the Employer to place such employee under such title/s.

No work may commence without written approval of the H&S COVID-19 plan by the client and/or SHE Agent.

5. IMPLEMENTATION REQUIREMENTS

5.1. BRIEF

The following requirements, but not limited to, are required to be considered, inclusive, part-planning and identification in the Contractors Covid-19 Health & Safety plan.

(b) The Contractor is expected to submit a COVID-19 Action Plan. with the Health & Safety Plan, consideringand outlying the following factors, and submit for approval.

Whilst this is a "new" virus and outbreak, it is expected that research is done (where necessary) and normal health management protocols are applied.

The Guideline from the Department of Employment & Labour refer to : Government Gazette No.43257dated 29 April 2020, COVID-19 Occupational Health and Safety Measures in Workplaces 2020 *and Government Gazette No. 43400 dated 04 June 2020, COVID-19*

In the context of the COVID-19 pandemic, this means any employer which is permitted to commence operations must develop measures to ensure that the workplace meets the standards of health protocols, adequate space for workers and physical distancing measures for the public and service providers, as required. Employers should take steps to eliminate or mitigate the transmission of COVID-19 in respect of its workers and any other person directly affected by the employer's activities (e.g. customers, clients or contractors and their workers who enter their workplace or come into contact with their workers) According to Disaster Management OHS Guideline the Measurements are

- Pandemic Policy
- Engineering Controls
- Work Plan
- Declaration of CEO Opening
- Social Distancing
- Screen Process
- Risk Assessment
- List of Employee Details
- Daily Register of Employees
- Emergency Procedures
- Checklist
- Training/Awareness/Toolbox Talks
- Declaration of Vulnerable Employees

5.2. COVID-19 POLICY

The aim of the policy is to ensure a safe working environment for all employees and to stop the spread of COVID-19 virus. Section 8 of the Occupational Health and Safety Act, 1993 “OHSA” requires every employer to provide and maintain, as far as reasonably practicable, a working environment that is safe and without risk to the health of its employees. Similarly, the OHSA also imposes a duty on employees to take reasonable care for their own health and safety and that of their fellow employees. This reason every employer have to create a COVID-19 Policy.

5.3. ENGINEERING CONTROLS

Definition for Engineering Controls is Isolating the person from the hazard through physical or mechanical means. See EPA-Registered Disinfectants from List N to update yourself.

5.3.1. The Following are examples of Engineering Controls

- To be effective you need disinfection procedures for facilities, shared equipment and spaces, workarea, and personal electronics
- Barriers, partitions, ropes to separate employees from public or building occupants, e.g. plexiglassscreens, sneeze guards, theater ropes and stanchions, hazard warning tape, etc.
- Use of biosafety cabinets when performing research.
- Drive-thru style partitions and windows
- Hands-free trash receptacles, soap and towel dispensers, door openers, and other similar hands-freeequipment.
- Handles, push-buttons, and other high touch points made of copper or coated with copper tape. SARS-CoV-2 has a low virus stability on copper surfaces and research has proven there to be no viablevirus after 4 hours on copper surfaces.
- Create isolated spaces/workstations for employees or students with immune deficiency.

5.3.2. Ventilation in Vehicles

Ensure vehicles are adequately ventilated. Keep canopy windows open at all times. Preferable, canopies should be replaced with adequate railings to allow for better ventilation to reduce "confine space" risk;

5.3.3. Physical barriers

Transportation is regarded as one of the “high contact” activities, which increases the risk of COVID – 19 transmission. “High contact” areas qualifies for the establishment of physical barriers between participants to reduce this risk;

Due to the nature of the activity, the use of personal protective equipment (PPE) when seated inside a vehicle will apply.

This will serve as a physical barrier between participants. The PPE during transportation shall include:

1) face shield;

2) face mask (3 x material layer washable face mask)

5.4. COVID-19 WORK PROCEDURES

5.4.1. Appointment of Compliance officer

Any employer which is permitted to commence operations during lockdown must designate a COVID-19 compliance officer who will oversee the:

a) implementation of the plan for the phased in return of workers to the workplace and
b) adherence to the standards of hygiene and health protocols relating to COVID-19 at theworkplace

5.4.2. Before re-opening operations, an employer which is permitted to commence operations during lockdown must develop a plan for the phased in return of their workers to the workplace, prior to re-opening the workplace for business. This plan must correspond with risk management plan and mustbe retained for inspection.

5.4.2.1. For small businesses, the COVID-19 Workplace Plan can be simpler but should capture the followingminimum information:

a) the size of the business,
b) which employees are permitted to work;
c) what the plans for the phased-in return of their workers to the workplace are;
d) what health protocols are in place to protect employees from COVID-19; and
e) the details of the COVID-19 compliance officer;

5.4.2.2. For medium and larger businesses, a more detailed written plan should be developed given the larger numbers of persons at the workplace and in addition to the information in paragraph 4.2.2should include the following additional information:

a) the date the business will open and the hours of opening;
b) the timetable setting out the phased return-to-work of workers, to enable appropriatemeasures to be
c) taken to avoid and reduce the spread of the virus in the workplace;
d) the steps taken to get the workplace COVID-19 ready; d) a list of workers:
   i. who can work from home;
   ii. who are 60 years or older; and
   iii. with comorbidities who will be required to stay at home or work from home.
e) arrangements for staff in the establishment including:
   i. sanitary and physical distancing measures and facilities at the entrance and exit to theworkplace
   ii. screening facilities and systems;
   iii. the attendance-record system and infrastructure;
   iv. the work-area of employees;

v. any designated area where the public is served;
vi. change room facilities and bathroom facilities;
vii. testing facilities (for establishments with more than 500 employees); and
viii. staff rotational arrangements (for establishments where fewer than 100% of employees will be permitted to work).

f) arrangements for customers or members of the public, including sanitation and social distancing measures.

5.4.3. The contractor shall ensure that employees are screened for COVID-19 related symptoms and report such symptoms to a designated person and / or occupational health practitioner prior to entry into the workplace or work area in order for a decision to be made as to the staff member's continued attendance at work.

5.4.4. At the start of a shift and prior to ending the shift, the Contractors designated persons and / or occupational health practitioner shall check with employees whether they have experienced sudden onset of any of the following symptoms: cough, sore throat, shortness of breath or fever/chills (or 38^0 C measured temperature if this is available at the worksite), in the past 24 hours as outlined in the symptom monitoring sheet. These are the current criteria for the identification of persons under investigation (PUI).

5.4.3. Should an employee report any symptom based on the attached monitoring sheet, s/he the contractor shall provide such employee with a surgical mask and referred to their identified Occupational health service provider, or primary care clinic for further clinical evaluation and requirement for COVID-19 testing if indicated.

5.4.4. On receiving their results the Contractors Occupational Health Service Provider, or Primary Care Clinic supporting the employee shall notify the contractor so that the employee is managed accordingly. The contractor shall proactively take steps to obtain this information to avoid any delays in reporting.

5.4.5. The contractor shall ensure that the employee shall be managed according to either scenario 1 or 2 in the algorithm outlined below.

Scenario 1: worker with a confirmed positive COVID-19 test	To remain consistent with the advice in the NDOH clinical management of COVID-19 disease Guideline[3], scenario 1 (COVID-19 confirmed in a worker), will require self-isolation of staff member for 14 days after symptom onset (mild cases) and 14 days after clinical stability (severe cases). Should an early return to work policy be needed in future owing to severe workforce shortages, the US CDC criteria may be reconsidered.
Scenario 2: worker with current flu-like symptoms	Consider latest NICD and international criteria (US CDC): any staff in with direct COVID-19 contact who develops an acute respiratory infection (e.g. cough, shortness of breath, sore throat) with or without fever (38^0 C) or history of fever (e.g. night sweats, chills) is a suspected COVID19 case. Complete NICD PUI form[I] and select appropriate essential worker tick box PLUS notify to NICD. Perform SARS-COV-2 RT-PCR testing. For staff, with a negative RT-PCR test, but high-risk COVID-19 exposure and COVID-19 compatible symptoms, discuss with occupational health/infectious diseases regarding the need for further testing and/or self-quarantine. If an alternate diagnosis is made (e.g. influenza), the criteria for return to work should be based on that diagnosis and duration of infectivity for other respiratory infections.[4]

5.4.6. A positive COVID-19 test in an employee shall require all potential contacts in the workplace to be assessed using scenarios 3 or 4 in the algorithm outlined above.

5.4.7. All employees on returning to work after isolation or quarantine period, should follow general work

Scenario 3: High risk, confirmed COVID-19 exposure, asymptomatic	High risk exposure: close contact within 1 metre of a COVID-19 confirmed case for >15 minutes without PPE (no face cover/eye cover) or with failure of PPE and/or direct contact with respiratory secretions of confirmed COVID-19 case (clinical or laboratory). Line manager to assess and confirm COVID-19 exposure risk (if uncertain, refer to WHO tool for assessing exposure risk).[s] Notify exposure to NICD. Staff member to perform daily symptom self-check and complete symptom monitoring form until 14 days since last COVID-19 exposure. If asymptomatic through day 7, consider for return to work, following a negative RT-PCR on day 8
Scenario 4: Low risk, suspected COVID-19 exposure, asymptomatic	Low risk exposure: metre away from a COVID-19 confirmed case for <15 minutes OR within 1 meter but wearing PPE (face cover, eye cover). Also consider lower risk if COVID case was wearing a surgical mask (source control). Line manager to assess and confirm COVID-19 exposure risk (if uncertain, refer to WHO tool for assessing exposure risk.[5] For low-risk exposures to a confirmed COVID-19 positive case, worker can continue to work with self-monitoring (twice daily temperature and daily symptom check) for 14 days after last COVID-19 exposure. (use symptom monitoring form below)

restrictions that include:

- undergo medical evaluation to confirm that they are fit to work
- wearing of surgical masks at all times while at work for a period of 21 days from the initial test implement social distancing measures as appropriate (in the case of health workers avoiding contact with severely immunocompromised patients) adherence to hand hygiene, respiratory hygiene, and cough etiquette
- continued self-monitoring for symptoms, and seek medical re-evaluation if respiratory symptoms **recur or worsen**

5.5. ROLE PLAYERS TO COVID-19 POLICY & PLAN OF CONTRACTOR

The Contractor shall establish a care/support team which can handle the process of cross contamination and infection on-site. The team should also be available / referred for answering workers' concerns and communicating accurate media updates etc.

With employees, site visitors and others coming to site from unknown origins, it is imperative that the Covid- 19 plan is drafted with the identification of the care/support individuals to form this team, as these individuals will be required to avail themselves, as per the procedure put into place.

The role-players will also be expected to deal with issues of resources, and maintaining of resources, e.g. using a glove, then re-using a glove is not permitted. Using a glove then taking off a hand where the hand is bare and infecting then the hand is also not correct.

All these controls need monitoring by role-players.

The organogram must be re-defined and submitted, and include appointment letters for such.

5.6. SOCIAL DISTANCING

5.6.1. PHYSICAL DISTANCING

5.6.1.1. Reduce worker concentration

Reducing face-to -face contact is an important measure to mitigate the impact of COVID-19. Employersshould, as far as practicable, minimise the number of workers at the workplace at any given time through rotation, staggered working hours, shift systems, remote working arrangements or similar measures in order to achieve social distancing.

5.6.1.1.1. Workers that can work from home should work from home particularly where they are Vulnerable Workers. Employers should develop a directive or guidance on working from home to provide clear advice to all workers working from home. **(frequently asked questions about remote working can be found here).**

5.6.1.13. Every employer should arrange the workplace to ensure minimal contact between workers and as far as practicable ensure that there is a minimum of one and a half metres between workers. A bigger distance may be required depending on the outcome of the risk assessment.

5.6.1.14. If it is not practicable to arrange a worker's workstation(s) to be spaced at least one and a half metres apart, the employer should:

a) arrange physical barriers to be placed between workers' working places or erected on workers' desks to form a solid, physical barrier between workers while they are working; or
b) if necessary, supply the worker free of charge with appropriate PPE based on a risk assessment of the working place.

5.6.2. Common areas

5.6.2.1. Every employer should ensure that social distancing measures are implemented through supervision both in the workplace and in the common areas outside the immediate workplace through queue control or within the workplace such as canteens, coffee shops and lavatories.

5.6.2.2. At a canteen and workplace coffee shops these measures may include:

a) dividing the workforce into groups or staggering break-times to avoid the concentration of workers in common areas such as the canteen.
b) prohibiting sit down food and only take away.
c) encouraging workers to bring their own lunches.
d) arranging for food to be delivered to workers' offices/desks to avoid having to go to the canteen.
e) closing of common areas to reduce pedestrian traffic.
f) staggering start / finish / break times to reduce traffic in common areas.
g) changing area layouts to create more space for movement.
h) minimising handling of cash and encourage contactless payments only.
i) markings on the floor / ground to define queueing quadrants to indicate minimum social distancing requirements.
j) providing for outside, well-spaced eating areas.

5.6.2.3. In other common areas these measures may include:

a) prohibiting ''hot desking'' (i.e. workers should have dedicated desks).
b) markings on the floor / ground to define routes and indicate minimum social distancing requirements.
c) leaving doors open (where appropriate) at busy times to speed up the flow of pedestrian traffic (and to avoid workers touching door handles).
d) disabling vending machines.
e) disabling of biometric systems where possible (introduce card systems).
f) Ongoing sanitation of door handles, lift buttons and furniture; social distancing to be applied in elevators.
g) designating coffee cups and other crockery as far as possible.

5.6.2.4. Providing dedicated lockers for the storage of their personal belongings, cell-phones and clothing such that there is no mixing and sharing of such facilities

5.6.3. Workplace meetings and gatherings

5.6.3.1. Where workplace meetings can be held via an online collaboration platform, it is strongly encouraged.

5.6.3.2. Where workplace meetings cannot be conducted virtually, strict protocols should be implemented in respect to in-person meetings:

a) the maximum occupancy of the workplace meeting room should be determined having regard to social distancing principles above and excess seats should be removed from the room;
b) the layout of workplace meeting rooms should conform with social distancing principles in so far as possible;
c) the number of attendees that may attend a workplace meeting should be limited to the prescribed occupancy requirements of the room;
d) the number of workplace meetings and the duration of workplace meetings should be reduced;
e) attendees should avoid social niceties such as shaking of hands and hugging;
f) all attendees should wear a face mask with nose and mouth covered;
g) all attendees should wash hands / hand sanitizer before entering and exiting the workplace meeting room;
h) doors to be left open during and between workplace meetings to avoid touching handles;
i) desks / equipment / seat handles in meeting room should be sanitised immediately before and after meetings;
j) meeting refreshments are permitted where the coffee cups are disposable, beverages are sealed and food is wrapped.

5.7. . RISK ASSESSMENT & RISK ASSESSMENT REVIEWS

5.7.1. In all Health & Safety Protocols – Risk Analysis is key**.**

Compiling the Covid-19 plan requires that Employers and workers should use this planning guidance to help identify risk levels in workplace settings and to determine any appropriate control measures to implement.

Planning for COVID-19 involves updating plans to address the specific exposure risks, sources of exposure, routes of transmission, and other unique characteristics of respiratory infections (i.e., compared to influenza virus outbreaks)

5.7.1.1. Covid-19 measures require that a revised risk assessment is compiled and inclusive of:

a. Hazard
b) Risk
c) Risk to Health
d) Risk to Safety
e) Precautionary / Prevention Measures
f) PPE listed inclusive referred in Precautionary Measures
g) Risk Rating / Residual Risk

5.7.2. The contractor is to identify and pre-determine the risks or potential risk exposure to THIS project and thereafter deep the hazards and risks. In other words the risk assessment should be more site-specific than global-specific

5.7.3. The Department of Employment and Labour Guideline also refers:

"The Department advises employers to "go back to basics" by conducting hazard identification and riskassessment to determine the level of risk exposure and communicate to all workers".

5.7.4. *Remember: In determining your Hazards, Risks & Control Measures – you need to achieve:*

Reduce and omit infection of the Corona Virus by:

a) Not spreading the Virus
b) Not cross-contaminating
c) Proper, Real and **Stringent** Hygiene Practices
d) Proper, sufficient and correct supply, use and disposal of PPE
e) Good Health Practices at home
f) Sufficient, Clean and Adequate water and sanitary

5.7.5. Hazards include pathogen exposure, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence

5.7.6. A systematic approach is to be followed to ensure that all significant hazards and risks are identified. This approach will include the identification of all activities, facilities, equipment, materials, substances, operations and products

5.7.7. Review and update a site specific COVID -19 Hazard Identification and Risk Assessment (HIRA)for each work site, based on the Baseline HIRA as per COVID – 19 Baseline Risk Assessment);

5.7.8. Review, update and implement COVID -19 Safe Work Procedure (SWP) for each work site, basedon recommended implementation steps in the Generic SWP COVID – 19 SWP);

5.7.9. The Focal points must provide HIRA information sessions and toolbox talks Safety Toolbox talk/s; to participants everyday prior to work commence, in order for them to be familiar with COVID – 19 risks;

5.7.10. Evaluate and complete a project continuity risk assessment plan prior the decision on proceeding with a project/work/task;

a) The observations should be discussed through social dialogue with Line function, Service Providers and Contract Teams, to assess the capacity of contractors, site supervisors and participants to implement these preventative measures. Consideration should be given to available resources and capacity
b) If either contractors, site supervisors and participants are unable to meet the requirements of the measures outlined in this procedure and in the COVID – 19 HIRA, whether partially or in their entirety, the work on sites must be suspended. Project suspension may also be trigged by government restrictions or an infection rate within local communities.

5.7.11. Risk assessment plan must be strictly complied with through monitoring and supervision.

I. Identification of “high contact” activities

The transportation of participants to and from work is regarded as a “high contact” activity. To minimise the risk of transmission of COVID – 19 during this activity, the safe work practises

stipulated in this procedure, under section 5.6, shall be implemented, monitored and adhered with at all times;

II. The site Emergency Preparedness/Response Plan must include and clearly indicate:

a) register of participants contacts on a daily attendance for the purposes of contact tracing (reduce the spread to other unaffected participants.

b) directory of COVID - 19 hotlines / task force, communication channels on site in the event of COVID - 19 situation and responsibilities, and location of the nearest available and competent medical facilities with sufficient staff;

c) mitigating measures to prevent the spread of the virus within the community, including health surveillance;

d) make arrangements for isolation of any person who develops COVID - 19 symptoms at work, and the area should be accessible only by public health authorities or those with appropriate protective gear;

e) clarify situations that should trigger suspension or closing of works, agreed by relevant stakeholders;

f) potential risks and a contingency plan for the project work if the spread of COVID - 19 increases to the extent that implementation is no longer possible (Include a "force majeure" clause in the contract of agreement).

5.7.12. Identification of vulnerable participants and special measures for their protection includingprotection against unfair discrimination or victimization,

Identification of vulnerable workers

COVID-19 is a new disease and there is limited information regarding risk factors for severe disease. Based on information and clinical expertise available at the date of this Practice Note, older adults and people of any age who have certain underlying medical conditions may be at higher risk for severe illness from COVID-19. Based on information available at the time of this Practice Note, those at higher-risk for developing severe illness from COVID-19 include people:

- 65 years and older;
- who live in a nursing home or long-term care facility; and/or
- of any age with underlying medical conditions,

particularly if not well controlled, including people with one of or a combination of the following:

i. chronic lung disease or moderate to severe asthma;
ii. diabetes;
iii. serious heart conditions;

iv. severe obesity

v. chronic kidney disease undergoing dialysis;

liver disease; and

vi. those who are immune compromised.

a) All participants must undergo pre, periodic and exit medical examinations, at approved Medical Practitioner, and be declared fit to perform their duties. A certificate of fitness must be available on site of all participants;
b) Participant with underlying medical conditions e.g. diabetes, asthma, cardiovascular disease, chronic respiratory disease, chronic renal disease, pregnant workers, HIV diagnosed workers who are virally unsuppressed etc., must be indicate this during screening process. Any medical conditions disclosed must be treated with confidentiality;
c) Focal points must encourage a healthy lifestyle amongst participants e.g. to take prescribed medication daily;
d) If it comes to the attention of the Focal point, that a participant/s with underlying medical conditions refuse to adhere to taking their prescribed medication, they should not be allowed to continue work;
e) Where persons with underlying medical conditions so signs of ill health, they should not be allowed to work and requested to remain home until his/her condition improves;
In this regard many conditions can cause a person to be immune compromised, including cancer treatment, smoking, bone marrow or organ transplantation, immune deficiencies, poorly controlled HIV or AIDS, and prolonged use of corticosteroids and other immune weakening medications

Employers should implement a process to identify both workers who:

- are, themselves, at high-risk for severe illness from COVID-19; and
- reside with or care for persons that are at high-risk for severe illness from COVID-19 (including family members, aged parents etc.). (here in after collectively referred to as “Vulnerable Workers”)

(c) Additional measures to protect Vulnerable Workers

Employers should consider what additional risk control measures would be appropriate in respect of Vulnerable Workers and develop policies and procedures to give effect to those measures.

In this regard employers should supplement and enhance the risk control measures mentioned above with additional measures to protect Vulnerable Workers. These measures would need to take into account the tailored to the circumstances of the Vulnerable Worker and their work environment and activities.

Employers are strongly encouraged to allow Vulnerable Workers that can work from home to do so

In respect of Vulnerable Workers whose current roles and responsibilities do not allow for remote working should consult with Vulnerable Workers to determine if additional risk control measures could be implemented to mitigate the transmission risk to Vulnerable Workers including:

- whether the Vulnerable Worker can fulfil a different role and responsibility which has a lowerrisk for COVID-19 transmission;
- whether the Vulnerable Worker's environment can be adapted or improved to lower the riskfor COVID-19 transmission (i.e. by stricter physical distancing protocols or additional hygienemeasures);
- whether the Vulnerable Worker can be provided with additional hygiene enablement tools(such as providing the worker with their own hand sanitiser);
- whether the Vulnerable Worker can be provided with specific PPE appropriate to the riskidentified in the risk assessment;
- allowing the Vulnerable Worker to utilise his/her annual leave or sick leave during differentlevels of the lockdown.

5.7.13. STIGMATATION OF VIRUS

Ensure that the participant is not discriminated against on grounds of having tested positive for COVID-19 in terms of section 6 of the Employment Equity Act, 1998 (Act No.55 of 1998).

5.7.13.1. Why Is Covid-19 Causing So Much Stigma?

The level of stigma associated with COVID-19 is based on three main factors: 1) it is a disease that's newand for which there are still many unknowns; 2) we are often afraid of the unknown; and 3) it is easy to associate that fear with 'others'.

It is understandable that there is confusion, anxiety, and fear among the public. Unfortunately, these factors are also fueling harmful stereotypes.

5.7.13.2. What Is The Impact?

Stigma can undermine social cohesion and prompt possible social isolation of groups, which might contribute to a situation where the virus is more, not less, likely to spread. This can result in more severe health problems and difficulties controlling a disease outbreak.

Stigma can:

- Drive people to hide the illness to avoid discrimination
- Prevent people from seeking health care immediately
- Discourage them from adopting healthy behaviours

5.7.13.3. How to Address Social Stigma

Evidence clearly shows that stigma and fear around communicable diseases hamper the response. What works is building trust in reliable health services and advice, showing empathy with those affected, understanding the disease itself, and adopting effective, practical measures so people can help keep themselves and their loved ones safe.

How we communicate about COVID-19 is critical in supporting people to take effective action to help combat the disease and to avoid fuelling fear and stigma. An environment needs to be created in which the disease and its impact can be discussed and addressed openly, honestly and effectively.

5.8. HYGIENE REQUIREMENTS

(d)5.8.1. The employer should ensure that:

a) There are adequate facilities for the washing of hands with soap and clean water;
b) Only paper towels are provided to dry hands after washing (fabric toweling must not be used);
c) surfaces that workers and members of the public come into contact, including reception desks, are routinely cleaned and disinfected and industrially sanitised, where appropriate;
d) Common areas and ablution facilities are sanitised more regularly;
e) workers are provided with the necessary tools and equipment required to perform their job to avoid sharing of workers' tools and equipment, insofar as it is reasonable and practicable to do so;
f) there are sufficient quantities of hand sanitizer (with at least 70% alcohol content) having regard to the number of workers or other persons who access the workplace at the entrance of, and in, the workplace which the workers or other persons are required to use;
g) Every worker who works away from the workplace, other than at home, should be provided with an adequate supply of hand sanitizer;
h) If a worker interacts with the public, the employer should provide the worker with sufficient supplies of hand-sanitizer at that worker's workstation for both the worker and the person with whom the worker isinteracting; and
i) The workplace is sufficiently ventilated.

5.9. HEALTH MANAGEMENT & MEDICALS

Health Management is crucial for the Covid-19 Disease Maintenance and Management.

Contractors must assume overall responsibility to ensure that all necessary preventive and protective measures are taken to minimize Occupational Health and Safety risks.

Contractors shall include, the following, in their Covid-19 Health & Safety Plan addendum:

- Screening Process
- Isolation and Management Process (in the event of suspected or infected cases)
- Isolating employees from hazardous risk areas
- Provide information, instruction and training on Occupational Hygiene & Management;
- Refresher Training on infection and contamination prevention and control (IPC); and Use, Putting on,
- Taking off and disposal of correct and identified personal protective equipment (PPE); provide adequate IPC and PPE supplies (masks, gloves, goggles, gowns, hand sanitizer, soap and water, cleaning supplies) in sufficient quantity to healthcare or other staff caring for suspected or confirmed
- Communicate health risks
- Identify a procedure for maintaining health and hygiene practices
- Monitoring & Reviewing of Health Status' of all employees daily
- Educating employees & offering Awareness or informative training (on the corona virus)
- Ensuring good and proper hygiene controls
- Ensuring good and proper ventilation and access to sufficient ventilation equipment
- Allowing administration to be done off-site (where technical and practically just)
- Planning and scheduling activities in such a way to minimise teams amalgamating (bricklaying vs general labour) in particular area etc i.e. minimising the number of workers on site at any given time e.g. rotationor shift work

(e) These measures shall include:

- Engineering Controls / Alternatives
- Administrative Controls / Alternatives
- Safe Work Procedures
- Quantity of Employee Controls per activity or engagement
- Personal Protective Equipment (PPE)
- Risk Level identification

Health Management includes the workplace and not only the workforce. There are certain areas that shall need disinfectant or to be hygienically maintained, eg high-trafficked areas, areas where food and gatherings take place (lunch facilities) etc.

Medical surveillance programme

Whilst the Construction Regulations 7(g) refers to The Contractor ensuring that all employees are fit to the specific work they perform, the Covid-19 outbreak, is identified as a threat to all on-site, and would deem any person who is infected or potentially infected, with the Corona Virus incompetent.

Therefore, after a global outbreak, and a National Lockdown, it is required that ALL EMPLOYEES includingmanagement would have to have a Medical Certificate of Fitness to resume or commence works on site.

5.10. PERSONAL PROTECTIVE EQUIPMENT [PPE]

As a normal part of Health and Safety Systems, it is a known factor that PPE is key to the prevention of most Injuries, Accidents, Diseases, Contaminations and Incidents. The Covid-19 outbreak proves this again.

Personal Protective Equipment (PPE) – while engineering and administrative controls are considered more effective in minimizing exposure to SARS-CoV-2, PPE is also be needed to prevent exposures, contamination and cross-contamination.

The PPE identification and Resource requirements should be identified and proven in the HazardIdentification and Risk Assessment (HIRA) per clause 2.5.

Although the HIRA may not conclude all the PPE, the Contractor is also to determine the same from all the requirements herein listed in the Covid-19 Health & Safety Specification

Examples of PPE include: gloves, goggles, face shields, face masks, gowns, aprons, coats, overalls, hair andshoe covers and respiratory protection, Hand Soap, Hand Sanitizer, No-touch Disposal / Waste Bins for Contaminated Waste only etc. Employers should check the NICD website regularly for updates about recommended PPE, and should also include **Health & Safety Signage and display notices**, where required

A register including the PPE for Covid-19 (not on the usual PPE Register) should be submitted with the Covid-19 Health & Safety Plan addendum.

5.11. FIRST AID / HEALTHCARE / EMERGENCY CONTINGENCY PLANNING

A First Aider is deemed competent in identifying symptoms or reactions that the Corona Virus would portray, whilst each individual case, is different.

The First Aider is therefore expected to be included in the Support/Reaction Team as noted in 2.4.

The First Aider / Support Team should therefore be diligent and even-more cautious to prevent and ensure no cross contamination, and no infection on-site even when applying First aid for another cause.

Whether acting as a First Aider, or a member of the Support Team, all Emergency Contingency planning should consider at least:

- Follow established Occupational Health and Safety procedures, avoid exposing others to health and safety risks and ensure participation in Employer-provided Occupational Health & Safety training;
- Stringent Hygiene Practice
- Use provided protocols to assess and treat patients;
- Treat patients with respect, compassion and dignity;
- Maintain patient confidentiality;
- Swiftly follow established public health reporting procedures of suspect and confirmed cases;
- Identify Call Centre and External Emergency Services for Covid-19
- Provide or reinforce accurate infection prevention and control and public health information, including to concerned people who have neither symptoms nor risk (i.e. other employees)
- Use and Disposal of personal protective equipment properly;
- Self-monitor for signs of illness and self-isolate or report illness to managers, if it occurs;
- advise management if they are experiencing signs of undue stress or mental health challenges that require support interventions; and
- Report to Construction Manager or appointed person any situation which they have reasonable justification to believe presents an imminent and serious danger to life or health.

(f) The Following, but not limited to, will be required, and expected to be Displayed, and with Key Personnel:

- An isolation area / space / facility on-site including the Disinfecting Management of this Facility ON-SITE;
- External Emergency Contacts List of Facilities identified for Covid-19 Management;
- Call Centre Contacts Lists Information for the Covid-19 Hotline, Local GP, WHO, NICD, Local DeptLabour, CDC etc.
- Emergency Plan to deal with Covid-19 screening, infection, contamination including the process of all employees when one is found to be infected (its deemed an emergency).
- Inclusion of PPE Resource Plan in the Covid-19 Emergency Plan

5.12. TRAINING & AWARENESS

Training and Awareness of the Covid-19 Addendum to your approved Health & Safety Plan is crucial, and part of the Implementation of the Contractors System. Employees need to be informed and education with accurate information. The Contractor is to outline Safe Work Procedures pertaining to the compiled system to manage and alleviate the Covid-19 disease.

- What is Covid-19 and Disease Information
- Role Players
- Hazards and Risks to Covid-19
- Hygiene Management & Practice
- Infection Prevention and Control (IPC) measures
- Safe Working Systems (working apart etc)
- Emergency Protocols
- PPE Use and Disposal
- Employee Benefits or Non-Benefits (Remuneration, UIF Claims, Compensation Claims etc) Zero-Tolerance Policies towards workplace violence and harassment, etc

The Contractors manual or safe work procedure sheets inclusive, but not limited to, the above should be attached to the Covid-19 plan.

5.13. REPORTING, RECORDING AND DOCUMENT SYSTEM OF COVID-19 PLAN

The Contractor is required to record all systems implemented, controlled and handled.

The Contractor shall record all screening processes, hygiene maintenance, medical reports, suspected and infected cases etc.

The Contractor shall amend, where applicable, and add, where applicable, suitably designed registers for the additional systems, protocols and resources needed to be recorded.

The contractor shall include Covid-19 matters in his monthly report including statistics.

5.14. SUB-CONTRACTOR / SUPPLIER MANAGEMENT

The Contractor shall ensure that his Sub-contractors and suppliers have sufficient systems on their own part to address items within this Health & Safety Covid-19 Specification, and to ensure that they do not contaminate or infect employees or facilities at this project

The Health & Safety Officer, who is deemed to be part of the Support Team, should ensure that all necessary protocols are followed, and that the Principal Contractor and Sub Contractor's and or Suppliers do not contradict his own protocols and plans to control, manage and handle Covid-19

The Contractor is to produce evidence of the same.

5.15. OCCUPATIONAL DISEASES (REPORTING & RECORDING)

(i) Reporting of incidents for regulatory purposes

5.15.1.1) Participants must be informed to alert their contractor or Focal point immediately, if they suspect they have been exposed to COVID – 19 (symptoms: body aches, loss of smell or loss of taste, nausea, vomiting, diarrhoea, fatigue, weakness or tiredness);

5.15.1.2) If a participant is diagnosed with COVID – 19, the Responsible Manager must investigate the cause including any control failure and review its risk assessment to ensure that the necessary controls and PPE requirements are in place;

5.15.1.3) An incident investigation reports shall be completed, indicating all possible causes and corrective actions taken or proposed. Incident reports shall be submitted to the relevant OHS Committeesas well as the office of the DD: Health and Safety *(see SHEQ/PROC 4.5.3.1/Incident Investigation)*;.

5.15.1.4) Service Providers/Contractors must **register with the Compensation Fund and be in possessionof a "Good Standing"** certificate. Alternatively, the Service Providers/Contractors must have Health Insurance, which provides health cover equivalent to that offered by the Compensation Fund;

5.15.1.5) If there is evidence that the worker contracted COVID-19 as a result of occupational exposure, lodge a claim for compensation in terms of the Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993) in accordance with Notice 193 published on 3 March 2020.

5.15.1.6) Reporting for purposes of public health, contact tracing, screening, testing and surveillance;

5.15.1.7) If a participant is diagnosed with COVID – 19, the Responsible Manager shall inform the Department of Health and the Department of Employment and Labour.

5.16. Responding to a worker with positive results

5.16.1.1. If a worker presents or reports typical COVID-19 related symptoms:

a) do not permit the worker to enter the workplace or report for work;

b) if the worker is already at work, immediately isolate the worker, provide a surgical mask to the worker, and arrange for the worker to be transported in a manner that does not place other workers or membersof the public at risk, for a medical examination, for testing or to be self-isolated;

c) if the employee does not need hospital admission and is sent home, ensure that the employee undergoes self-isolation at home if appropriate, or at a designated isolation accommodation identified by the employer, in line with National Department of Health guidelines;

d) provide prompt counselling and support to the employee as per institution’s guidelines/standard operating procedures (SOPs);

e) immediately assess the risk of transmission and if appropriate, may require temporary closure to disinfectthe area and workstation;

f) refer other workers who may also be at risk for symptom screening;

g) place the worker on paid sick leave, or if sick leave is exhausted, make application for illness benefits from the UIF in terms of the Directive issued on 25 March 2020; and

h) ensure that the worker is not discriminated against on grounds of having tested positive for COVID-19.

The employer should report all alleged, presumed and confirmed cases of COVID-19 related occupational

disease to the Compensation Commissioner in the prescribed format using the relevant documentation as required in terms of the Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA) in order to facilitate procedures for all worker's compensation benefits available to employees, including:

i. leave for temporary disability;
ii. assessment by an occupational medicine specialist in cases of complex disease that may resultin permanent disability; South African Forum of Civil Engineering Contractors | LR 2/6/3/13817
iii. cover of medical expenses for the treatment and testing, as well as permanent disability assessments; and
iv. compensation to dependents in case of death.

5.17. Returning to work after testing positive for COVID-19

If a worker has been diagnosed with COVID-19 and isolated in accordance with the Department of Health Guidelines, the worker may only return to work if:

a) the worker has undergone a medical examination confirming that s/he has been tested negative for COVID-19 after at least 14 days isolation;
b) the worker wears the minimum of a surgical mask at all times for the remaining period of 21 days from the date of initial testing;
c) the employer ensures that the worker adheres to social distancing, hygiene and cough etiquette; and
d) the employer closely monitors the worker for symptoms on return to work.

5.18. PROVISIONAL COSTINGS & BUDGETS: COVID-19 OUTBREAK

The Contractor is expected to compile his Provisional Costings and Budgets expected to derive from this Health & Safety Specification and his plan, with the Health & Safety Covid-19 plan.

Based on all recommended COVID 19 Protocols the contractor shall develop and submit their BOQ to the appointed Safety Agent or Principal Agent for this project which shall be checked and verified for **Department of Rural Development and Agrarian Reform**

This provisional budget and / or costing requirement relates to **Construction Regulation 5(1) (g),** and is not a guarantee to Contingency Claims, a Variation Order that may be deemed due to Covid-19. Such Claims or variations must be dealt with the Principal Agent accordingly thereafter approval obtained from **Department of Rural Development and Agrarian Reform**

5.19. SAFE SITE SHUTDOWN / SUPPORT SYSTEMS

Once Lockdown is suspended, and perhaps an outbreak on site, or another Lockdown is required, or at any given interval whereby Covid-19 has demanded a close or interval, the Contractor shall ensure proper Safe Site Shutdown procedure and practice.

The Contractor is to ensure that proper systems of shutdown, lock-out and security of all is carried out, and that proper support systems are communicated and offered, where applicable and possible, to all employees,teams and surrounding communities or facilities

Support Call Centre, Support Counselling centres and so forth are to be sourced, and the information of such to be communicated. The contractor shall provide his procedure for such in his addendum of the Health & Safety plan.

No PPE disposed must be left on-site should Shutdown take place. All hazardous waste must be removed and disposed as per the procedure identified; this should also be in the Risk Assessment.

6. OCCUPATIONAL HEALTH & SAFETY PLAN ADDENDUM SUBMISSION AND PENALTIES

6.1. REQUIREMENTS of PLAN SUBMISSION

The Contractor shall identify and include, but not limited to, items herein stipulated and submit to the Client and or the Health & Safety Agent, with his Health & Safety Addendum to his safety plan, for approval.

Upon ease of the National Lockdown, the Contractor may not return to site, until the Covid-19 Health & Safety Plan addendum, with items, is approved by the SHE Agent and or the Client.

6.2. PENALTIES TO NON-COMPLIANCE

Reference to penalties referred in the National Disaster Management Act, its regulations, and the Occupational Health & Safety Act, and its regulations (including Construction Regulations) shall apply, and it isa criminal offence to cede to Non-compliance herein.

In Addition to legislative penalties, the client may impose further penalties, including time penalties, for the noncompliance, delay to compliance and negligence of any Contractor and or his suppliers deemed to be in Non-Compliance, accordingly.

7. Annexure 1

(g) COVID-19 SELF-ASSESSMENT QUESTIONNAIRES

The Organisation has developed this questionnaire based on information required by the Department of Health to assess risk and determine those participants eligible for COVID - 19 testing. The questionnaire must be completed (by a Focal Point) daily for each participant prior to them being allowed access to a vehicle and/or site.

Please tick the applicable box.

QUESTIONS	YES	NO
Persons with acute respiratory illness with sudden onset of at least **one** of the following:		
1. Are you experiencing a rise in body temperature recently? (use a non – contact thermometer to measure rise in temperature)		
2. Are you experiencing acute headaches recently?		
3. Are you coughing regularly recently?		
4. Are you experiencing excess sweating?		
5. Are you experiencing frequent shortness of breath recently?		
6. Are you suffering from acute diarrhea lately?		
7. Are you suffering from any muscle or joint pains recently?		
8. Do you have any underlying illness/disorder that might have an impact on your immune system?		
9. If yes, are you taking medication?		
AND / OR		
In the 14 days prior to onset of symptoms, met at least one of the following criteria:		
10. Have you been in contact with anyone who travelled abroad or has been exposed to the virus in the past 21 days?		
11. Have you travelled abroad in the last 21 days?		
12. Had a history of travel to areas with presumed ongoing community transmission of SARS-CoV- 2?		
13. Worked at, or attended a health care facility where patients with SARS-CoV-2 infections were being treated?		
14. **Close contact**: A person having had face-to-face contact or was in a closed environment with a COVID-19 case; this includes, amongst others, all persons living in the same household as a COVID-19 case and, people working closely in the same environment as a case.		
15. **Confirmed case:** A person with laboratory confirmation of SARS-CoV-2 infection, irrespective of clinical signs and symptoms.		
16. **Probable case:** A person for whom testing for SARS-CoV-2 is inconclusive (the result of the test reported by the laboratory) or for whom testing was positive on a pan-coronavirus assay.		
If you have ticked more than five (5) boxes under "YES", then do the following:		
17. Refer the person to nearest medical institution dealing with COVID - 19 cases. Call the institution ahead of your visit and inform them of the symptoms.		
18. Contact the department's internal helpline on: **012 399 9300** for further assessment and advice.		

Contractor's Acknowledgement:

I,_____representing

_____ (Contractors), have satisfied

myself with the content of this Health and Safety Specification and have made the relevant provision

under my Preliminary & General Section for any and all costs involved to ensure compliance of this

Specification and shall we be the successful contractor, we shall ensure that our employees and contractors on site comply with the requirements of this documents, our safety documentation and

health and safety legislation.

Signature of Contractor **Date**

Comments:

_____

_____

_____

_____

8. Annexure 2

9. ANNEXURE 3: BASELINE RISK ASSESSMENT

	Type key : Safety – S : Health – H : Health - E : Environmental – BI : Business Disruption - MD : Material Damage or Other Consequential Losses – L&R : Legal and Regulatory – R/S/C : Impact of reputation, Social , Community											
No	Item / Step (Task)	Hazard / Impact (What can go wrong)	Most probable cause (What)	What could happen (Effects)	Type	C	L	R	Existing control (controls that are in place)	C	L	R
1	**Screening of Employees**	Infecting of employees whilescreening	• Pens infected • Employees come towork infected • Employees unaware he/she got COVID-19	• , resulting in symptomatic effects, possible runny nose, possible sore throat, possible cough, possiblefever, possible pneumonia, possible respiratory distress, possible fatality	**H**	5	4	**20H**	Screening processSurvey filled in Training of Staff membersAppointment of Covid compliance officer Thermometer of temperature screening .	5	3	**15H**
2	**Site Offices Employees signing Registers**	Sneezin g, Coughin g conveyin ggerms.	• Not cleaning, desantising office environment. • Not sneezing/coughing into handkerchief. • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus),resulting in symptomatic effects, possible runny nose, possible sore throat, possible cough, possiblefever, possible pneumonia, possible respiratory distress, possible fatality	**H**	5	4	**20H**	•Try and keep a distancefrom each other when talking to one another. •Always try, where a FFP2dust mask. (Never use someone else's dust masks. Disinfect Pens all the time	5	3	**15H**
3	**Yard**	Sneezing, Coughing, speaking to eachother conveying germs.	• Not sneezing/coughing into handkerchief. • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus),resulting in symptomatic effects, possible runny nose, possible sore throat, possible cough, possiblefever, possible pneumonia, possible respiratory distress, possible fatality	**H**	5	4	**20H**	Cleaning and desanitisingbefore opening of site post lockdown Cleaning regularly on a daily basis can •eliminatemost of the germs.	5	3	**15H**

4	**Work area**	Sneezing, Coughing, speaking to eachother.	• Not sneezing/coughing into handkerchief. • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus)resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	Disinfect work areasbefore use. Each work station is responsibility of personcurrently at station	5	3	**18H**

5	**Containers**	Sneezing, coughing, dirty environment.	• Not cleaning, desantisinContainer • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus)resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	.•Always wash your handswith soap and warm water when leaving the Container. Train staff member onhow to clean Train staff member onimportance of PPE •Toilets must be cleanedregularly. •Toilet seats & toilet basinhandles to be cleaned regularly. •Washing bin/tubs mustbe desanitised regularly. •Always wash your handswith soap and warm water when leaving the toilet.	5	3	**18H**
6	**Toilet**	Sneezing, coughing, dirty environment.	• Not cleaning, desantising, toilet handles or toilet seats • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus)resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**		5	3	**15H**
8	**Transport on site**	Sneezing, Coughing, in closed environment .	• Not cleaning, desantising LDV interiorenvironment. • Not sneezing/coughing into handkerchief. • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus)resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	Ensure the LDV is kept clean. Wipe the steering wheel, door handles, gearlever and seat belt clip regularly by wiping them with a disinfectant.	5	3	**15H**
9	**Equipment /tools Used**	Using each other's tools andequipment	• Not cleaning, tools orequipment • Interactions and shakinghands. • Not sanitizing	• Covid19 (Corona Virus)resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	• Desantise all equipment or tools that are used wherepossible. • Keep them in a goodand clean condition. • Try to use your own tools and equipment.	4	3	**12H**
10	**Plant**	Sneezing, Coughing, in closed environment .	• Not cleaning, Plant interior environment. • Not sneezing/coughing into handkerchief.	• Covid19 (Corona Virus)resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	• Ensure the Plant is keptclean. Wipe the steering wheel, door handles, levers and seat belt clip regularly	4	3	**12H**

		Plant in dirty condition.	• Interactions and shaking hands. • Not sanitizing						by wiping them with a disinfectant.			
11	**LDV**	Sneezing, Coughing in closed environment. LDV interior in dirty condition.	• Not cleaning, LDV interior environment. • Not sneezing/coughing into handkerchief. • Interactions and shaking hands. • Not sanitizing	• Covid19 (Corona Virus) resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	• Ensure the LDV is kept clean. Wipe the steering wheel, door handles, gear lever and seat belt clip regularly by wiping them with a disinfectant.	4	3	**12H**
12	**Quantum**	Sneezing, Coughing in closed environment. Dirty conditions of interior.	• Not cleaning, Quantum interior environment. • Not sneezing/coughing into handkerchief. • Interactions and shaking hands. • Not sanitizing	• Covid19 (Corona Virus) resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	• Ensure the Quantum is kept clean. Wipe the steering wheel, door handles, gear lever and seat belt clips regularly by wiping them with a disinfectant. • Ensure the seats are always in a clean condition. • Wipe the window handles with a disinfectant as well.	5	3	**18H**

13	**PPE and Respiratory Breathing**	Sneezing, Coughing in closed environment. Dirty conditions of interior.	Not wearing PPE/ Mask Mask may suffocate some employees Dirty PPE	• Lung Disease • Covid19 (Corona Virus) resulting in symptomatic effects, possible runny nose, possible sore	**H**	5	4	**20H**	• Employees must be trained in respiratory, sneezing and coughing etiquette and other hygiene controls. Provide tissues and no-touch disposal receptacles. Hand sanitising practices must be in force. Provide soap and water in the workplace for hand washing or multiple hand sanitising stations with alcohol based hand sanitizer that is at least 70% alcohol	5	3	**18H**

14	**Toolbox Talks, Lunch Time, Entrance of site**	Biological agent	Multiple persons make contactwith COVID-19 infected droplets when person sneezes or coughs, causing multiple persons to become infected with COVID-19 virus,	• resulting in symptomatic effects,possible runny nose,possible sore			**H**	5	4	**20H**	• Limit Person per toolbox talk. Do one group of 5 employeesat a time. • Lunch times must be taken in shifts. As wellas tea breaks • Social distancing entering site must bemonitored • PPE must be worn at alltime, • Supervisor mustmonitor	5	4	**20H**
15	No discipline	Psychosocial Hazard:	Person does not take COVID-19 virus threat seriously and ignores any instructions or advice provided to counter potential COVID-19 virus exposure, causing person to contract the COVID-19 virus	, resulting in symptomatic effects, possible runny nose, possible sore throat, possible cough, possible fever, possible pneumonia, possible respiratory distress, possible fatality	H	5	4	20H			• Disciplinary procedures must be followed to curb the spread. • Train employees on aspects daily • Supervision over task work	5	4	20 H	
16	**Vehicle DriversRage or Argument between workers**	Physical Hazard	Person is physically attacked by fellow workers due to suspectedCOVID- 19	• infections, resulting in bumps, bruises, possible fractures			**S**	5	4	**24H**	• All Workers must be trained that this virus isnot a stigma • Company support during this time must be visual	4	3	**12S**
17	**Stigma**	Psychosocial Hazard:	Person is attacked verbally by fellow workers due to suspectedCOVID-19 infection,	• resulting in psychosocial stress			**S**	5	4	**24H**	• Training workers onCOVID 19 • Company support during this time must be visual.	4	3	**12S**

18	**Washing hands Frequently**	Chemical Hazard	Person undertakes frequent washing of hands with soap andhand sanitizer, as part of COVID-19 countermeasures,	• resulting in skin dryness, irritation, possible light chemical burns	**H**	5	4	**24H**	• Encouraging staff to use Vaseline or lotion • Wear PPE so it can be cleaned, Protect hands	5	3	**15H**
19	**Infected Cases**	Psychosocial Hazard:	Person is placed in required isolation for two (2) weeks or more after testing positive for COVID-19 virus,	• resulting in psychosocial stress, financial impact to the company in sick leave	**H**	5	4	**24H**	• Government must be notified. Full process ofreporting must be followed.	5	3	**15H**

									• Support from manageme nt				
20	**Daily work in contact with people**	Biological agent	Person makes contact with unidentified or unaware exposed COVID-19 persons mucus or respiratory droplets, causing person to contract the COVID-19 virus,	• resulting in symptomatic effects, possible runny nose, possible sore throat, possible cough, possible fever, possible pneumonia, possible respiratory distress, possible fatality	**H**	5	4	**24H**	• Encourage reporting any symptoms a.s.a.p • Training • Good Hygiene • Regular screening • Knowledge of COVID cases • No person allowed on site with COVID	5	3	**15H**
21	**Cleaning employee s**	Chemical Hazard	Person makes contact with the chemical used to disinfect the area	• resulting is sickness, chemical burn wounds, fatality	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • MSDS on site and First Aider trained on HAZCHEM	5	3	**15H**
22	**Daily Task**	Physical Hazard	Due to poor housekeeping person trips over material in the way	• resulting in chemical burns, multiple fractures, fatality	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • First Aider trained on HAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Procedures must be adhere to	5	3	**15H**

23	**Daily Task, Lunchtime**	Chemical Hazard	Person disinfects close to a hotsurface	• resulting in chemical fire that results to burnwounds, fire and multiple fatalities	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • First Aider trained onHAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Proceduresmust be adhere to	5	3	**15H**
24	**Daily Task**	Physical Hazard	Person disinfects close to sharpmaterial	• resulting in cuts and bruises, chemical burnsand chemical spills	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • 2First Aider trained onHAZCHEM • Housekeeping supervisor very vigilant	5	3	**15H**

									• Disciplinary Proceduresmust be adhere to			
25	**Sanitising, Cleaning or Toolsor using Sanitiser**	Chemical Hazard - Hazardous vapours	Person exposed to disinfectantchemical fumes	• Result0ing in lung damage, unconsciousness orfatality	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • First Aider trained onHAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Proceduresmust be adhere to	5	3	**15H**
26	**Using sanitiser**	Chemical Hazard - Toxic Substanc e	While disinfecting tools or surfaceperson may get into contact with the disinfectant chemical	• resulting in skin irritation, chemicalburns	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • First Aider trained onHAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Proceduresmust be adhere to	5	3	**15H**
27	**Using sanitiser**	Chemical Hazard - Toxic Gasses	Person exposed to toxic fumes while mixing different chemicalsfor disinfectant	• may result in fire hazard,1st, 2nd and 3rdburn wounds, unconsciousness, fatality or multiple fatalities	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • First Aider trained onHAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Proceduresmust be adhere to	5	3	**15H**

28	**Using sanitiser**	Environmental Hazard	Person exposed to fumes due to poor ventilation when disinfecting the area	• result in lung damage, unconsciousness, fatality	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision • First Aider trained on HAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Procedures must be adhere to	5	3	**15H**
29	**Using sanitiser**	Chemical Hazard	Damage to the supplied PPE when disinfecting the area	• may result in lung damage, chemical burns, unconsciousness,	**H**	5	4	**24H**	• Training on Bio chemical hazards • Supervision	5	3	**15H**

				fatality or multiple fatalities					• First Aider trained on HAZCHEM • Housekeeping supervisor very vigilant • Disciplinary Procedures must be adhere to			
30	Daily Task	Physical Hazard	Wrong PPE supplied to the persons conducting the disinfecting of work areas	• resulting in lung damage, chemical burns, unconsciousness, fatality or multiple fatalities	**H**	5	4	**24H**	• Supervision • Training on correct PPE and use of PPE as well as cleaning of PPE	5	3	**15H**
31	**Daily Task**	Physical Hazard	While disinfecting the area person slips on a wet surface	• resulting in PPE damage, fracture or multiple fractures or unconsciousness	**H**	5	4	**24H**	• Good housekeeping • Supervision	5	3	**15H**
32	**Daily Task**	Physical Hazard	While disinfecting the area person makes contact with rotating machinery	• resulting in PPE damage, cuts and bruises or amputation	**H**	5	4	**24H**	• PPE Register • Training on how to disinfect PPE • Training on Housekeeping and working with Power tools	5	3	**15H**
33	**Cleaning**	Physical Hazard	While disinfecting the area person makes contact with nip points	• resulting in PPE damage, cuts and bruises	**H**	5	4	**24H**	• PPE Register • Training on how to disinfect PPE	5	3	**15H**
34	**Transport/Plant**	Environmental Hazard	Person driving vehicle in poor lighting conditions while using private or company vehicle, public transport (e.g. taxi's, buses) causing an accident	• resulting in loss of vehicle up to R500 000, bruises, lacerations, fractures, unconsciousness, fatality	**H**	5	4	**24H**	• Disaster management protocol regarding vehicles/ taxis must be followed • Supervisor on Vehicles Disciplined	5	3	**15H**

b) ANNEXURE 4: BILL OF QUANTITIES COVID-19

ITEM NO	DESCRIPTION	UNIT	QUANTITY	RATE	TOTAL
	PRELIMINARY & GENERAL ITEMS				
1	**Occupational Health & Safety Obligations**				
1.1	Update of the Contractors COVID-19 Health and Safety Plan and Risk assessment				
2	**Provision of Personal Protective Equipment (PPE)**				
2.1.	Plastic Face Shields (quantitiy to be alignedwith scaling in employment) If applicable				
2.2.	Cloth Face Masks (quantity to be alligned with scaling in employment)(at least 2 for each employee)				
3	**Education & Training & Awareness**				
3.1.	Initial COVID-19 Training (quantity to be alligned with risk assessment and scaling of employment)				
3.2.	Weekly COVID-19 Toolbox Talks				
3.3.	Update of First Aid Training				
3.5.	Posters on COVID-19 for site A3,A5				
4	**Facilities and Equipment**				
4.1.	Provision of Isolation Area Office				
4.2.	Delivery office for all items quarintine (specific time period before use)				
4.3.	Provision of Non Contract Infrared Thermometer				
4.4.	Stationary (paper,pens, etc) for survey etc.				
4.5.	Hand Sanitiser Foot Petal Stand (once off)				
5	**Cleaning Material and Hand Sanitisers**				

5.1.	Hand Sanitiser				
5.2.	Daily Cleaning and Disinfecting of facilities				
5.3.	Daily Cleaning and Disinfecting of Vehicles				
5.4.	Paper Towels				
5.5.	Hand Soap				
5.6.	Water for Drinking and Washing hands mobile stations throughout the site				
6	**Administration**				
6.1.	COVID-19 Reporting and administration				
7	**List any Extra COVID-19 Requirements not mentioned above**				
TOTAL (EXCLUDING VAT)					

C 3.2.7 PARTICULAR SPECIFICATIONS

ENVIRONMENTAL MANAGEMENT PLAN

PROJECT SPECIFICATIONS FOR BID FOR THE CONSTRUCTION OF 2 X 50 SEATER FURNISHED LECTURE THEATRES IN FORT COX

ENVIRONMENTAL MANAGEMENT PLAN

PEM ENVIRONMENTAL MANAGEMENT PLAN

PEM.1 PURPOSE

The purpose of the EMP is to encourage good management practices through planning and commitment with respect to environmental issues, and to provide rational and practical environmental guidelines to minimise disturbance of the natural environment.

PEM.2 RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT

The contractor will be responsible for environmental control on site during construction and the maintenance period. The construction activities will be monitored by an independent environmental specialist and audited against the EMP.

PEM.3 TRAINING AND INDUCTION OF EMPLOYEES

The contractor has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.).

PEM.4 COMPLAINTS REGISTER AND ENVIRONMENTAL INCIDENT BOOK

Any complaints received by the project team from the community will be recorded. The complaint will be brought to the attention of the site manager.

All complaints received will be investigated and a response given to the complainant within 28 days.

All environmental incidents occurring on the site will also be recorded.

PEM.5 ENVIRONMENTAL SAFETY

The management of impacts associated with various categories of concern is discussed as separate topics, indicated below.

PEM.5.1 Soil

(a) Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky material, when areas are cleared. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.

(b) Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.

(c) Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season. The need for such measures will be indicated in the site-specific report.

(d) Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. Topsoil obtained from sites with different soil types must not be mixed.

(e) Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may

inhibit the later growth of vegetation and microorganisms in the soil.

(f) Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the Project Manager.

(g) Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be coordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.

(h) Limited vehicular access is allowed across rocky outcrops and ridges.

(i) All cut and fill surfaces need to be stabilized with appropriate material or measures when major civil works are complete.

(j) Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and de-stabilized.

(k) All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.

(l) Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods.

(m) Runoff must be reduced by channeling water into existing surface drainage system.

PEM.5.2 Water

(a) Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place.

(b) Adequate sedimentation control measures must be implemented where excavations or disturbance of drainage lines of a wetland may take place.

(c) All fuel, chemical, oil, etc. spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a watercourse.

(d) Oil absorbent fibres must be used to contain oil spilt in water.

(e) During construction through a wetland, the majority of the flow of the wetland should be allowed to pass downstream.

(f) Vehicular traffic across wetland areas must be avoided.

(g) No dumping of foreign material in streams, rivers and/or wetland areas is allowed.

(h) The wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from the DWAF. The necessary licenses must be obtained in terms of Section 21 and 22 of the National Water Act, 36 of 1998 from DWAF.

(i) No fires or open flames are allowed in the vicinity of the wetland, especially during the dry season.

(j) No swimming, washing (including vehicles and equipment), fishing or related activity is permitted in a wetland or river without written permission from the Project Manager.

(k) Disturbances to nesting, breeding and roaming sites of animals in or adjacent to wetland areas must be minimized.

PEM.5.3 Air

(a) Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution.

(b) Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that must not result in the generation of run-off.

(c) The site-specific investigation will quantify the impact of dust on nearby wetlands, rivers and dams in terms of sedimentation. Mitigation measures identified during the site specific study must be implemented.

(d) The Contractor must notify the Principal of all schools within 50m of the site of proposed activities. The Principal must in turn ensure that children with allergies and respiratory ailments take the necessary precautionary measures during the construction period. The Contractor must ensure that construction activities do not disturb school activities e.g. dust clouds may reduce visibility affecting sports activities.

(e) Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours.

(f) Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. IAP's must be informed of the excessive noise factors.

(g) The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g. the application of chemicals to the work surface. Normal working hours must be clearly indicated to adjacent land owners.

(h) No loud music is allowed on site and in construction camps.

(i) No fires are allowed if smoke from such fires will cause a nuisance to IAP's.

PEM.5.4 Social and Cultural

(a) Access by non-construction people onto any construction sites must be restricted. The Contractors activities and movement of staff must be restricted to designated construction areas only.

(b) The Contractors crew must be easily identifiable due to clothing, identification cards or other methods.

(c) Rapid migration of job seekers could lead to squatting and social conflict with resident communities and increase in social pathologies if not properly addressed. The Contractor must ensure that signs indicating the availability of jobs are installed.

(d) Criteria for selection and appointment (by the Contractor) of construction labour must be established to allow for preferential employment of local communities. The Local Authority must be actively involved in the process of appointing temporary labourers.

(e) Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g. the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document.

(f) No member of the construction workforce is allowed to wander around private property, except within the immediate surroundings of the site.

(g) The Contractor must provide suitable sanitation facilities for site staff. Sanitation provided during the construction

phase should be managed so that it does not cause environmental health problems. The use of the surrounding fields or grounds for toilet purposes is not permitted under any circumstance.

(h) The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the findings of the environmental report before the commencement of construction to ensure:

- A basic understanding of the key environmental features of the work site and environments, and
- Familiarity with the requirements of this document and the site specific report.

(i) Supervisory staff of the Contractor or his sub-contractors must not direct any person to undertake any activities which would place such person in contravention of the specifications of this document endanger his/her life or cause him/her to damage the environment.

(j) The demand for construction materials and supplies will have an effect on the local economy. This impact can be optimised by sourcing and purchasing materials locally and regionally wherever possible, insofar as the material complies with the design specification.

(k) The Contractor must maintain a detailed complaints register. This must be forwarded, together with solutions, to the authorities when requested.

PEM.5.5 Aesthetics

(a) Scenic Quality

Damage to the natural environment must be minimized.

Trees and tall woody shrubs must be protected from damage to provide a natural visual shield. Excavated material must not be placed on such plants and movement across them must not be allowed, as far as practical.

The clearing of all sites must be kept to a minimum and surrounding vegetation must, as far as possible, be left intact as a natural shield.

No painting or marking of natural features must be allowed.

(b) All above ground structures could be treated or painted to blend in with the natural environment.

(c) Cut and fill areas, river and stream crossings and other soil stabilisation works must be constructed to blend in with the natural environment.

(d) Natural outcrops, rocky ridges and other natural linear features, must not be bisected. Vegetation on such features must, as far as possible, not be cut unless absolutely necessary for construction.

(e) Excavated material must be flattened (not compacted) or removed from site. No heaps of spoil material must be left on site once the Contractor has moved off site either temporarily or permanently.

(f) Any complaints from interest groups regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.

PEM.5.6 Archaeology and Cultural Sites

a) All finds of human remains must be reported to the nearest police station.

b) Human remains from the graves of victims of conflict, or any burial ground or part thereof which contains such graves and any other graves that are deemed to be of cultural significance may not be destroyed, damaged, altered, exhumed or removed from their original positions without a permit from the South African Heritage and

Resource Agency (SAHRA).

c) Work in areas where artefacts are found must cease immediately.

d) Under no circumstances must the Contractor, his/her employees, his/her sub-contractors or his/her sub-contractors' employees remove, destroy or interfere with archaeological artefacts. Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act, 25 of 1999.

e) A fence at least 2 m outside the extremities of the site must be erected to protect archaeological sites.

f) All known and identified archaeological and historical sites must be left untouched.

g) Work in the area can only be resumed once the site has been completely investigated. The Project Manager will inform the Contractor when work can resume.

PEM.5.7 Flora

a) All suitable and rare flora and seeds must be rescued and removed from the site. They must be suitably stored, for future use in rehabilitation.

b) The felling and/or cutting of trees and clearing of bush must be minimised.

c) Bush must only be cleared to provide essential access for construction purposes.

d) The spread of alien vegetation must be minimized.

e) Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented by the Contractor.

f) Woody vegetative matter stripped during construction must either be spread randomly throughout the surrounding fields so as to provide biomass for other microorganisms and habitats for small mammals and birds, or it may be stockpiled for later redistribution over the reinstated top soiled surface. No vegetative matter must be burnt or removed for firewood other than those removed during the grubbing and clearing phase. Such vegetation can be made available to the local inhabitants to be used as firewood.

g) No tree outside the footprint of the Works area must be damaged.

PEM.5.8 Fauna

a) No species of animal may be poached, snared, hunted, captured or willfully damaged or destroyed.

b) Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee.

c) Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes.

d) Disturbances to nesting sites of birds must be minimized.

e) The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.

PEM.5.9 Infrastructure

a) The relevant authorities must be notified of any interruptions of services, especially the District Municipality, Local Municipality, National Road Agency, Spoornet, TELKOM and ESKOM. In addition, care must be taken to avoid damaging major and minor pipelines and other services.

b) The integrity of property fences must be maintained.

c) No telephone lines must be dropped during the construction operations, except were prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary.

d) All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.

e) Storage Facilities

- Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and hazardous materials.
- The Contractor must ensure that accidental spillage does not pollute soil and water resources.
- Fuel stock reconciliation must be done on all underground tanks to ensure no loss of oil, which could pollute groundwater resources.
- Cement must be stored and mixed on an impermeable substratum.

f) Traffic Control

All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods.

Before any work can start the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control.

g) Access Roads

The Contractor and the affected landowner must collaborate on the planning and construction of new access routes and the repair or upgrading of existing routes.

Access to the site must be controlled such that only vehicles and persons directly associated with the work gains access to the site.

Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed.

h) Batching Plants

Concrete must be mixed only in an area demarcated for this purpose. All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site. After all concrete mixing has been completed, all waste concrete must be removed from the batching area and disposed of at an approved dumpsite. Storm water must not be allowed to flow through the batching area. Water laden with cement must be collected in a retention area for evaporation and not allowed to escape the batching area. Operators must wear suitable safety clothing.

i) Chemical toilet facilities should be managed and serviced by a qualified company. No disposal or leakage of sewerage should occur on or near the site.

j) Blasting

Blasting must not endanger public or private property.

Noise mufflers and/or soft explosives must be used to minimize the impact on animals.

All the provisions of the Explosives Act, 26 of 1956 and the Minerals Act, 50 of 1991 must be complied with.

The Contractor must take measures to limit fly rock.

PEM.5.10 Safety

a) Measures must be taken to prevent any interference that could result in flashover of power lines due to breaching of clearances or the collapse of power lines due to collisions by vehicles and equipment.

b) Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes.

c) All tall structures must be properly earthed and protected against lightning strikes.

d) The process of excavation and back filling must be carried out as a sequential process following one another as quickly as possible. Excavations must only remain open for a minimum period of time and during this time they must be clearly demarcated. If excavations place the public at risk these sites must be fenced.

e) The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase.

PEM.5.11 Waste

PEM 5.11.1 Solid Waste

(a) Littering on site and the surrounding areas is prohibited.

(b) Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite.

(c) All bins must be cleaned of litter regularly.

(d) All waste removed from site must be disposed at a municipal/permitted waste disposal site.

(e) Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.

(f) The entire works area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.

(g) Contaminated soil must be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.

(h) Waste must be recycled wherever possible.

PEM 5.11.2 Liquid Waste

(a) The Contractor must maintain mobile toilets on site.

(b) The Contractor must provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities must be designed and sited with the intention of preventing pollution of the surrounding area and environment.

(c) All vehicles must be regularly serviced in designated area within the Contractors camp such that they do not drip oil.

(d) All chemical spills must be contained and cleaned up by the supplier or professional pollution control personnel.

Run-off from wash bays must be intercepted.

PEM 5.11.3 Hazardous Waste

(a) No hazardous materials must be disposed of in the field or anyplace other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for.

(b) The Contractor must maintain a hazardous material register.

PEM.5.12 Rehabilitation and Site clearance

(a) When all major construction activities are completed, the site must be inspected to determine site-specific rehabilitation measures. This may be considered as unplanned work e.g. soil rehabilitation due to oil spills.

(b) All temporary buildings and foundations, equipment, lumber, refuse, surplus materials, waste, construction rubble fencing and other materials foreign to the area must be removed.

(c) If waste products cannot be recycled they must be disposed of at a permitted landfill site.

(d) All drainage deficiencies including abandoned pit latrines and waste pits must be corrected.

(e) Cut and fill areas must be restored and re-shaped.

(f) The area must be restored to its natural vegetation condition using indigenous trees, shrubs and grasses as directed by a grassland and/or rehabilitation expert.

(g) Borrow pits must be re-shaped into even slopes and surfaces to blend with the natural terrain and topsoil must be replaced.

(h) The grass mix, shrubs and trees used for rehabilitation must be compatible with the species identified in the site-specific investigation.

(i) Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.

PEM.6 MEASUREMENTS AND PAYMENT

No additional payment will be made to the Contractor to comply with the above actions as it will be deemed to be included in the rates tendered