



NKANGALA DISTRICT MUNICIPALITY



**PROJECT NO: 174730
INSTALLATION OF SMART ELECTRICITY METERS AND MANAGEMENT AND
SOLAR INSTALLATION IN MUNICIPAL BUILDING AT EMAKHAZENI LOCAL
MUNICIPALITY**

SCOPE OF WORK

Tenderer

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C3.1 DESCRIPTION OF THE WORKS

C3.1.1 EMPLOYER'S OBJECTIVES

The objective of the employer is to ensure that they Install smart electricity meters in Emakhazeni Local Municipality in order to eliminate the challenges faced by the municipality on revenue collection and tempering with the electricity meters.

The employer's objectives are to deliver smart metering infrastructure using labour-intensive methods and subcontractors where possible. The project will be executed using both conventional construction methods as well as labour-based methods. This is as per the program of the National Department of Public Works the Special Public Works Programme (SPWP) as the guidelines of the Expanded Public Works Programme (EPWP).

Labour-intensive works comprise the activities described in SANS 1921-5/Earthwork's activities that are to be performed by hand/Labour-Intensive Specification ⁽¹⁾ and its associated specification data. Such works shall be constructed using local workers who are temporarily employed in terms of this scope of work.

Bidders must note that preference will be given to local based companies and that this bid may be awarded to more than one company.

C3.1.1.1 LOCAL SMMEs DEVELOPMENT

The Contractor will be required to employ local SMMEs Sub-Contracting Company to assist with the excavations of trenches, foundations, electrical wire-ways installation and any electrical works that is not a specialist installation. The SMMEs Company will be responsible for the appointment of local laborer's from the Nkangala District community.

Unskilled and semi-skilled labour required for the execution of all labour intensive works shall be engaged strictly in accordance with prevailing legislation and SANS 1914-5, Participation of Targeted Labour.

The rate of pay set in the SAFCEC tables (South African Federation of Civil Employer's Agenting Contractors). The rate of pay set in the SAFCEC tables (South African Federation of Civil Employer's Agenting Contractors). Sub-contractors must be paid fortnightly and the main contractor must allow for financing such payouts. Sub-contractors must be paid within 7 days from presenting invoice and failure to adhere will be penalized R1 000/day. Failure of sub-contractors for non-payment of his labour will be penalized at 50% of his payment by the main contractor. Contractor must provide enter market-related rates.

The contractor must familiarise him/her with the abovementioned requirements and price this document accordingly.

C3.1.1.2 KEY PERSONNEL

The Contractor shall maintain the involvement of the key personnel as the exigencies of this contract. Should it become necessary to replace any of the key personnel as detailed at the time of the tender during the course of this contract, they may only replace by individuals with similar or better qualifications and experience and only when a written approval has been obtained from the municipality

Sufficient suitably qualified professional staff must be made available by the contractor and sub-contractor to undertake the full scope of the project. The personnel must be knowledgeable and experienced in their fields of expertise and must be currently actively involved in these fields. The tenderer must include documentary evidence that each proposed key personnel meet these requirements.

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The person nominated to act as project site agent for the project must be registered with the Department of Labour (DoL) as an Installation Electrician and be in a possession of a diploma in Electrical Engineering and have subsequent there of one-year experience installation of electricity meters.

C.3.1.2 OVERVIEW OF WORKS

Installation of electricity smart meter in Entokozweni (Machadodorp) and Emthonjeni Region within Emakhaseni Local Municipality, the successful tenderer shall install **2878** single phase smart electricity meters, **21** three phase smart electricity meters with all necessary components as per the bill of quantities and as specified in the specifications.

There is currently a need in the municipality to install smart electricity meters ranging from single phase smart meters through to large power users with some ancillary equipment specifically relating to existing Bulk consumer installations as per the below specifications.

C.3.1.3 EXTENT OF WORKS

1. SMART ELECTRICITY METERS

The scope necessitated to investigate and make recommendations on the smart metering solution in order to achieve the municipality objectives, The current electricity meters installed within the municipality are wired and are not, and are easily tampered with and auditing of meters is done manually, the municipality is losing on revenue collection due to these types of electricity meters and these electricity meters will be discontinued by 2024.

tenderers shall offer a smart metering solution with a combination of RF and GSM based communication protocol, communication between the smart meter and data concentrator shall be via RF signal and communication between the Advanced Metering infrastructure server shall be via a GSM signal. The AMI system infrastructure shall have a two-way communication between a meter and the Utility. The objective of an AMI system is to provide Utilities with real-time data about energy consumption and allow them to remotely manage their metering devices. The system shall comprise of two distinct functional areas: the front-end components that are responsible for the collection, storage and communication of data from the metering devices; and the head end components that retrieve and manage this data. Data shall be communicated wirelessly to and from the meter via data concentrator units (DCU's) connected to a suite of management tools at the head-end, providing the municipality with the tools to manage their prepayment metering infrastructures. The municipality can do remote tamper detection and load management through the advanced metering infrastructure.

2. SINGLE PHASE SMART ELECTRICITY METERS (MCU)

The smart meter shall be installed inside, metering kiosks, Mini-substation, pole top boxes, The single-phase smart meter shall be an integrated wireless meter, compact DIN rail meter that uses an integrated radio frequency (RF) for communication, the meter shall not subject to line interference and shall not require the addition of filters.

3. WIRELESS USER INTERFACE UNIT (SINGLE PHASE)

The wireless user interface unit (wUIU) shall be wall mounted inside the consumer premises on the wall, communication between the meter and (wUIU) wireless communication shall be through radio frequency (RF). the (wUIU) shall operate within a distance of 100m.

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4. THREE PHASE SMART ELECTRICTY METERS (MCU)

The smart meter shall be installed inside, metering kiosks, Mini-substation and metering box, The single-phase smart meter shall be an integrated wireless meter, BS footprint mounting and shall use an integrated radio frequency (RF) for communication, the meter shall not subject to line interference and shall not require the addition of filters.

5. WIRELESS USER INTERFACE UNIT (THREE PHASE)

The wireless user interface unit (wUIU) shall be wall mounted inside the consumer premises on the wall in, communication between the meter and (wUIU) wireless communication shall be through radio frequency (RF). the (wUIU) shall have operate within a distance of 100m.

6. WIRELESS USER INTERFACE UNIT

The Wireless Extender unit (WEX) shall be wall mounted inside the consumer premises on the wall in, communication between the meter and (wUIU) wireless communication shall be through radio frequency (RF). the (wUIU) shall have operate within a distance of 100m.

7. DATA CONCENTRATOR UNIT

The Data Concentrator Unit shall be installed inside the Pole top box and power shall be supplied via a circuit breaker. The Data Concentrator Unit (DCU) is an integral link between the front and head-end system, the DCU shall be responsible for the routine collection, storage and communication of metering data. The DCU shall be a primary means of remote communication and shall be capable of reading and writing data to and from metering devices. the DCU shall communicate with the service provider Advanced Metering infrastructure (AMI) via a GSM signal, The DCU shall performs various activities as required by the AMI System, these include meter discovery, meter reading, remote disconnection, reconnection of meters and load management processes. In addition, the DCU shall provide up to date reporting on status changes such as tamper detection in the metering device and shall be capable of delivering tokens on request.

8. SMART ELECTRICTY METERS EQUIPMENT

This specification provides for the supply, delivery and off-loading of various electricity meters as per price schedule. Tenderer must tender for both the main item and any sub items required in order for the unit to operate as required.

SPECIFIC REQUIREMENTS FOR ITERS IN THE SCHEDULE OF QUANTITIES

The descriptions below are to assist the tenderer to identify specific requirements for the items listed in the pricing Schedule.

- Fill in the make and model offered
- Tick either the “Comply” or “Do Not Comply box for each of the requirements
- Non-compliance may invalidate your offer for the item.

There are various meter types that will be required:

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RF SINGLE PHASE SPLIT PRE-PAID SMART METER DIN-RAIL

MAKE AND MODEL	:		
No.	Requirements	Comply	Do Not Comply
1	The meter shall consist of a MCU without UIU.		
2	The meter complies with SANS 1524-1: Electricity payments system,		
2.1	If "Do not Comply "is ticked above, then list the non- complain clauses		
3	The meter complies with Eskom's Standard ST 240-76625601 "Particular Requirements for Prepayment meters"		
3.1	If "Do not Comply "is ticked above, then list the non-compliant clauses		
7	The UIU shall communicate with the MCU Using radio frequency (Rf) for a distance of not less than 100mm for line-of-sight and 50m inside brick and concrete built environment.		
8	The MCU shall be suitable for rail mounting and shall fit on the standard 35mm DIN rail.		
9	The MCU shall have terminals as follows (Tick below which lay-out applies)		
9.1	Top: Live-in, Neutral-in; Bottom: Live-out.		
9.2	Bottom: Live-in, Live-out and Neutral-in, Neutral-out		
10	The MCU dimensions including DIN rail clip, shall not exceed:		
10.1	Height = 150 mm		
10.2	Width = 55 mm		
10.3	Depth = 90 mm		
11	The meter shall have a certificate of compliance for SABS 1524-1 and bear the SABS mark		
12	The meter shall have a certificate of compliance from the STS Association and bear the STS mark		
13	The radio RF port shall operate within the license free band		
14	Communication between the MCU and the Data Concentrator shall be by means of radio frequency (RF)		
15	The MCU data Concentrator shall communicate over a distance of not less than 100m.		
16	The meter shall be capable of detecting, storing and sending notification to The DCU when the terminal cover is opened.		
17	The meter shall be capable of detecting, storing and sending notification to the DCU when it senses voltage on the load side when the breaker is open		
18	In the lines below, please indicate which of the following options are supported:		
18.1	The system Communications protocols are based on DLMS/COSEM		
18.2	The meter is IDIS approved and bears the IDIS mark		
18.3	Has a battery-backed internal clock		

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18.4	STS compliant for currency tokens		
18.5	Supports Time-of-Use tariffs		
18.6	Can operate in post-payment mode		
18.7	Can be remotely configured between post-payment modes		
18.9	Auto registering with Data Concentrator		
18.10	support remote software upgrades		
18.11	Supports remote configuration change, clock set, tariff change, alarm reporting		
18.12	Local communication port for information transfers between the meter and devices connected to the port		
18.13	Has appliance control capability through the DCU		
18.14	Support load limiting through the DCU		
18.15	Support load disconnect and reconnect through the DCU		
18.16	Support Bi-directional metering		
18.19	Support token credit token forwarding through the DCU		
19	The base of the MCU shall conform to the BS 7856 enclosure, terminals pacing and mounting arrangement.		
10	The meter shall be supplied with two-meter ID cards		
20	The meter serial numbers shall be printed in barcode, code 128 C symbology on the face of each ID card. No space characters shall be used		
21	The installation Kit shall include four barcode meter serial number stickers		
22	The meter shall have a failure rate of less than 0.5 percent per annum		
23	The meter shall have five-year repair or replace warranty.		

RF WIRELESS USER INTERFACE			
MAKE AND MODEL	:		
No.	Requirements	Comply	Do Not Comply
1	The UIU operate from standard AA Alkaline batteries		
2	If "do not comply "is ticked above, then provide explanatory information below		
3	The UIU shall communicate with the MCU for a distance of not less than 100mm for line-of-sight and 50m inside brick and concrete built environment		
4	The radio RF port shall operate within the license free band		
5	The UIU shall have a failure rate of less than 0.5 percent per annum		
6	The UIU shall have a five-year repair or replace warranty.		

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RF THREE PHASE SPLIT PRE-PAID SMART METER

MAKE AND MODEL	:		
No.	Requirements	Comply	Do Not Comply
1	The meter shall consist of a MCU without UIU.		
2	The meter complies with SANS 1524-1: Electricity payments system,		
2.1	If "Do not Comply "is ticked above, then list the non-complain clauses		
3	The meter complies with Eskom's Standard ST 240-76625601 "Particular Requirements for Prepayment meters"		
3.1	If "Do not Comply "is ticked above, then list the non-compliant clauses		
7	The UIU shall communicate with the MCU Using radio frequency (Rf) for a distance of not less than 100mm for line-of-sight and 50m inside brick and concrete built environment.		
8	The MCU shall be suitable for rail mounting and shall fit on the standard 35mm DIN rail.		
9	The MCU shall have terminals as follows (Tick below which lay-out applies)		
9.1	Top: Live-in, Neutral-in; Bottom: Live-out.		
9.2	Bottom: Live-in, Live-out and Neutral-in, Neutral-out		
10	The MCU dimensions including DIN rail clip, shall not exceed:		
10.1	Height = 350 mm		
10.2	Width = 180 mm		
10.3	Depth = 100 mm		
11	The meter shall have a certificate of compliance for SABS 1524-1 and bear the SABS mark		
12	The meter shall have a certificate of compliance from the STS Association and bear the STS mark		
13	The radio RF port shall operate within the license free band		
14	Communication between the MCU and the Data Concentrator shall be by means of radio frequency (RF)		
15	The MCU data Concentrator shall communicate over a distance of not less than 100m.		
16	The meter shall be capable of detecting, storing and sending notification to The DCU when the terminal cover is opened.		
17	The meter shall be capable of detecting, storing and sending notification to the DCU when it senses voltage on the load side when the breaker is open		
18	In the lines below, please indicate which of the following options are supported:		
18.1	The system Communications protocols are based on DLMS/COSEM		

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18.2	The meter is IDIS approved and bears the IDIS mark		
18.3	Has a battery-backed internal clock		
18.4	STS compliant for currency tokens		
18.5	Supports Time-of-Use tariffs		
18.6	Can operate in post-payment mode		
18.7	Can be remotely configured between post-payment modes		
18.9	Auto registering with Data Concentrator		
18.10	support remote software upgrades		
18.11	Supports remote configuration change, clock set, tariff change, alarm reporting		
18.12	Local communication port for information transfers between the meter and devices connected to the port		
18.13	Has appliance control capability through the DCU		
18.14	Support load limiting through the DCU		
18.15	Support load disconnect and reconnect through the DCU		
18.16	Support Bi-directional metering		
18.19	Support token credit token forwarding through the DCU		
19	The base of the MCU shall conform to the BS 7856 enclosure, terminals pacing and mounting arrangement.		
10	The meter shall be supplied with two-meter ID cards		
20	The meter serial numbers shall be printed in barcode, code 128 C symbology on the face of each ID card. No space characters shall be used		
21	The installation Kit shall include four barcode meter serial number stickers		
22	The meter shall have a failure rate of less than 0.5 percent per annum		
23	The meter shall have five-year repair or replace warranty.		

WIRELESS USER INTERFACE UNIT

MAKE AND MODEL	:		
No.	Requirements	Comply	Do Not Comply
1	The UIU operate from standard AA Alkaline batteries		
2	If "do not comply "is ticked above, then provide explanatory information below		
3	The UIU shall communicate with the MCU for a distance of not less than 100mm for line-of-sight and 50m inside brick and concrete built environment		
4	The radio RF port shall operate within the license free band		
5	The UIU shall have a failure rate of less than 0.5 percent per annum		
6	The UIU shall have a five-year repair or replace warranty.		

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DATA CONCENTRATOR UNIT (DCU)			
MAKE AND MODEL	:		
No.	Requirements	Comply	Do Not Comply
1	The DCU shall support 3G and fall-back to GPRS communications between itself and the HES		
2	Shall support Radio Frequency (RF) communications between itself and the smart meters above		
3	Support auto registration of the meters connected to the DCU		
4	The DCU shall be supplied with complete power supply, external magnetic base or patch antenna.		
5	The DCU shall incorporate and Ethernet, USB or RS 485 port for interfacing with any other future communication technology and/or for programming and interrogation purposes		
6	The electrical, mechanical and climax requirements for the DCU shall be in accordance with SANS 62052-11		
7	The DCU shall in addition comply with SANS 474 for Bulk Metering		
8	Shall have a battery backed internal Real Time Clock		
9	The DCU shall be able to support at least 500 connected meters		
10	It shall be possible to update the DCU software/firmware remotely from the HES via the connected communication medium or directly via the Ethernet, USB or RS 485 port		
11	The DCU shall store all initializing and current parameter in non-volatile memory.		
12	The memory shall allow for the storage of APN information such as username, password etc required for automatically registration and connection to the APN after power failure and/or network failure		
13	The DCU shall be capable of monitoring the 3G/GPRS connection and automatically detach and reconnect to the APN. Detach/attach periods shall be a configuration within the DCU software/firmware and be remotely programmable		
14	The DCU shall be capable of monitoring and reporting local health and tamper conditions to the AMI		
15	Auto registering upon installation		
16	The DCU shall support outage detection with last-gasp event push capability		
17	Shall have a five-year repair or replace warranty.		

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C3.1.5 TEMPORARY WORKS

The will be no temporary works on this project.

C3.2.1 DESIGN SERVICES AND ACTIVITY MATRIX

Works designed by, per design stage:

Description	Responsibility
Design of Works	Employer's Agent
Concept, feasibility and overall process	Client
Basic Engineering and detail layouts to tender stage	Employer's Agent
Final Design of Works	Employer's Agent
Final Design to approved for construction stage	Client
Preparation of tender documentation & adverts	Employer's Agent
Placement of Advertisements in newspapers	Client
Payment of Eskom connection fees	Contractor
Appointment of sub-contractors	Contractor
Supervision	Employer's Agent
Preparation of as-built drawings	Contractor / Employer's Agent
Completion certificate	Employer's Agent / Client / Contractor

C3.2.2 EMPLOYER'S DESIGN

The permanent works included in this contract has been designed by the Employer's agent. The detail of the works is indicated on the drawing and in the specifications. The tenderer may submit alternative offers for designs prepared by himself subject to the conditions specified in clause 05 of the standard specifications.

C3.2.3 CONTRACTOR'S DESIGN

Where the contractor is to supply the design of designated parts of the permanent Works or temporary Works he shall supply fill working drawings supported by a professional Employer's Agent's design certificate.

C3.2.4 DRAWINGS

The Employer's Agent will provide the Contractor with one full set of drawings, which will be used exclusively for the recording of as built information by the Contractor.

Only dimensions, positions, levels, co-ordinates etc. that change from the original values, will be required to be entered on these drawings. These drawings, fully marked up, will be handed to the Employer's Agent at the issue of the Certificate of completion, which will not be issued until the as-built information has been received.

Additional construction drawings will, in terms of Clause 5.9 of the General Conditions of Contract (2010), be issued to the Contractor by the Employer's Agent/Employer on the commencement date and from time to time as required

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The applicable drawings mentioned above are attached under Part C5.2.

C3.2.5 DESIGN PROCEDURES

Designs shall be concluded by the Employer's Agent and issued to the Contractor on the day of the official site handover. The designs shall be approved by the local authority before construction commences. The contractor shall be liable for capturing all the relevant changes to the design on the as built drawing, thereafter the drawing shall be submitted to the Employer's Agent for capturing. Under no conditions will the contractor deviate from the issued design unless the Employer's Agent formally approves thereof in writing.

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C3.4 : CONSTRUCTION

C3.4.1 STANDARD SPECIFICATIONS

The standard specifications on which this contract is based on the following BS specifications are also referred to in this document and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

MATTERS RELATING TO THE STANDARD SPECIFICATIONS

Standard	Title
BS 476	Fire tests on building materials and structures. Methods for determination of the contribution of components to the fire resistance of a structure
BS 5266-1	Emergency lighting - Part 1: Code of practice for the emergency escape lighting of premises
BS 5839-1	Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises
BS 5839-3	Fire detection and fire alarm systems for buildings. Specification for automatic release mechanisms for certain fire protection equipment
BS 6387	Test methods for resistance to fire of cables required to maintain circuit integrity under fire conditions
BS 7430	Code of practice for protective earthing of electrical installations
BS 7671	Requirements for electrical installations
BS 7870-1	LV and MV polymeric insulated cables for use by distribution and generation utilities: General
BS 7870-2	LV and MV polymeric insulated cables for use by distribution and generation utilities: Methods of test
BS 7870-8.1	LV and MV polymeric insulated cables for use by distribution and generation utilities: Specification for multicore and multipair cables for installation above and below ground: Single wire armoured and PVC sheathed multicore cable with copper conductors
BS 7870-8.2	LV and MV polymeric insulated cables for use by distribution and generation utilities: Specification for multicore and multipair cables for installation above and below ground: Single wire armoured and PVC sheathed multipair cable with copper conductors
BS EN 1022-2	Welding. Recommendations for welding of metallic materials Arc welding of ferrite steels.
BS EN 10240	Internal and/or external protective coatings for steel tubes. Specification for hot dip galvanized coatings applied in automatic plants.
BS EN 1838	Lighting applications. Emergency lighting
BS EN 22063	Metallic and other inorganic coatings. Thermal spraying. Zinc, aluminium and their alloys.
BS EN 50522	Earthing of power installations exceeding 1 kV a.c.
BS EN 54-22	Fire detection and fire alarm systems for buildings. Manual call points
BS EN 54-2	Fire detection and fire alarm systems for buildings. Control and indicating equipment
BS EN 54-4	Fire detection and fire alarm systems for buildings. Power supply equipment
BS EN 60793-3	Optical fibres - Part 3: Outdoor cables
BS EN ISO 1460	Metallic coatings. Hot dip galvanized coatings on ferrous materials. Gravimetric determination of the mass per unit area.
BS EN ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods
BS EN ISO 8501-1	Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness Rust grades and preparation grades of

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	uncoated steel substrates and of steel substrates after overall removal of previous coatings.
BS EN ISO 8503-1	Preparation of steel substrates before application of paints and related products. Surface roughness characteristics of blast-cleaned steel substrates Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast- cleaned surfaces.
BS 2562	Specification for Cable Boxes for Transformers and Reactors
BS 5499	Graphical Symbols and Signs – Safety Signs, Including Fire Safety Signs
BS 6435	Specification for Unfilled Enclosures for the Dry Termination of HV Cables for Transformers and Reactors.
BS EN 10244-2	Steel Wire and Wire Products. Non-Ferrous Metallic Coatings on Steel Wire – Part 2 – Zinc or Zinc Alloy Coatings
BS EN 50180	Bushings above 1 kV up to 36 kV and from 250 A to 3.15 kA for liquid filled transformers.
BS EN 50216	Power Transformer and Reactor Fittings.
BS EN ISO 12944-2	Paints and Varnishes. Corrosion Protection of Steel Structures by Protective Paint Systems. Classification of Environments.
BS EN ISO 14001	Environment Management Systems. Requirements with Guidance for use.
BS EN ISO 9000	Management and Quality Assurance Standards
CIBSE LG12	CIBSE Lighting Guide 12: Emergency Lighting Design Guide
EIA/TIA-598-C	Optical fibre cable colour coding
IEC 60099-4	Surge Arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems
IEC 60099-5	Surge Arresters - Part 5: Selection and application recommendations
IEC 60127	Miniature fuses
IEC 60146	Semiconductor converters
IEC 60189	Low frequency cables and wires with PVC insulation and sheath (parts 1 to 3)
IEC 60227	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements
IEC 60228	Conductors of insulated cables
IEC 60229	Electric cables – Tests on extruded over sheaths with a special protective function
IEC 60230	Impulse tests on cables and their accessories.
IEC 60269	Low voltage fuses
IEC 60287	Calculation of the continuous current rating of cables (100% load factor).
IEC 60475	Method of sampling insulating liquids
IEC 60502-1	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1.2 kV) up to 30 kV (Um = 36 kV) – Part 1: Cables for rated voltages from 1 kV (Um = 1.2 kV) up to 3 kV (Um = 3.6 kV).
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 60617	Graphical symbols for diagrams
IEC 60623	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells
IEC 60724	Short-circuit temperature limits of electric cables with rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3,6 kV)
IEC 60793-2	Optical Fibres - Part 2: Product specifications
IEC 60822	Common test methods for insulating and sheathing materials of electric cables and optical cables
IEC 60870-5-101	Transmission protocols, companion standards especially for basic telecontrol tasks
IEC 60870-5-104	Transmission protocols, network access for IEC 60870-5-101 using standard transport profiles
IEC 60885	Electric test methods for electric cables.
IEC 60947	Low-voltage switchgear and control gear
IEC 60947-7	Terminal block requirements
IEC 61000-4	Electromagnetic compatibility (EMC): Test and measurement techniques (All Parts)
IEC 62305-1	Protection against lightning - General principles
IEC 62305-2	Protection against lightning - Risk Management

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IEC 62305-3	Protection against lightning - Physical Damage to Structures and Life Hazard
IEC 62305-4	Protection against lightning - Electrical and Electronic Systems within Structures
IEC 60071	Insulation Coordination
IEC 60076	Power Transformers
IEC 60085	Thermal evaluation and classification of electrical insulation.
IEC 60137	Insulated bushings for ac voltages above 1000V.
IEC 60156	Insulating Liquids – Determination of the breakdown voltage at power frequency – Test method
IEC 60214	On Load Tap Changers
IEC 60296	Fluids for electro technical applications. Unused mineral insulating oils for transformers and switchgear.
IEC 60354	Loading guide for oil-immersed transformers
IEC 60437	Radio Influence Voltage Measurement
IEC 60518	Dimensional Standardization of terminals for high voltage switchgear and control gear.
IEC 60529	Degrees of protection provided by enclosures.
IEC 60616	Terminal and tapping markings for power transformers
IEC 60815	Guide for Selection of insulators in respect of polluted conditions.
IEC 61850	Communication networks and systems in substations
IEC 61869-1	Instrument Transformers – Part: General Requirements
IEC 61869-2	Instrument Transformers – Part 2: Additional Requirements for Current Transformers
IEC 61869-3	Instrument Transformers – Part 3: Additional Requirements for Inductive Transformers.
IEEE 2215	IEEE Recommended practice for sizing Nickel-cadmium batteries
IEEE 1613	IEEE Standard environmental and testing requirements for communications networking devices installed in electric power substations
IEEE 80	IEEE Guide for Safety in AC Substation Grounding
IEEE 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System
ISO/IEC 22801	Information technology - Generic cabling for customer premises

CB 2.5 MANAGEMENT OF THE WORKS

CB 2.5.1 Planning and Programming

The program referred to in Clause 5.6 of the GCC shall be a network-based program in accordance with the precedence method; a detailed cash flow graph indicating projected monthly invoice amounts shall also be provided. The critical path of the program of work shall be clearly indicated and the program monitored continually and updated monthly by the Contractor in accordance with his progress.

1. In compiling the program of work, the Contractor shall incorporate the following important specific requirements and constraints:
 - (a) The identification and marking of affected services prior to commencing construction works.
 - (b) The requirements of the Environmental Management Plan (EMP) as specified in the relevant sections of the Particular Specifications and the requirements in respect of inspections and community liaison.
 - (c) The requirements of the Occupational Health Safety (OHS) Act of 1993 and the Construction Regulations, 2003.
 - (d) The relocation of services.
 - (e) An allowance to accommodate “normal” rain days.
 - (f) The recorded water table in certain parts of the site and a requirement to make timeous arrangements in this regard to enable the permanent work to proceed in an orderly manner.

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2. Particular attention shall be given to the concurrent construction activities of the Employer and/or his Contractors responsible for the mechanical, electrical and electronic works. In this regard, the Contractor shall ensure that access is provided timeously for the purpose of the erection, installation and commissioning of the plant, equipment and cabling at appropriate times during the contract period.
3. The sequence for completion of the Works required to acknowledge the constraints imposed by operating existing facilities either uninterrupted until additional processing capacity is provided by the completion of portion of the new work included in this contract, or partially interrupted in consultation with the Employer.
4. The program submitted shall include at least the following details:
 - (a) A work breakdown structure identifying the major activity groups.
 - (b) For each activity group further details shall be provided with regard to the start and end dates of the separate work sites as identified in the Schedules of Quantities and as shown on the drawings.
 - (c) The critical path shall be indicated and floats on non-critical activities shall be shown.
 - (d) The working hours per day, week and month allowed for in the program with details of resource allocations per activity.
 - (e) Production rates for key activities e.g. excavate and place, compaction, concrete, etc.
5. In addition the Contractor shall submit to the Employer's Agent at monthly intervals a progress report indicating the following details:
 - (a) Work completed in previous month and total progress to date, per activity.
 - (b) Activities behind program, for which the Contractor shall detail all reasons for such delays as well as the measures to be implemented to make up delays.
 - (c) A GANTT chart showing the original program, the latest approved version of the program, actual progress achieved and revised completion dates, if and when applicable. Failure to comply with all of the foregoing requirements shall entitle the Employer's Agent to use a program based on his own assumptions to evaluate claims for extension of time for completion of the works, or for additional compensation.

CB 2.5.2 Quality Management

CB 2.5.2.1 *General*

The Contractor's Quality Management System shall include quality management objectives, policies, organization, procedures and work instruction that comply with the requirements of ISO 9001/2000.

CB 2.5.2.2 *Project Quality Plan*

The Contractor shall within 20 days from the commencement date submit a Project Quality Plan for the Contract. The Plan shall indicate how the Quality System shall apply to the specific requirements of the Contract to ensure compliance of the Works with the requirements of the Specifications. The Project Quality Plan shall be subject to the approval of the Employer's Agent.

CB 2.5.2.3 *Quality Control Plans*

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Quality Control Plans shall be prepared by the Contractor and/or his subcontractors for each group of activities. Where applicable, approved plant, equipment or services required to realize the specific component shall be included.
 Quality Control Plans shall be submitted to the Employer's Agent for approval and for the inclusion of his construction monitoring activities before any construction of the permanent works may commence.

The following surveillance requirements shall be included for affirmation by the Employer's Agent or his representative.

- Record (R) Documentary evidence of the activity and statistical analysis of the data to be retained and copied to the Employer's Agent.

- Verification (V) The Employer's Agent or his representative will not necessarily be present during the activity but documentary evidence to permit verification of compliance with the requirements is generated, retained and copied to the Employer's Agent.

- Witness (W) The Employer's Agent or his representative requires notification to permit witnessing of the activity. The notice period shall be agreed to depending on the nature of the activity and shall be reviewed from time to time. Documentary evidence shall be retained and copied to the Employer's Agent.

- Hold (H) The Contractor may not proceed to the following activity until the Employer's Agent or his representative has approved the proceeding activity. Documentary evidence shall be retained and copied to the Employer's Agent.

- Random (R) Construction monitoring by random inspection. Random construction monitoring may be carried out at any stage of the activity or preparation for the activity. Documentary evidence shall be retained and copied to the Employer's Agent.

CB 2.5.2.4 Categorisation

The following categories shall apply in determining the requirement for a Quality Control Plan

Category	Clarification	Quality Control Plan
Critical	A component, group of components, structure, and the failure of which to comply with the specifications may affect the performance of the works of which it is a part and /or will cause a detrimental environmental impact, and /or may result in hazardous or unsafe conditions.	Required for all components.
Major	A component, group of components, structure, element of a structure or facility, other than categorized as critical, the failure of which to comply with the specifications may compromise the performance of the works of which it is a part, result in increased, maintenance and/or impact negatively on the quality of the works.	As determined by the Contractor and to the approval of the Employer's Agent.
Minor	All items other than those categorized as Critical or Major and which are visible and capable of rectification during routine inspections.	As determined by the Contractor

CB 2.5.2.5 Quality Management Audit

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The Contractor shall carry out periodic assessments of the adherence to the Quality Plan and Quality Control Plans by senior qualified staff who are not normally employed on the Site. The Employer's Agent and/or his representative shall be invited to attend at the periodic assessments meeting and be afforded the opportunity to report on the implementation of the Quality System at the Site. The assessment reports shall be copied to the Employer's Agent.

CB 2.5.2.6 Corrective Action

Failure to confirm to the specified requirements will result in the move by the Employer's Agent of a Corrective Action Request. Failure to rectify the deficiencies covered by a Corrective Action Request within the period stated will result in the Employer's Agent invoking the provisions of GCC Clause 7.9 – Removal of Improper Work and Materials.

CB 2.5.3 Environmental Management during Construction

The contractual requirements for environmental management are comprehensively set out in Section C.3.4.7 Additional Specifications: PC Environmental Management during Construction.

C3.4.3 PROJECT SPECIFICATIONS: ADDITIONAL SPECIFICATIONS

CONTENTS

- C3.4.3.1 REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT REGULATIONS
- C3.4.3.2 ENVIRONMENTAL MANAGEMENT PLAN
- C3.4.3.3 PROVISION OF STRUCTURED TRAINING
- C3.4.3.4 REQUIREMENTS OF EXTEND PUBLIC WORKS PROGRAMME
- C3.4.3.5 HIV /AIDS REQUIREMENTS

C3.4.3.1 OCCUPATIONAL HEALTH AND SAFETY ACT 1993: HEALTH AND SAFETY SPECIFICATION

CONTENTS

- C3.4.3.1.1 INTRODUCTION
- C3.4.3.1.2 SCOPE
- C3.4.3.1.3 GENERAL OCCUPATIONAL HEALTH AND SAFETY PROVISIONS
- C3.4.3.1.4 OPERATIONAL CONTROL
- ANNEXURE 1: MEASURING INJURY EXPERIENCE
- ANNEXURE 2: EXECUTIVE SHE RISK MANAGEMENT REPORT
- ANNEXURE 3: LIST OF RISK ASSESSMENTS

C3.4.3.1 OCCUPATIONAL HEALTH AND SAFETY ACT 1993: HEALTH AND SAFETY SPECIFICATION

C3.4.3.1.1 Introduction

In terms of the Construction Regulation 4(1) (a) of the Occupational Health and Safety Act, No. 85 of 1993, Nkangala District Municipality, as the Client, is required to compile a Health & Safety Specification for any intended project and provide such specification to any prospective tenderer.

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The Client's further duties are as in C3.5.1.3.1.1 below and in the Construction Regulations, 2003.

This specification has as objective to ensure that Principal Contractors entering into a Contract with the Nkangala District Municipality achieve an acceptable level of OH&S performance. This document forms an integral part of the Contract and Principal and other Contractors should make it part of any Contracts that they may have with Contractors and/or Suppliers.

Compliance with this document does not absolve the Principal Contractor from complying with minimum legal requirements and the Principal Contractor remains responsible for the health & safety of his employees and those of his Mandataries.

C3.4.3.1.2 Scope

Development of a health & safety specification that addresses all aspects of occupational health and safety as affected by the abovementioned contract work.

The specification will provide the requirements that Principal Contractors and other Contractors will have to comply with in order to reduce the risks associated with the abovementioned contract work that may lead to incidents causing injury and/or ill health, to a level as low as reasonably practicable.

C3.4.3.1.3 General Occupational Health & Safety Provisions

(a) Hazard Identification & Risk Assessment (Construction Regulation 7)

(i) Risk Assessments

Annexure 3 contains a list of Risk Assessment headings that have been identified by Nkangala District Municipality as possibly applicable to the abovementioned contract work. It is, by no means, exhaustive and is offered as assistance to Contractors intending to tender.

(ii) Development of Risk Assessments

Every Principal 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 OH&S Plan and be implemented and maintained as contemplated in Construction regulation 5(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 review plan

Based on the Risk Assessments, the Principal Contractor must develop a set of site-specific OH&S rules that will be applied to regulate the OH&S aspects of the construction.

The Risk Assessments, together with the site-specific OH&S rules must be submitted to the Nkangala District Municipality before mobilisation on site commences.

Despite the Risk Assessments listed in Annexure 7, the Principal Contractor is required to conduct a baseline Risk Assessment and the aforesaid listed Risk Assessments must be incorporated into the base-line Risk Assessment. The baseline Risk Assessment must further include the Standard Working procedures (SWP) and the applicable Method Statements based on the Risk Assessments

All out-of-scope work must be associated with a Risk Assessment.

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(iii) Review of Risk Assessments

The Principal Contractor is to review the Hazard Identification, Risk Assessments and SWP's at each Production Planning and Progress Report meeting as the Contract work develops and progresses and each time changes are made to the designs, plans and construction methods and processes.

The Principal Contractor must provide the Client, other Contractors and all other concerned-parties with copies of any changes, alterations or amendments as contemplated in above.

(b) Legal Requirements

All Contractors entering into a Contract with the Nkangala District Municipality 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 must be available on site at all times
- Compensation for Occupational Injuries & Diseases Act (Act 130 of 1993). The principal Contractor will be required to submit a letter of Registration and "good-standing" from the Compensation Insurer before being awarded the Contract. A current, up-to-date copy of the COID Act must be available on site at all times.
- Where work is being carried out on mines' premises the Contractor will have to comply with the Mine Health & Safety Act and Regulations (Act. 29 of 19960 and any other OH&S requirements that the mine may specify. A current, up-to-date copy of the OHS Act must be available on site at all times.

(c) Structure and Responsibilities

(i) Overall Supervision and Responsibility for OH&S

* It is a requirement that the Principal Contractor, when he appoints Contractors (Sub-contractors) in terms of Construction Regulations 5(3), (5), (9), (10) and (12) he includes an OHS Act Section 37(2) agreement: "Agreement with Mandatary" in his agreement with such Contractors.

* Any OH&S Act (85/1993), Section 16(2) appointee/s as detailed in his/her/their respective appointment forms

(ii) Further (Specific) Supervision Responsibilities for OH&S

The Contractor shall appoint designated competent employees and/or other competent persons as required by the Act and Regulations. Below is a list of identified appointments and may be used to select the appropriate appointments for the current contract:

Ref. Section/Regulation in OHS Act

Batch Plant Supervisor	(Construction Regulation 6(1))
Construction Vehicles/Mobile Plant/Machinery Supervisor	(Construction Regulation 21)
Demolition Supervisor	(Construction Regulation 12)
Drivers/Operators of Construction Vehicles/Plant	(Construction Regulation 21)
Electrical Installation and Appliances Inspector	(Construction Regulation 22)
Emergency/Security/Fire Coordinator	(Construction Regulation 27)
Excavation Supervisor	(Construction Regulation 11)
Explosive Powered Tool Supervisor	(Construction Regulation 19)
Fall Protection Supervisor	(Construction Regulation 8)
First Aider	(General Safety Regulation 3)

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Fire Equipment Inspector	(Construction Regulation 27)
Formwork & Support work Supervisor	(Construction Regulation 10)
Hazardous Chemical Substances Supervisor	(HCS Regulations)
Incident Investigator	(General Admin Regulation 29)
Ladder Inspector	(General Safety Regulation 13A)
Lifting Equipment Inspector	(Construction Regulation 20)
Materials Hoist Inspector	(Construction Regulation 17)
OH&S Committee	(OHS Act Section 19)
OH&S Officer	(Construction Regulation 6(6))
OH&S Representatives	(OHS Act Section 17)
Person Responsible for Machinery	(General Machinery Regulation 2)
Scaffolding Supervisor	(Construction Regulation 14)
Stacking & Storage Supervisor	(Construction Regulation 26)
Structures Supervisor	(Construction Regulation 9)
Suspended Platform Supervisor	(Construction Regulation 15)
Tunneling Supervisor	(Construction Regulation 13)
Vessels under Pressure Supervisor	(Vessels under Pressure Regulations)
Working on/next to Water Supervisor	(Construction Regulation 24)
Welding Supervisor	(General Safety Regulation 9)

The appointments must be in writing and the responsibilities clearly stated together with the period for which the appointment is made. This information must be communicated and agreed with the appointees.

Copies of appointments must be submitted to the Nkangala District Municipality together with concise CV's of the appointees. All appointments must be officially approved by Nkangala District Municipality. Any changes in appointees or appointments must be communicated to Nkangala District Municipality forthwith.

The Principal Contractor must, furthermore, provide Nkangala District Municipality with an organogram of all Contractors that he/she has appointed or intends to appoint and keep this list updated on a weekly basis.

Where necessary, or when instructed by the Nkangala District Municipality or an Inspector of the Department of Labour, the Principal Contractor must appoint a competent OH&S Officer subject to the approval of the Nkangala District Municipality

In addition Nkangala District Municipality may require that a Traffic Safety Officer be appointed for any project.

(iii) Designation of OH&S Representatives (Section 18 of the OHS Act)

Where the Principal Contractor employs more than 20 persons (including the employees of other Contractors (sub-contractors) he has to appoint one OH&S Representatives for every 50 employees or part thereof. General Administrative Regulation 6 requires that the appointment OR election and subsequent designation of the OH&S Representatives are executed in consultation with Employee Representatives or Employees. (Section 17 of the Act and General Administrative Regulation 6. & 7)

OH&S Representatives have to be designated in writing and the designation must include the area of responsibility of the person and term of the designation.

(iv) Duties and Functions of the OH&S Representatives (Section 19 of the OHS Act)

The Principal Contractor must ensure that the designated OH&S Representatives conduct a minimum monthly inspection of their respective areas of responsibility using a checklist and report thereon to the Principal Contractor.

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OH&S representatives must be included in accident/incident investigations
 OH&S representatives must attend all OH&S committee meetings.

(v) Appointment of OH&S Committee (Section 20 of the OHS Act)

The Principal Contractor must establish an OH&S Committee consisting of all the designated OH&S Representatives together with a number of management representatives that are not allowed to exceed the number of OH&S representatives on the committee and a representative of the Client who shall act as the chairman without a vote. The members of the OH&S committee must be appointed in writing.

The OH&S Committee must meet minimum monthly and consider, at least, the following Agenda:

1. Opening & Welcome
2. Present/Apologies/Absent
3. Minutes of previous Meeting
4. Matters Arising from the previous Minutes
5. OH&S Reps Reports
6. Incident Reports & Investigations
7. Incident/Injury Statistics
8. Other Matters
9. Endorsement of Registers and other statutory documents by a representative of the Principal Contractor
10. Close/Next Meeting

(d) Administrative Controls and the Occupational Health & Safety File

(i) The OH&S File (Construction Regulation 5 (7))

As required by Construction Regulation 5(7), the Principal Contractor and other Contractors will each keep an OH&S File on site containing the following documents as a minimum:

- * Notification of Construction Work (Construction Regulation 3.)
- * Copy of OH&S Act (updated) (General Administrative Regulation 4.)
- * Proof of Registration and good standing with a COID Insurer (Construction Regulation 4 (g))
- * OH&S Programme agreed with the Client including the underpinning Risk Assessment/s & Method Statements (Construction regulation 5 (1))
- * Copies of OH&S Committee and other relevant Minutes
- * Designs/drawings (Construction Regulation 5 (8))
- * A list of Contractors (Sub-Contractors) including copies of the agreements between the parties and the type of work being done by each Contractor (Construction Regulation 9)
- * Appointment/Designation forms as per (a)(i) & (ii) above.
- * Registers as follows:
 - * Accident/Incident Register (Annexure 1 of the General Administrative Regulations)
 - * OH&S Representatives Inspection Register
 - * Asbestos Demolition & Stripping Register
 - * Batch Plant Inspections
 - * Construction Vehicles & Mobile Plant Inspections by Controller
 - * Daily Inspection of Vehicles. Plant and other Equipment by the Operator/ Driver/User
 - * Demolition Inspection Register
 - * Designer's Inspection of Structures Record
 - * Electrical Installations, -Equipment & -Appliances (including Portable Electrical Tools)
 - * Excavations Inspection
 - * Explosive Powered Tool Inspection, Maintenance, Issue & Returns Register (incl. cartridges & nails)
 - * Fall Protection Inspection Register
 - * First Aid Box Contents
 - * Fire Equipment Inspection & Maintenance
 - * Formwork & Support work Inspections

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- * Hazardous Chemical Substances Record
- * Ladder Inspections
- * Lifting Equipment Register
- * Materials Hoist Inspection Register
- * Machinery Safety Inspection Register (incl. machine guards, lock-outs etc.)
- * Scaffolding Inspections
- * Stacking & Storage Inspection
- * Inspection of Structures
- * Inspection of Suspended Platforms
- * Inspection of Tunnelling Operations
- * Inspection of Vessels under Pressure
- * Welding Equipment Inspections
- * Inspection of Work conducted on or Near Water
- * All other applicable records

Nkangala District Municipality will conduct an audit on the OH&S file of the Principal Contractor from time-to-time.

(e) OH&S Goals & Objectives & Arrangements for Monitoring & Review of OH&S Performance

The Principal Contractor is required to maintain a CIFR of at least 8 (See Annexure 1. to this document: "Measuring Injury Experience) and report on this to Nkangala District Municipality on a monthly basis

(f) Notification of Construction Work (Construction Regulation 3.)

The Principal Contractor must, where the Contract meets the requirements laid down in Construction Regulation 3, within 5 working days, notify the Department of Labour of the intention to carry out construction work and use the form (Annexure A in the Construction Regulations) for the purpose. A copy must be held on the OH&S File and a copy must be forwarded to Nkangala District Municipality for record keeping purposes.

(g) Training, Awareness and Competence

The contents and syllabi of all training required by the Act and Regulations are to be included in the Principal Contractor's OH&S Plan.

(i) General Induction Training

All members of Contractor's Site management as well as all the persons appointed as responsible for OH&S in terms of the Construction and other Regulations will be required to attend a general induction session by the Client

All employees of the Principal and other Contractors to be in possession of proof of General Induction training.

(ii) Site Specific Induction Training

The Principal Contractor will be required to develop Contract work project specific induction training based on the Risk Assessments for the Contract work and train all employees and other Contractors and their employees in this.

All employees of the Principal and other Contractors to be in possession of proof of Site Specific OH&S Induction training at all times.

(iii) Other Training

All operators, drivers and users of construction vehicles, mobile plant and other equipment to be in possession of valid proof of training.

All employees in jobs requiring training in terms of the Act and Regulations to be in possession of valid proof of training as follows:

OH&S Training Requirements: (as required by the Construction Regulations and as indicated by the OH&S Specification & the Risk Assessment/s):

- * General Induction (Section 8 of the Act)

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- * Site/Job Specific Induction (also visitors) (Sections 8 & 9 of the Act)
- * Site/Project Manager
- * Construction Supervisor
- * OH&S Representatives (Section 18 (3) of the Act)
- * Training of the Appointees indicated above
- * Operators & Drivers of Construction Vehicles & Mobile Plant (Construction Regulation 21)
- * Basic Fire Prevention & Protection (Environmental Regulations 9 and Construction regulation 27)
- * Basic First Aid (General Safety Regulations 3)
- * Storekeeping Methods & Safe Stacking (Construction Regulation 26)
- * Emergency, Security and Fire Co-coordinator

(iv) Awareness & Promotion

The Principal Contractor is required to have a promotion and awareness scheme in place to create an OH&S culture in employees. The following are some of the methods that may be used:

- Toolbox Talks
- OH&S Posters
- Videos
- Competitions
- Suggestion schemes
- Participative activities such as OH&S Safety circles.

(v) Competence

The Principal Contractor shall ensure that his and other Contractors personnel appointed are competent and that all training required to do the work safely and without risk to health, has been completed before work commences.

The Principal Contractor shall ensure that follow-up and refresher training is conducted as the contract work progresses and the work situation changes.

Records of all training must be kept on the OH&S File for auditing purposes.

(h) Consultation, Communication and Liaison

OH&S Liaison between the Client, the principal Contractor, the other Contractors, the Designer and other concerned parties will be through the OH&S committee as contemplated in above.

In addition to the above, communication may be directly to the Client or his appointed Agent, verbally or in writing, as and when the need arises.

Consultation with the workforce on OH&S matters will be through their Supervisors, OH&S Representatives, the OH&S committee and their elected Trade Union Representatives, if any.

The Principal Contractor will be responsible for the dissemination of all relevant OH&S information to the other Contractors e.g. design changes agreed with the Client and the Designer, instructions by the Client and/or his/her agent, exchange of information between Contractors, the reporting of hazardous/dangerous conditions/ situations etc.

The Principal Contractor will be required to do Site Safety Walks with Nkangala District Municipality at least on a basis to be determined between the two parties.

The Principal and other Contractors will be required to conduct Toolbox Talks with their employees on a weekly basis and records of these must be kept on the OH&S File. Employees must acknowledge the receipt of Toolbox Talks which record must, likewise be kept on the OH&S File.

The Principal Contractors most senior manager on site will be required to attend all Nkangala District Municipality OH&S meetings and a list of dates, times and venues will be provided to the Principal Contractor by Nkangala District Municipality

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(i) Checking, Reporting and Corrective Actions

(i) Monthly Audit by Client (Construction Regulation 1(d))

Nkangala District Municipality will be conducting a Monthly Audit to comply with Construction Regulation 4(1)(d) to ensure that the principal Contractor has implemented and is maintaining the agreed and approved OH&S Plan.

(ii) Other Audits and Inspections by Nkangala District Municipality:

Nkangala District Municipality reserves the right to conduct other ad hoc audits and inspections as deemed necessary. This will include Site Safety Walks.

(iii) Conducting an Audit

A representative of the Principal Contractor must accompany Nkangala District Municipality on all Audits and Inspections and may conduct his/her own audit/inspection at the same time. Each party will, however, take responsibility for the results of his/her own audit/inspection results.

(iv) Contractor's Audits and Inspections

The Principal Contractor is to conduct his own monthly internal audits to verify compliance with his own OH&S Management system as well as of with this specification.

(v) Inspections by OH&S Representative's and other Appointees

OH&S Representatives must conduct weekly inspections of their areas of responsibility and report thereon to their foreman or supervisor whilst other appointees must conduct inspections and report thereon as specified in their appointments e.g. vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

(vi) Recording and Review of Inspection Results

All the results of the abovementioned inspections to be in writing, reviewed at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

(vii) Reporting of Inspection Results

The Principal Contractor is required to provide the Client with a monthly report in the format as per the attached Annexure 2: "SHE Risk Management Report"

(j) Incident Reporting and Investigation

Reporting of Accidents and Incidents (Section 24 and General Administrative Regulation 8 of the OHS Act)

The Principal Contractor must report all incidents where an employee is injured on duty to the extent that he/she:

- * dies
- * becomes unconscious
- * loses a limb or part of a 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 any substance under pressure took place

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- * machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- * machinery ran out of control

to Nkangala District Municipality within two days and to the Provincial Director of the Department of Labour within seven days (Section 24 of the Act & General Administrative Regulation 8.) EXCEPT that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both Nkangala District Municipality and the Provincial Director of the Department of Labour forthwith by telephone, telefax or E-mail.

The Principal Contractor is required to provide Nkangala District Municipality with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring.

The Principal Contractor is required to provide Nkangala District Municipality with copies of all internal and external accident/incident investigation reports including the reports contemplated below within 7 days of the incident occurring.

Accident and Incident Investigation (General Administrative Regulation 9)

The Principal Contractor is responsible for the investigation of all accidents/incidents where employees and non-employees were injured to the extent that he/she/they had to be referred for medical treatment by a doctor, hospital or clinic

The results of the investigation to be entered into the Accident/Incident Register listed in above.

The Principal Contractor is responsible for the investigation of all minor and non-injury incidents as described in Section 24 (1) (b) & (c) of the Act and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

The Principal Contractor is responsible for the investigation of all road traffic accidents and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

The Nkangala District Municipality reserves the right to hold its own investigation into an incident or call for an independent external investigation.

C3.4.3.1.4 Operational Control

(a) Emergency Preparedness, Contingency Planning and Response

The Principal Contractor must appoint a competent person to act as Emergency Controller/ Coordinator.

The Principal Contractor must conduct an emergency identification exercise and establish what emergencies could possibly develop. He/she must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that Nkangala District Municipality may have in place.

The Principal Contractor and the other Contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.

(b) First Aid (General Safety Regulation 3)

The Principal Contractor must provide First Aid equipment (including a stretcher) and have qualified First Aider/s as required by General Safety Regulation 3 of the OHS Act.

The Contingency Plan of the Principal Contractor must include the arrangements for speedily and timeously transporting injured/ill person/s to a medical facility or of getting emergency medical aid to person/s that may require it.

The Principal Contractor must have firm arrangements with his other Contractors in place regarding the responsibility of the other Contractors injured/ill employees.

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(c) Security

The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must include the rule that non-employees will not be allowed on site unaccompanied.

The Principal Contractor must develop a set of Security rules and procedures and maintain these throughout the construction period

(d) Fall Protection (Working in Elevated Positions (Construction regulation 8.)

A pre-emptive Risk Assessment will be required for any work to be carried out above two metres from the ground or any floor level and will be classified as "Work in Elevated Positions".

As far as is practicable, any person working in an elevated position will work from a platform, ladder or other device that is at least as safe as if he/she is working at ground level and whilst working in this position be wearing a single belt with lanyard that will be worn to prevent the person falling from the platform, ladder or other device utilised. This safety belt will be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard must be of such a length that the person will not be able to move over the edge. Alternatively any platform, slab, deck or surface forming an edge over which a person may fall may be fitted with guard rails at two different heights as prescribed in SABS 085: Code of Practice for the Design, Erection, Use and Inspection of Access Scaffolding.

Where the requirement in is not practicable, the person will be provided with a full body harness that will be worn and attached above the wearer's head at all times and the lanyard must be fitted with a shock absorbing device OR the person must be attached to an approved, by AL, fall arrest system.

Where the requirements are not practicable, a suitable catch net must be erected

Workers working in elevated positions must be trained to do this safely and without risk to health

Where work on roofs is carried out, the Risk Assessment must take into account the possibility of persons falling through fragile material. Skylights and openings in the roof.

(e) Structures (Construction Regulation 9)

The Principal Contractor must ensure that:

- Steps are taken to ensure that no structure becomes unstable or collapses due to construction work being performed on it or in the vicinity of it
- No structure is overloaded to the extent where it becomes unsafe
- He/she has received from the designer the following information:
- Information on known or anticipated hazards relating to the construction work and the relevant information required for the safe execution of the construction work
- A geo-scientific report (where applicable)
- The loading the structure is designed to bear
- The methods and sequence of the construction process
- All drawings pertaining to the design are on site and available for inspection

(f) Formwork & Support Work (Construction Regulation 10.)

- Formwork & Support work (F&SW) must be carried out under the supervision of competent person designated in writing
- F&SW structures must be so designed, erected, supported, braced and maintained that it will be able to support any vertical or lateral loads that may be applied
- No load to be imposed onto the structure that the structure is not designed to carry
- F&SW must be erected in accordance with the structural design drawings for that F&WS and, if there is any uncertainty, the designer must be consulted before proceeding with the erection/use of the F&WS
- All drawings pertaining to the F&SW must be kept available on site

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- All equipment used in the erection of F&SW must be checked by a competent person before use
 - The foundation or base upon which F&SW is erected must be able to bear the weight and keep the structure stable
 - Employees erecting F&SW must be trained in the safe work procedures for the erection, moving and dismantling of F&SW
 - Safe access (and emergency escape) must be provided for workers
 - A competent person must inspect F&SW structures that have been erected before, during and after pouring of concrete or the placing of any other load and thereafter daily until the F&SW is stripped. The results of all inspections must be recorded in a register kept on site
 - The F&SW must be left in place until the concrete has reached sufficient strength to bear its own weight plus any additional weight that may be imposed upon it and not until the designated competent person has authorised its stripping in writing
 - Any damaged F&SW must be repaired/rectified immediately
 - Deck panels must be secured against displacement
 - The slipping of persons on release agents on deck panels prevented
 - Persons health must be protected against the use of solvents, oils or other similar substances
- (g) Excavations (Construction Regulation 11.)
Where excavations will exceed 1, 5 m in depth the Contractor will be required to submit a Method Statement to Nkangala District Municipality for approval before commencing with the excavation and Nkangala District Municipality will issue a permit to proceed once the Risk Assessment and Method Statement are approved.
- Excavation work must be carried out under the supervision of a competent person who has been appointed in writing
 - Before excavation work begins the stability of the ground must be evaluated
 - Whilst excavation work is being performed, the contractor must take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material
 - No person may be required or permitted to work in an excavation that has not been adequately shored or braced or where:
 - the excavation is in stable material or where
 - the sides of the excavation are sloped back to at least the maximum angle of repose measured relative to the horizontal plane
 - The shoring or bracing may not be left out unless written permission has been obtained from the appointed competent person and shoring and bracing must be designed and constructed to safely support the sides of the excavation
 - Where uncertainty exists regarding the stability of the soil the opinion of a competent professional Employer’s Agent or professional technologist must be obtained whose opinion will be decisive. The opinion must be in writing and signed by the Employer’s Agent or technologist as well as the appointed excavator
 - No load or material may be placed near the edge of an excavation if it is likely to cause a collapse of the trench unless suitable shoring has been installed to be able to carry the additional load
 - Any neighbouring building, structure or road that may be affected or endangered by the excavation must be protected from damage or collapse
 - Every excavation must be provided with means of access that must be within 6 metres of any worker within the excavation
 - The location and nature of any existing services such as water, electricity, gas etc. must be established before any excavation is commenced with and any service that may be affected by the excavation must be protected and made safe for workers in the excavation
 - Every excavation including the shoring and bracing or any other method to prevent collapse must be inspected by the appointed competent person as follows:
 - Daily before work commences
 - After every blasting operation
 - After an unexpected collapse of the excavation

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- After substantial damage to any supports
- After rain
- The results of any inspections must be recorded in a register kept on site
- Every excavation accessible to the public or that is adjacent to a public road or thoroughfare or that threatens the safety of persons, must be adequately barricaded or fenced to at least one metre high and as close to the excavation as practicable and
- Provided with warning lights or visible boundary indicators after dark or when visibility is poor
- Upon entering an excavation the requirements of General Safety Regulation 5 must be observed:
- any confined space may only be entered after the air quality has been tested to ensure that it is safe to breathe and does not contain any flammable mixture or
- the confined space has been purged and ventilated of any hazardous or flammable gas, vapour, dust or fumes and
- the safe atmosphere must be maintained or
- employees have to be using breathing apparatus and wearing a safety harness with a rope with the free end of the rope being attended to by a person outside the confined space, furthermore,
- an additional person trained in resuscitation must be in full-time attendance immediately outside the confined space and
- additional breathing and rescue apparatus must be kept immediately outside the confined space for rescue purposes
- all pipes, ducts etc. that may leak into the confined space to be blanked off sufficiently to prevent any leakage or seepage
- the employer must ensure that all employees have left the confined space after the completion of work
- where flammable gas is present in a confined space no work may be performed in close proximity to the flammable atmosphere that may ignite the flammable gas or vapour.
- (h) Demolition Work (Construction Regulation 12.)
- Demolition work to be carried out under the supervision of a competent person who has been appointed in writing
- A detailed structural Engineering survey of the structure to be demolished to be carried out and a method statement on the procedure to be followed in demolishing the structure to be developed by a competent person, before any demolition may be commenced
- As demolishing progresses the structural integrity of the structure to be checked at intervals as determined in the method statement by the appointed competent person in order to prevent any premature collapse
- Steps must be taken to ensure that where a structure is being demolished:
 - no floor, roof or any other part of the structure is overloaded with debris or material that would make it unsafe
 - precautions are taken to prevent the collapse of the structure when any frame or support is cut or removed
 - shoring or propping is applied where necessary
 - No person must be required or allowed to work under unsupported overhanging material

THE STABILITY OF AN ADJACENT BUILDING, STRUCTURE OR ROAD MUST BE MAINTAINED AT ALL TIMES

- The location and nature of any existing services such as water, electricity, gas etc. must be established before any demolition is commenced with and any service that may be affected by the demolition must be protected and made safe for workers
- Every stairwell in a building being demolished must be adequately illuminated
- Convenient and safe means of access must be provided
- A catch platform or net must be erected over every entrance to the building or structure being demolished where the likelihood exists of material or debris falling on persons entering and leaving and every other area where the likelihood exists of material or debris falling on persons, must be fenced or barricaded
- No material may be dropped on the outside of the building unless the area into which it is dropped is fenced off or barricaded

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- Waste and debris may only be disposed of from a height in a chute with the following design:
 - Adequately constructed and rigidly fastened
 - If inclined >45 degrees enclosed on all four sides
 - Fitted with a gate or control mechanism to control the flow of material that may not freefall down the chute
 - Discharged into a container or a barricaded area
 - Demolition equipment may only be used on floors or slabs that are able to support it
 - Asbestos related work must be conducted to the requirements of the Asbestos regulations promulgated under the OHS Act and in particular Asbestos Regulation 21:
 - Demolition of asbestos may only be carried out by a registered (with the Department of Labour) Asbestos Contractor
 - All asbestos materials likely to become airborne must be identified
 - A Plan of Work must be submitted for approval to an Approved Asbestos Inspection Authority (AAIA) (approved by the Department of Labour) 30 days prior to commencement of demolishing work unless the Plan was drawn up by an AAIA and a signed (by all parties) copy must be submitted to the Department of Labour 14 days before commencement of the demolishing
 - During demolition work:
 - all asbestos containing material must be disposed of safely workers must be issued with appropriate PPE and the proper use thereof enforced
 - After the demolition has been completed the area/premises must be thoroughly checked to ensure that all asbestos waste has been removed
 - No person is allowed to:
 - Use compressed air or permit the use of compressed air to remove asbestos dust from any surface or person
 - Smoke, eat, drink or keep food or beverages in an area not specifically designated for this
 - Apply asbestos by spraying
- Lead related work must be conducted to the requirements of the Lead regulations promulgated under the

OHS Act

Where demolition work will involve the use of explosives a method statement must be developed by a competent person in accordance with applicable explosives legislation.

(i) Tunnelling (Construction Regulation 13.)

• To be performed in accordance with the Tunnelling Regulations as published under the Mines Health & Safety Act (29 of 1996)

• No person shall enter a *tunnel that has a height dimension less than 800 mm

* Definition of Tunnelling: "the construction of any tunnel beneath the natural surface of the earth for the purpose other than the searching for or winning of a mineral

(j) Access Scaffolding (Construction Regulation 14)

Access Scaffolding must be erected, used and maintained safely in accordance with Construction Regulation 14 and SA Bureau of Standards Code of Practice, SANS 085 entitled, "The Design, Erection, and Use & Inspection of Access Scaffolding.

Detailed consideration must be given to all scaffolding to ensure that it is properly planned to meet the working requirements, designed to carry the necessary loadings and maintained in a sound condition. It must also be ensured that there is sufficient material available to erect the scaffolding properly.

Scaffolding may only be erected, altered or dismantled by a person who has adequate training and experience in this type of work or under the supervision of such a person.

(k) Suspended Platforms & Boatswains Chairs (Construction Regulation 15 & 16)

The Contractor to design, erect, use and maintain suspended platforms in accordance with the requirements of Construction Regulation 15.

Boatswains chairs are to be erected, used maintained and inspected in accordance with the requirements of Construction Regulation 16.

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(l) Batch Plants (Construction Regulation 18)

The Contractor to erect, operate and maintain Batch Plants in accordance with the requirements of Construction Regulation 18

Explosive Powered Tools (Construction Regulation 19)

Every Explosive Powered Tools (EPT) must be:

- Provided with a guard around the muzzle to confine flying fragments or particles
- A firing mechanism that will prevent the EPT from firing unless it is pushed against the surface and at right angle (where the EPT is fitted with an intermediate piston between the charge and the nail this requirement is waived)

The Contractor or user must ensure that:

- Only the correct type of cartridge is used
- The EPT is cleaned inspected and cleaned daily before use by an appointed competent person who keeps register with the findings of his inspection and the details of cleaning, service and repairs
- The safety devices are in good working order before the EPT is use
- When the EPT is not being used it is stored in an unloaded condition together with the cartridges in a safe/secure place inaccessible to unauthorised persons
- A warning notice is displayed at the point where the EPT is in use
- The issue and return of cartridges must be by issue/returns register signed by both issuer and user and empty cartridge cases must be returned with unspent cartridges
- Users/operators of the EPT have received the necessary training and has been authorised as competent to use/operate the EPT
- Users/operators must wear the prescribed PPE whilst using/operating the tool

(m) Cranes & Lifting Equipment (Construction Regulation 20)

Cranes and Lifting equipment must be designed and constructed in accordance with generally accepted technical standards and operated, used, inspected and maintained in accordance with the requirements of Driven Machinery Regulation 8 of the OHS Act:

- to be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the a table should be used by the driver/operator
- each winch on a lifting machine must at all time have, at least, three full turns of rope on the drum when the winc has been run to its lowest limit
- fitted with a brake or other device capable of holding the MML. This brake or device to automatically prevent the downward movement of the load when the lifting power is interrupted
- fitted with a load limiting device that automatically arrest the lift when
- the load reaches its highest safe position or
- when the mass of the load is greater than the MML
- every chain or rope on a lifting machine that forms an integral part of the machine must have a factor of safety as prescribed by the manufacturer of the machine and where no standard is available the factor of safety must be:
 - chains – 4 (four)
 - steel wire ropes - 5 (five)
 - fibre ropes - 10 (ten)
- every hook or load attaching device must be designed such or fitted with a device that will prevent the load from slipping off or disconnecting
- every lifting machine must be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test must be in accordance with the manufacturers prescription or to 110% of the MML
- in addition all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety

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- devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person
- all maintenance, repairs, alterations and inspection results must be recorded in a log book
- and each lifting machine must have its own log book.
- no person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by the inspector of the Department of Labour
- every jib crane with an MML of 5 000 kg or more at minimum jib radius must be provided
- with a load indicator or a load lifting limiting device

Lifting Tackle:

- to be manufactured of sound material, well-constructed and free from patent defects
- to be clearly and conspicuously marked with ID number and MML
- factor of safety:
 - Natural fibre ropes - 10(ten)
 - Man-made fibre ropes & woven webbing - 06(six)
 - Steel wire ropes – single rope - 06(six)
 - Steel wire ropes – combination slings - 08(eight)
 - Mild Steel chains - 05(five)
 - High tensile/alloy steel chains - 04(four)
- steel wire ropes must be discarded (not used any further for lifting purposes) when excessive wear and corrosion is evident and must be examined by a competent person every three months for this purpose and the results recorded.
- Operator
- Every lifting machine operator must be trained specifically for the type of lifting machine that he/she is operating
- Operators of Jib cranes with a MML of 5 00 kg or more must be in possession of a certificate of training issued by an accredited (by The Department of Labour) training provider.

Construction Regulation 20:

Where tower cranes (TC) are used:

- account must be taken of the effects of wind force on the structure
- account must be taken of the bearing capacity of the ground on which the TC is to be erected
- the bases for the TC and tracks for rail mounted TC's must be firm and level
- must be erected at a safe distance from excavations
- clear space must be provided and maintained for erection, operation, maintenance and dismantling
- TC operators must be competent to carry out the work safely
- TC operators must be in possession of a valid medical certificate testifying that the holder is physically and psychologically fit to work on a TC.

All lifting operations where the lift will exceed 2000 kg must be planned by a competent person and the plan submitted to Nkangala District Municipality for approval and permission to carry out the lift.

(n) Construction Vehicles & Mobile Plant (Construction Regulation 21)

Construction Vehicles and Mobile Plant will be inspected by Nkangala District Municipality prior to being allowed on a project site and suppliers of hired vehicles, plant and equipment will be required to comply with this specification as well as the OHS Act and Regulations.

Construction Vehicles and Mobile Plant (CV&MP) to be:

- of acceptable design and construction

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- maintained in good working order
- used in accordance with their design and intention for which they were designed
- operated/driven by trained, competent and authorised operators/ drivers. No unauthorised persons to be allowed to drive CV&MP
- Operators and drivers of CV&MP must be in possession of a valid medical certificate declaring the operator/drive physically and psychologically fit to operate or drive CV&MP
- provided with safe and suitable means of access
- fitted with adequate signaling devices to make movement safe including reversing
- Excavations and other openings must be provided with sufficient barriers to prevent CV&MP from falling into same
- provided with roll-over protection
- inspected daily before start-up by the driver/operator/user and the findings recorded in a register/log book
- CV&MP to be fitted with two head and two tail lights whilst operating under poor visibility conditions
- No loose tools, material etc. is allowed in the driver/operators compartment/cabin nor in the compartment in which any other persons are transported
- CV&MP used for transporting persons must have seats firmly secured and sufficient for the number of persons being transported

No person may ride on a CV&MP except for in a safe place provided for the purpose

The construction site must be organised to facilitate the movement of CV&MP and that pedestrians and other vehicles are not endangered. Traffic routes to be suitable, sufficient in number and adequately demarcated CV&MP left unattended after hours adjacent to roads and areas where there is traffic movement must be fitted with lights reflectors or barricades to prevent moving traffic to come into contact with the parked CV&MP.

In addition CV&MP left unattended after hours must be parked with all buckets, booms etc. full lowered, the emergency brakes engaged and, where necessary, the wheels chocked, the transmission in neutral and the motor switched off and the ignition key removed and stored safely

Workers employed adjacent or on public roads must wear reflective safety vests

All CV&MP inspection records must be kept in the OH&S File

(o) Electrical Installations (Construction Regulation 22)

The installation of temporary electricity for Construction shall be in accordance with the Construction regulation 22 and the Electrical Installation Regulations.

The Contractor must ensure that:

- existing services are located and marked before construction commences and during the progress thereof
- where the abovementioned is not possible, workers with jackhammers etc. are protected against electric shock by the use of suitable protective equipment e.g. rubber mats, insulated handles etc.
- electrical installations and -machinery are sufficiently robust to withstand working conditions on site
- temporary electrical installations must be inspected at least once per week by a competent person and a record of the inspections kept on the OH&S File
- electrical machinery used on a construction site must be inspected daily before start-up by the competent driver/operator or any other competent person and a record of the inspections kept on the OH&S File
- all temporary electrical installations must be controlled by a competent person appointed in writing

(p) Electrical & Mechanical Lock-Out

An electrical and mechanical lock-out procedure must be developed by the Principal Contractor and submitted to Nkangala District Municipality for approval before construction commences. This lock-out procedure to be adhered to by all Contractors on site

(q) Use & Storage of Flammables (Construction Regulation 23)

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The Contractor to ensure that:

- No person is required or permitted to work in a place where there is the danger of fire or an explosion due to flammable vapours being present unless adequate precautions are taken
- No flammable is used or applied e.g. in spray painting, unless in a room or cabinet or other enclosure specially designed and constructed for the purpose unless there is no danger of fire or explosion due to the application of adequate ventilation
- The workplace is effectively ventilated. Where this cannot be achieved:
 - Employees must wear suitable respiratory equipment
 - No smoking or other sources of ignition is allowed in the area
 - The area is conspicuously demarcated as “flammable”
- Flammables stored on a construction site are stored in a well-ventilated, reasonably fire-resistant container, cage or room that is kept locked with access control measures in place and sufficient fire fighting equipment installed and fire prevention methods practised e.g. proper housekeeping
- Flammables stored in a permanent flammables store are stored so that no fire or explosion is caused i.e.:
 - stored in a locked well-ventilated reasonably fire resistant container, cage or room conspicuously demarcated as “Flammable Store – No Smoking or Naked Lights”
 - the flammables store to be constructed of two-hour fire retardant walls and roof and separated from adjoining rooms or workplaces by means of a two-hour fire retardant fire wall
 - Adequate and suitable fire fighting equipment installed around the flammables store and marked with the prescribed signs
 - All electrical switches and fittings to be of a flameproof design
 - Any work done with tools in a flammables store or work areas to be of a non-sparking nature
 - No Class A combustibles such as paper, cardboard, wood, plastic, straw etc. to be stored together with Flammables
 - The flammable store to be designed and constructed to, in the event of spillage of liquids in the store, to contain the full quantity + 10% of the liquids stored
 - A sign indicating the capacity of the store to be displayed on the door
 - Only one day's quantity of Flammable is to be kept in the workplace
 - Containers (including empty containers) to be kept closed to prevent fumes/vapours from escaping and accumulating in low lying areas
 - Metal containers to be bonded to earth whilst decanting to prevent build-up of static
 - Welding and other flammable gases to be stored segregated as to type of gas and empty and full cylinders
- (r) Working on or Near Water (Construction Regulation 24)

The Principal Contractor must ensure that, where construction work is being carried out over or in close proximity to water:

- Measures are in place to prevent workers from falling into the water and drowning. These measure to include the availability of lifejackets
- Measures are in place to rescue any worker/ that has fallen into the water
- Measures for the timeous warning of flooding are in place
- (s) Housekeeping (Construction Regulation 25)

The Contractor to ensure that:

- Housekeeping is continuously implemented
- Materials & equipment are properly stored
- Scrap, waste & debris are removed regularly
- Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to free flow of pedestrian and vehicular traffic
- Waste & debris not to be removed by throwing from heights but by chute or crane
- Where practicable, Construction sites are fenced off to prevent entry of unauthorised persons

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- Catch platforms or –nets are erected over entry and exit ways or over places where persons are working to prevent them being struck by falling objects
- 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 materials
- As far as is practicable, every floor, walkway, stair, passage and gangway is kept in good state of repair, skid-free and free of obstruction, waste and materials
- The walls and roof of every indoors workplace is sound and leak-free
- Openings in floors, hatchways, stairways and open sides of floors or buildings are barricaded, fences, boarded over or provided with protection to prevent persons from falling

(t) Stacking & Storage (Construction Regulation 27)

The Contractor/Employer must ensure that:

- A competent person is appointed in writing to supervise all stacking and storage on a construction site
- Adequate storage areas are provided and demarcated
- The storage areas are kept neat and under control
- 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
- The height of any stack does not exceed 3X the base unless stepped back at least half the depth of a single container at least every fifth tier or
- The approval of an inspector has been obtained to build the stacks higher with the aid of a machine. (The operator of the machine must be protected against items falling from overhead off the stack and no items may overhang)
- The articles that make up a single tier are consistently of the same size, shape and mass
- Structures for supporting stacks are structurally sound and able to support the mass of the stack
- No articles are removed from the bottom of the stack first but from the top tier first
- Anybody climbing onto a stack can and does do it safely and that the stack is sufficiently stable to support him/her
- Stacks that are in danger of collapsing are broken down and restacked
- 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
- Stepped back at least half the depth of a single container at least every fifth tier
- Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations

(u) Storage of Flammables and Hazardous Chemicals (Hazardous Chemical Substances Regulations)

See (u) above and (v) below.

Fire Prevention and Protection

The Principal Contractor must ensure that:

- The risk of fire is avoided
- Sufficient & suitable storage of flammables is provided
- Sources of ignition is obviated wherever flammable or highly combustible material is present in the workplace e.g.:
- notices prohibiting smoking is displayed and enforced
- welding and flame cutting is only allowed under controlled conditions that includes written hot work permits
- Only spark-free hand and power tools are used
- No grinding, cutting and shaping of ferrous metals are allowed using electrically driven power tools that produces sparks
- Flameproof switches & fittings are to be used in the flammable atmosphere

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- Good housekeeping is maintained to prevent the accumulation of unnecessary combustibles
 - Adequate ventilation is maintained
 - Adequate and suitable fixed and portable fire appliances is provided and maintained in good working order.
 - Maintenance must include:
 - Regular inspection by a competent person appointed in writing and keeping a register
 - Annual inspection and service by an accredited service provider
 - All employees are instructed in the use of the Fire equipment and know how to attempt to extinguish a fire
 - A sufficient number of employees are appointed and trained to act as Emergency Team to deal with fires and other emergencies
 - Employees are informed re. Emergency evacuation procedures and escape routes
 - Emergency escape routes are kept clear at all times
 - After evacuation assembly points are demarcated
 - Evacuation is practiced to ensure that all is evacuated timeously
 - Roll-call is held after evacuation to account for all personnel and ensure that no-one has been left behind.
 - A clearly audible to all persons on site siren or alarm is fitted
- w) Eating, Changing, Washing & Toilet Facilities (Construction Regulation 28)

The following will be the minimum requirements:

Toilets

The provision of Toilets is required in terms of the National Building Regulations and Construction Regulation 28. Chemical toilets are allowed instead of the water borne sewerage type. Toilets have to be provided at a ratio of 1 toilet per 30 workers

Showers

At least cold water showers of some sort have to be provided to a ratio of 1 shower per 15 workers.

Change Rooms

Some form of screened off changing facility must be provided separately for each sex.

Eating Facility

Some form of shelter from the sun, wind and rain must be provided

Living Accommodation

Where the site is in a remote location and transport home is not readily available, reasonable and suitable living accommodation must be provided.

(x) **Personal & Other Protective Equipment (Sections 8/15/23 or the OHS Act)**

The Contractor is required to identify the hazards in the workplace and deal with them. He must either remove them or, where impracticable take steps to protect workers and make it possible for them to work safely and without risk to health under the hazardous conditions.

Personal Protective equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply Engineering and other solutions to mitigating hazardous situations before the issuing of PPE is considered.

Where it is not possible to create an absolutely safe and healthy workplace the Contractor is required to inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.

It is a further requirement that the said equipment be maintained by the Contractor, that he instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s. Employees do not have the right to refuse to use/wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment

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was prescribed but an alternative solution has to be found that may include relocating or discharging the employee. The Contractor may not charge any fee for protective equipment prescribed by him/her but may charge for equipment under the following conditions:

- Where the employee requests additional issue in excess of what is prescribed
- Where the employee has patently abused or neglected the equipment leading to early failure
- Where the employee has lost the equipment

All employees shall, as a minimum, be required to wear the following PPE on any Nkangala District Municipality projects:

- Protective overalls
- Protective footwear
- Protective headwear
- Eye/face protection

(y) Portable Electrical Tools & Equipment (Electrical Machinery Regulation 9)

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 amp. plug point and is moved around for use in the workplace i.e. drills, saws, grindstones, portable lights, etc. In addition electrical appliances such as fridges, hotplates, heaters, etc. must be inspected and maintained to the same standards as portable electrical tools and appliances.

The use, inspection and maintenance of portable electrical tools and equipment must be governed by the following:

- Regular inspections by a competent person appointed in writing
- Inspection results must be recorded in a register
- Only competent authorised persons are allowed to use portable electrical tools and equipment
- The correct protective equipment is worn/used whilst operating portable electrical tools and equipment

Portable Electrical Tools

- Must be maintained in good condition at all times to prevent an electrical shock to the user
 - The main source must incorporate an earth leakage protection device or receive power through a double wound transformer or be double insulated and clearly marked as such
 - All equipment must be fitted with a switch to allow for safe & easy starting and stopping
- Portable Lights

- Must be fitted with a robust non-hygroscopic non-conducting handle
- Live metal parts/parts which may become live must be protected against contact
- The lamp must be protected by a strong guard
- The cable lead-in must withstand rough handling
- It is suggested that a register be kept for each piece of equipment and findings of regular
- Inspections must be entered
- Inspections must concentrate on plug, cord, switch and any obvious faults
- When used in wet/damp/metal container conditions, it must be protected as for portable
- Electrical tools, above

(z) Public Health & Safety (Section 9 of the OHS Act)

The Principal Contractor will be responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes:

- Non- employees entering the site for whatever reason
- The surrounding community
- Passersby to the site

Tenderer

Witness 1

Witness 2

Employer

Witness 1

Witness 2



Appropriate signage must be posted to this effect and all employees on site must be instructed on ensuring that non-employees are protected at all times
 All non-employees entering the site must receive induction into the hazards and risks and the control measures for these.

(z) Hazardous Chemical Substances

The Contractor/Employer must ensure that:

- Employees receive the necessary information & training to be able to use and store HCS safely
- Employees obey lawful instructions regarding:
 - the wearing and use of protective equipment
 - The use and storage of HCS
 - the prevention of the release of HCS
 - the wearing of exposure monitoring and measuring equipment
 - the cleaning up and disposal of materials containing HCS
 - housekeeping, personal hygiene and the protection of the environment
- the Risk Assessments required in terms of Construction Regulation 7 include employee exposure to HCS and that the necessary to protect persons from being detrimentally affected by HCS present or used in the workplace, are taken
- suppliers provide the necessary information in the form of a Material Safety Data Sheet (MSDS) regarding an HCS required to ensure the safe use and storage of that HCS
- an up-to-date list is kept on site of HCS's stored and used together with the MSDS's of the said HCS's
- HCS containers are clearly marked as to the contents and main hazardous category e.g. "Flammable" or "Corrosive" and the reference number of the HCS on the list indicated above
- HCS e.g. Asbestos dust is not cleared by the use of compressed air but is vacuumed
- No person eats or drinks in a HCS workplace
- HCS waste is disposed of safely in terms of hazardous waste disposal requirements

(AA) Project/Site Specific Requirements

- See Annexure 3
- Annexure 1: Measuring Injury Experience
- Annexure 2: Executive SHE Risk Management Report
- Annexure 3: List of Risk Assessments

ANNEXURE 1: MEASURING INJURY EXPERIENCE

Injury experience has traditionally been measured by the use of a disabling injury frequency rate, the so-called "DIFR". The DIFR is calculated by multiplying the number of disabling injuries by 1 million and dividing by the number of man-hours worked.

Lately the DIFR has been replaced internationally with a DIIR: disabling injury incidence rate. The only difference between the two rates are that the 10 million in the calculation is replaced with 200 000. (200 000 purported to be the number of hours and average person works in a lifetime.)

The use of the two rates above has proved to be somewhat problematical as they are open to manipulation and disabling injuries are often "hidden" by returning the injured employee to the workplace so as not to lose a shift and therefore having to register a disabling injury.

The Construction Industry recently decided to promote the use of a new frequency rate based on the number of compensation injury claims as these are more difficult to hide or manipulate because the reporting of compensable injuries is a legal requirement.

The industry is hoping that adoption of this new measurement of injury experience will enable the industry to monitor itself as far as work related injuries are concerned.

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Below follows an explanation of this new rating system.

COMPENSATION INCIDENCE FREQUENCY RATE (CIFR) FORMULA

No. of Compensation Claims X 200 000

*220 man hours X No. of Employees

DEFINITIONS

No. of Compensation

Claims: The number of claims lodged with the COID insurer for the period under review

200 000: The fixed factor to align the rate with other rates used internationally

Man-hours Worked

Include: * Hourly Paid Employees

* Sub-contractors (No. of Employees X *220 each)

* Staff (No. of Employees X *220 hours each)

220 man-hours: The *average number of hours worked by one employee in one month in the Construction industry.

* Overtime, absence on leave or sick leave, unrecorded after hours time worked by senior and middle management factored into this average.

No. of Employees: The actual or average number of employees employed for the period under review.

2002/03CIFRSystem

ANNEXURE 2: EXECUTIVE SHE RISK MANAGEMENT REPORT

The SAFCEC OH&S committee recently developed the following report in an attempt to standardise on reporting and assist contractors in obtaining a clear picture of their SHE Risk Management performance. It is hoped that clients will also accept this standardised report. Your comments/suggestions for improvement is invited.

EXAMPLE ONLY: ALL INFORMATION IS FICTITIOUS

XYZ construction

*SHE RISK MANAGEMENT REPORT

PERIOD JANUARY TO MARCH 2002

*(SHE = Safety, Health & Environment)

1. Introduction

We hope that this new format of quarterly SHE Risk Management reporting will provide a clear picture of the company's performance as far as occupational health & safety is concerned.

The first quarter of 2002 generally reflected an improvement in injury experience and shows a decline in the number of injuries. Although Building was the only division where there was an increase in compensation claims, figures are still well down from the average 2001 figures. A sub-contractor experienced one fatality.

All divisions are eagerly awaiting the final implementation in May of the new electronic SHE Management system that will make the tools to implement the SHE programme available to all management and supervisory staff.

2. Incident Statistics

Compensation Incident Frequency Rate (CIFR)

CIFR = $\frac{\text{Total No. of Claims against the Workmen's Compensation Fund X 200 000}}{\text{Man-hours worked}}$

2.

2. Disabling Injury Incidence Rate (DIIR)

DIIR = $\frac{\text{No. Disabling Injuries X 200 000}}{\text{Man-hours worked}}$

2.3. Other Major Incidents

Three other major incidents were experienced in the period under review:

2.3.1. A major trench collapsed at Job. 00123: XYZ Head Office, Bochum: No personnel injured, extensive damage to foundations: 3 days delay.

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Witness 1

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2.3.2. A concrete dumper ran away when its brakes failed. It smashed into the glass façade of the building on Job 00332: McDonalds, Polokwane. The driver jumped off and was not injured. Cost of damage to façade: R45 000.

2.3.3. A storage hut on Job 00567: BP Petrol Station, Swartruggens was demolished by fire when the night watchman made a fire inside the storage hut which contained concrete vibrators and levelling machines. Cost of replacing the hut and machines: R30 000

3. RISK AREAS

The following items of concern need priority consideration by management:

- 3.1. New employees must undergo pre-employment medical examinations to:
 - protect XYZ from claims at a later stage
 - ensure that only healthy persons are employed
 - prevent injuries and illness in the workplace
 - enhance XYZ image
- 1.2. Vehicle drivers and plant operators must be instructed to inspect their vehicles daily before start-up using the prescribed checklists to ensure that these are safe to operate and in good condition.

4. AUDITS

Three SHE audits were conducted in February and March:

4.1.	Job 00432:	Gillooly's Mall	Compliance: 56 %(*)
	Job 00786:	Cullinan Head Office	Compliance: 83 %(***)
	Job 00589:	Cleveland Station	Compliance: 76 %(***)

5. TRAINING

One hundred and forty two employees, representing 7% of employees, attended nine training courses. *Our objective is to train 5, 5% of employees quarterly.

Month	No. of Employees Trained	Course Source
January	26	
15		
3		Induction
		OH&S Reps
		Crane Drivers Internal
		Consultant
		External
February	23	
17		Induction
		OH&S Reps Internal
		Consultant
March	43	
9		
3		
3		Induction
		OH&S Reps
		Bomag Rollers
		First Aiders Internal
		Consultant
		Supplier
		St. John's

6. LEGAL ISSUES

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Witness 1

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6.1. An inspector of the Department of Labour issued an improvement notice on Job 00987: Gillooly's Mall. The notice requires that all scaffolding comply with the SABS standards for the Erection and Maintenance of Access Scaffolding (SABS 085). This is currently being attended to and the inspector will return on 15 April 2002 to ascertain if the notice has been complied with.

8. OCCUPATIONAL AND OTHER HEALTH MATTERS

8.1. HIV Aids

The proposed SAFCEC clinic will soon be operational and we will then be able to send our employees who have tested positive to the clinic for counselling and eventual treatment when necessary
 The mobile clinic saw and tested fifty employee volunteers at 3 sites this month. Eighteen of them tested positive.

8.2. Tuberculosis

The mobile clinic will be calling at Gillooly's Mall and Cleveland Station on 15 and 16 October respectively to screen employees for TB.

8.3. Noise

All suspected noise pollution areas have been tested and the results are awaited. Employees working in areas testing over 85dBa will be issued with suitable hearing protectors.

9. ENVIRONMENTAL MEASURES

Inspectors from the Botswana Department of the Environment visited Djwaneng and inspected the site and yard. They gave it a "clean bill of health" and advised that we should increase the dust control measures by spraying roads three times per day instead of the present twice per day.

ANNEXURE 3: LIST OF RISK ASSESSMENTS

- * Clearing & Grubbing of the Area/Site
- * Site Establishment including:
 - Office/s
 - Secure/safe storage for materials, plant & equipment
 - Ablutions
 - Sheltered eating area
 - Maintenance workshop
 - Vehicle access to the site
- * Dealing with existing structures
- * Location of existing services
- * Installation and maintenance of temporary construction electrical supply, lighting and equipment
- * Adjacent land uses/surrounding property exposures
- * Boundary and access control/Public Liability Exposures (NB: the Employer is also responsible for the OH&S of non-employees affected by his/her work activities.)
- * Health risks arising from neighbouring as well as own activities and from the environment e.g. threats by dogs, bees, snakes, lightning etc.
- * Exposure to noise
- * Exposure to vibration
- * Protection against dehydration and heat exhaustion
- * Protection from wet & cold conditions
- * Dealing with HIV/Aids and other diseases
- * Use of Portable Electrical Equipment including
 - Angle grinder
 - Electrical drilling machine
 - Skill saw
- * Excavations including
 - Ground/soil conditions

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Witness 2

Employer

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- Trenching
- Shoring
- Drainage of trench
- * Welding including
- Arc Welding
- Gas welding
- Flame cutting
- Use of LP gas torches and appliances
- * Loading & offloading of trucks
- * Aggregate/sand and other materials delivery
- * Manual and mechanical handling
- * Lifting and lowering operations
- * Driving & operation of construction vehicles and mobile plant including
- Trenching machine
- Excavator
- Bomag roller
- Plate compactor
- Front end loader
- Mobile cranes and the ancillary lifting tackle
- Parking of vehicles & mobile plant
- Towing of vehicles & mobile plant
- * Use and storage of flammable liquids and other hazardous substances
- * Layering and bedding
- * Installation of pipes in trenches
- * Pressure testing of pipelines
- * Backfilling of trenches
- * Protection against flooding
- * Gabion work
- * Use of explosives
- * Protection from overhead power lines
- * As discovered by the Principal Contractor's hazard identification exercise
- * As discovered from any inspections and audits conducted by the Client or by the Principal Contractor or any other Contractor on site
- * As discovered from any accident/incident investigation.

C3.4.3.2 ENVIRONMENTAL MANAGEMENT PLAN

CONTENTS

C3.4.3.2.1	SCOPE
C3.4.3.2.2	DEFINITIONS
C3.4.3.2.3	IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS
C3.4.3.2.4	LEGAL REQUIREMENTS
C3.4.3.2.5	ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS
C3.4.3.2.6	TRAINING
C3.4.3.2.7	ACTIVITIES/ASPECTS CAUSING IMPACTS
C3.4.3.2.8	ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES
C3.4.3.2.9	RECORD KEEPING
C3.4.3.2.10	COMPLIANCE AND PENALTIES
C3.4.3.2.11	MEASUREMENT AND PAYMENT

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C3.4.3.2.1. SCOPE

This environmental management programme (EMP) sets out the methods by which proper environmental controls are to be implemented by the contractor. The duration over which the contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the General Conditions of Contract, and the project specifications, as the defects notification period (maintenance period).

The provisions of this EMP are binding on the contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract. In the event that any conflict occurs between the terms of the EMP and the project specifications or Record of Decision, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the Roads Agency Limpopo in writing for approval.

The EMP identifies the following:

Construction activities that will impact on the environment.

Specifications with which the contractor shall comply in order to protect the environment from the identified impacts.

Actions that shall be taken in the event of non-compliance.

C3.4.3.2.2. DEFINITIONS

Alien Vegetation: alien vegetation is defined as undesirable plant growth which shall include, but not be limited to, all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Construction Activity: a construction activity is any action taken by the contractor, his subcontractors, suppliers or personnel during the construction process as defined in the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7, 1998)

Environment: environment means the surroundings within which humans exist and that could be made up of -

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

Environmental Aspect: an environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.

Environmental Impact: an impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Record of Decision: a record of decision is a written statement from the Limpopo Department of Economic Development, Environment and Tourism that records its approval of a planned undertaking to improve, upgrade or rehabilitate a section of road and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Road Reserve: the road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Road Width: for the purposes of the EMP, the road width is defined as the area within the road reserve i.e. fence line to fence line, but also includes all areas beyond the road reserve that are affected by the continuous presence of the road, e.g. a reach of a water course.

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C3.4.3.2.3. IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS

The contractor shall identify likely aspects before commencing with any construction activity. Examples of environment aspects include:

- waste generation
- stormwater discharge
- emission of pollutants into the atmosphere
- chemical use operations
- energy use operations
- water use operations
- use of natural resources
- noise generation

Thereafter the contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impact from happening. If prevention is not practicable, or in the event of mishap or misapplication, the contractor shall provide plans and measures for the Employer's Agent's approval, which will limit and contain the magnitude, duration and intensity of the impact. The contractor shall demonstrate that he/she is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce an approved construction programme according to subclause 8.

Listed below are some environmental impacts that could adversely alter an aspect of the environment through usual construction activities:

- Pollution of atmosphere, soil or water
- Destruction or removal of fauna and flora and effect on biological diversity
- Deformation of the landscape
- Soil erosion
- Destruction of historical/heritage sites
- Effect on the built environment
- Effect on agricultural land and wetlands

General good construction practice will play an important role in avoiding the occurrence of an Impact. The contractor's attention is drawn, in this regard, to C1008. Environmental Management of Construction Activities

C3.4.3.2.4. LEGAL REQUIREMENTS

a) General

Construction will be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project.

In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

b) Statutory and other applicable legislation

The contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

C3.4.3.2.5. ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS

a) Appointment of a Designated Environmental Officer (DEO)

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For the purposes of implementing the conditions contained herein, the contractor shall submit to the Employer's Agent for approval the appointment of a nominated representative of the contractor as the DEO for the contract. The request shall be given, in writing, at least fourteen days before the start of any work clearly setting out reasons for the nomination, and with sufficient detail to enable the Employer's Agent to make a decision. The Employer's Agent will, within seven days of receiving the request, approve, reject or call for more information on the nomination. Once a nominated representative of the contractor has been approved he/she shall be the DEO and shall be the responsible person for ensuring that the provisions of the EMP are complied with during the life of the contract. The Employer's Agent will be responsible for issuing instructions to the contractor where environmental considerations call for action to be taken. The DEO shall submit regular written reports to the Employer's Agent, but not less frequently than once a month.

The Employer's Agent shall have the authority to instruct the contractor to replace the DEO if, in the Employer's Agent's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMP or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required. There shall be an approved DEO on the site at all times.

b) Administration

Before the contractor begins each construction activity the DEO shall give to the Employer's Agent a written statement setting out the following:

- The type of construction activity. Locality where the activity will take place.
- Identification of the environmental aspects and impacts that might result from the activity.
- Methodology for impact prevention for each activity or aspect. Methodology for impact containment for each activity or aspect. Emergency/disaster incident and reaction procedures. Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the Employer's Agent whenever there is a change or variation to the original.

The Employer's Agent may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

c) Good Housekeeping

The Contractor shall undertake "good housekeeping" practices during construction as stated in clause 11.11 of the General Conditions of Contract. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

C3.4.3.2.6. TRAINING

The designated environmental officer (DEO) must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;

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Witness 2

Employer

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- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.

In the case of permanent staff the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the Employer's Agent when and how he/she intends concluding his environmental training obligations.

C3.4.3.2.7. ACTIVITIES/ASPECTS CAUSING IMPACTS

A list of possible causes of environmental impacts that occur during construction activities is given in Table 7/1: Aspects or Activities that Cause Environmental Impacts during Construction Activities, which is to be found at the end of this part. This list is not exhaustive, and shall be used for guideline purposes only.

C3.4.3.2.8 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

a) Site Establishment

i. Site Plan

The contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the contractor shall submit to the Employer's Agent for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place. The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course as possible.

Regardless of the chosen site, the contractor's intended mitigation measures shall be indicated on the plan. The site plan shall be submitted not later than the first site meeting. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the Employer's Agent for consultation during rehabilitation of the site.

ii. Vegetation

The contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the Employer's Agent. Only trees and shrubs directly affected by the works, and such others as may be indicated by the Employer's Agent in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring shall be re-established.

The project specification for the rehabilitation of the grass cover shall be strictly adhered to. Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding. Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

iii. Rehabilitation

The area where the site offices were erected will require rehabilitation at the end of the contract. All construction material, including concrete slabs and braai areas shall be removed from the site on completion of the contract.

iv. Water for human consumption

Water for human consumption shall be available at the site offices and at other convenient locations on site.

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All effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams etc). Only domestic type wastewater shall be allowed to enter this drain.

v. Heating and cooking fuel

The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

b) Sewage treatment

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of project management, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are supplied and maintained by a subcontractor. The type of sewage treatment will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets.

Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the Employer's Agent.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the Employer's Agent.

c) Waste Management

The contractor's intended methods for waste management and waste minimisation shall be implemented at the outset of the contract. All personnel shall be instructed to dispose of all waste in the proper manner.

i. Solid Waste

Solid waste shall be stored in an appointed area in covered, tip proof metal drums for collection and disposal. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the Employer's Agent. Disposal of solid waste shall be at a Department of Water Affairs and Forestry (DWAF) licensed landfill site or at a site approved by DWAF in the event that an existing operating landfill site is not within reasonable distance from the site offices and staff accommodation. No waste shall be burned or buried at or near the site offices, or anywhere else on the site, including the approved solid waste disposal site.

ii. Litter

No littering by construction workers shall be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter.

Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites.

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Employer

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iii. Hazardous waste

Hazardous waste such as bitumen, tar, oils etc. shall be disposed of in a Department of Water Affairs and Forestry approved landfill site. Special care shall be taken to avoid spillage of tar or bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.

Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant. Any spillage of tar or bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the Employer's Agent.

d) Control at the workshop

The contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop).

i) Safety

All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the contractor to, and used or worn by, the staff whose duty it is to manage and maintain the contractor's and his subcontractor's and supplier's plant, machinery and equipment.

ii) Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials e.g. tar or bitumen binders shall be stored in a secured, appointed area that is fenced and has restricted entry. Storage of tar or bituminous products shall only take place using suitable containers to the approval of the Employer's Agent.

The contractor shall provide proof to the Employer's Agent that relevant authorisation to store such substances has been obtained from the relevant authority.

In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the contractor shall furnish the Employer's Agent with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage.

The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

iii) Fuel and Gas Storage

Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.

iv) Oil and Lubricant Waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.

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All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

e) Clearing the Site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the Employer's Agent for his approval.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the Employer's Agent for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the road reserve, or at designated or instructed areas outside the road reserve. This responsibility shall extend until expiry of the defects notification period.

f) Soil Management

i) Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include the storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved Department of Water Affairs and Forestry waste disposal site.

The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water. Stockpiles of topsoil shall not exceed a height of 2m, and if they are to be left for longer than 6 months, shall be analysed, and if necessary, upgraded before replacement. Stockpiles shall be protected against infestation by weeds.

The contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be topsoiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns.

The contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the Employer's Agent. The contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

ii) Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the Employer's Agent, and stored separately from the topsoil if not used for road building. This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.

g) Drainage

Tenderer

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The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and 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 or tar products.

The contractor shall submit to the Employer's Agent his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions.

h) Earthworks and Layer works

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the contractor shall have complied with the requirements of sections C1008 (e) and C1008 (g). In addition, the contractor shall take cognisance of the requirements set out below.

i) Quarries and borrow pits

The contractor's attention is drawn to the requirement of the Department of Minerals and Energy that before entry into any quarry or borrow pit, an EMP for the establishment, operation and closure of the quarry or borrow pit shall have been approved by the Department.

It is the responsibility of the contractor to ensure that he is in possession of the approved EMP or a copy thereof, prior to entry into the quarry or borrow pit. The conditions imposed by the relevant EMP are legally binding on the contractor and may be more extensive and explicit than the requirements of this specification.

In the event of any conflict occurring between the requirements of the specific EMP and these specifications the former shall apply. The cost of complying with the requirements shall be deemed to be included in existing rates in the Bill of Quantities.

ii) Excavation, hauling and placement

The contractor shall provide the Employer's Agent with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated.

Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.

iii) Spoil sites

The contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered.

Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the Employer's Agent for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the Employer's Agent. No spoil site shall be located within 500m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

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The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority.

The same shall apply for the disposal of solid waste generated from the various camp establishments. The Employer's Agent will assist the contractor in obtaining the necessary approval if requested by the contractor.

Spoil sites will be shaped to fit the natural topography. These sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Slopes shall not exceed a vertical: horizontal ratio of 1:3. Only under exceptional circumstances will approval be given to exceed this ratio. Appropriate grassing measures to minimise soil erosion shall be undertaken by the contractor. This will include both strip and full sodding.

The contractor may motivate to the Employer's Agent for other acceptable stabilising methods. The Employer's Agent may only approve a completed spoil site at the end of the defects notification period upon receipt from the contractor of a landowner's clearance notice and an Employer's Agent's certificate certifying slope stability.

The contractor's costs incurred in obtaining the necessary certification for opening and closing of spoil sites shall be deemed to be included in the Tendered rates for spoiling.

iv) Stockpiles

The contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Employer's Agent for his approval, together with the contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the contractor shall at all times ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and
- Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the contractor's cost until clearance from the Employer's Agent and the relevant Authority is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the Employer's Agent within the road reserve, shall be subject to the same condition as other stockpiled materials.

Excess materials from windrows, in-situ milling or any detritus of material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract drawing or under instruction from the Employer's Agent

In all cases, the Employer's Agent shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been satisfactorily rehabilitated.

v) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives. In addition, the contractor shall, prior to any drilling of holes in preparation for blasting, supply the Employer's Agent with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock.

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The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc.

The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard. The contractor shall also indicate to the Employer's Agent the manner in which he intends to advertise to the adjacent communities and/or road users the times and delays to be expected for each individual blast.

i) Batching sites

Asphalt plants are considered scheduled processes listed in the second schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be considered on site, the contractor shall be responsible to obtain the necessary permit from the Department of Environmental Affairs and Tourism, regardless of where they are sited.

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the Department of Minerals and Energy legislation as well as the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project.

In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section C1008(h)(iii), with the exception that the contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The Employer's Agent will assist the contractor in his submissions to the relevant authority.

Effluent from concrete batch plants and crusher plants shall be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the Employer's Agent for approval.

The contractor shall invite the relevant department to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter, not exceeding 12 months apart

j) Spillages

Streams, rivers and dams shall 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 tar or bituminous products. In the event of a spillage, the contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill treatment lies with the contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her DEO or to the Employer's Agent.

The Designated Environmental Officer will assess the situation in consultation with the Employer's Agent and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the DEO and the Employer's Agent. Areas cleared of hazardous waste shall be re-vegetated according to the Employer's Agent's instructions

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Employer's Agent.

The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input.

k) Areas of Specific Importance

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Any area, as determined and identified within the project document as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the approved EMP. The contractor may offer alternative solutions to the Employer's Agent in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection shall not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall require ad hoc treatment.

i) Archaeological Sites

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Employer's Agent of such discovery. The South African Heritage Research Agency (SAHRA) is to be contacted who will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist.

ii) Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the Employer's Agent informed of the discovery. The South African Heritage Research Agency (SAHRA) should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The employer will be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

l) Noise Control

The contractor shall keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during daylight hours. Compliance with the appropriate legislation with respect to noise shall be mandatory. Should noise generating activities have to occur at night the people in the vicinity of the drilling shall be warned about the noise well in advance and the activities kept to a minimum.

m) Dust Control

Dust caused by strong winds shall be controlled by means of water spray vehicles. Dust omission from batching plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant office of the Department of Minerals and Energy.

n) Alien Vegetation

The contractor shall be held responsible for the removal of alien vegetation within the road reserve disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily or otherwise within the road reserve. This responsibility shall extend for the duration of the defects notification period.

C3.4.3.2.9. RECORD KEEPING

The Employer's Agent and the DEO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the Employer's Agent shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The DEO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the Employer's Agent in the monthly report.

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Copies of any record of decision or EMP's for specific borrow pits or quarries used on the project shall be kept on site and made available for inspection by visiting officials from the employer or relevant environmental departments.

C3.4.3.2.10. COMPLIANCE AND PENALTIES

The contractor shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings. Any avoidable non-compliance with the above-mentioned measures shall be considered sufficient ground for the imposition of a penalty

THE FOLLOWING PENALTIES SHALL APPLY FOR ENVIRONMENTAL VIOLATIONS:

- A) UNNECESSARY REMOVAL OR DAMAGE TO TREES**
- 2600MM GIRTH OR LESS : R 5 000 PER TREE
 - GREATER THAN 2600MM, BUT LESS THAN 6180MM GIRTH : R10 000 PER TREE
 - GREATER THAN 6180MM GIRTH : R30 000 PER TREE

B) SERIOUS VIOLATIONS:

- Hazardous chemical/oil spill and/or dumping in non-approved sites. : R10 000 per incident
- General damage to sensitive environments. : R 5 000 per incident
- Damage to cultural and historical sites. : R 5 000 per incident
- Uncontrolled/unmanaged erosion (plus rehabilitation at contractor's cost). : R 1 000 to R5 000 per incident
- Unauthorised blasting activities. : R 5 000 per incident
- Pollution of water sources. : R10 000 per incident

The Employer's Agent's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final.

C) LESS SERIOUS VIOLATIONS:

- Littering on site. : R1 000 per incident
- Lighting of illegal fires on site. : R1 000 per incident
- Persistent or un-repaired fuel and oil leaks. : R1 000 per incident
- Excess dust or excess noise emanating from site: R1 000 per incident
- Dumping of milled material in side drains or on grassed areas: R1 000 per incident
- Possession or use of intoxicating substances on site: R 500 per incident
- Any vehicles being driven in excess of designated speed limits: R 500 per incident
- Removal and/or damage to flora or cultural or Heritage objects on site, and/or killing of wildlife : R2 000 per incident
- Illegal hunting. : R2 000 per incident
- Urination and defecation anywhere except in designated areas. : R 500 per incident

The Employer's Agent's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final. The calculation shall include allied construction activities in the same way as the calculation of reduced payments under section 8200. The imposition of such a penalty shall not preclude the relevant provincial or national authority from applying an additional penalty in accordance with its statutory powers. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

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Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

C3.4.3.2.11. MEASUREMENT AND PAYMENT

“The cost of complying with this specification shall be deemed to be included in the rates tendered for this contract.”

Item	Unit
C100.01	Penalty for unnecessary removal or damage to trees for the following diameter sizes
(a)	2600mm girth or less number (No)
(b)	Greater than 2600mm, but less than 6180mm girth number (No)
(c)	Greater than 6180mm girth number (No)

The unit of measurement shall be the number of trees by diameter size removed unnecessary or damaged. The penalty rates applied shall be those stated in clause C3.5.2.10.

Item	Unit
C100.02	Penalty for serious violations
(a)	Hazardous chemical/oil spill and/or dumping in non-approved sites number (No)
(b)	General damage to sensitive environments number (No)
(c)	Damage to cultural and historical sites number (No)
(d)	Pollution of water sources number (No)
(e)	Unauthorised blasting activities number (No)
(f)	Uncontrolled/unmanaged erosion per incident, depending on environment impacts, plus rehabilitation at contractor’s cost) number (No)

The unit of measurement for C100.02 (a) to (f) shall be the number of serious violation incidents. The penalty rates to be applied shall be those stated in clause C3.5.2.10.

Item	Unit
C100.03	Penalty for less serious violations
•	Littering on site number (No)
•	Lighting of illegal fires on site number (No)
•	Persistent or un-repaired fuel and oil leaks number (No)
•	Excess dust or excess noise emanating from site number (No)
•	Dumping of milled material in side drains or on grassed areas number (No)
•	Possession or use of intoxicating substances on site number (No)
•	Any vehicles being driven in excess of designated speed limits number (No)
•	Removal and/or damage to flora or cultural or heritage objects on site, and/or killing of wildlife number (No)
•	Illegal hunting number (No)
•	Urination and defecation anywhere except in designated areas number (No)

The unit of measurement shall be the number of less serious violation incidents. The penalty rates applied shall be those stated in clause C3.5.2.10.

The Employer’s Agent’s decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final. The calculation shall include allied construction activities in the same way as the calculation of reduced payments under section 8200. The imposition of such a penalty shall not preclude the relevant provincial or national authority from applying an additional penalty in accordance with its statutory powers. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

Table 1: Mechanisms that Cause Environmental Impacts during Construction Activities

Tenderer *Witness 1* *Witness 2* *Employer* *Witness 1* *Witness 2*



CONTENTS ENVIRONMENTAL IMPACTS

POLLUTION TYPE	DEFORMATION OF LANDSCAPE	SOIL EROSION/ALIEN	VEGETATION
SENSITIVE AREAS			
(To be completed by compiler)			
Camp Establishment	Waste treatment		
Hazardous waste			
Water supply			
Spillage			
Storage	Selection of site		
Preserve indigenous vegetation			
Preserve topsoil	Selection of site		
Preserve indigenous vegetation			
Preserve topsoil	Preserve indigenous vegetation		
Preserve topsoil			
Management of weeds			
Housing, Offices and laboratories	Waste treatment		
Hazardous waste			
Water supply			
Spillage			
Storage			
Noise/lights	Selection of site		
Preserve indigenous vegetation			
Preserve topsoil			
Demarcate sensitive areas	Selection of site		
Preserve indigenous vegetation			
Preserve topsoil			
	Preserve indigenous vegetation		
Preserve topsoil			
Management of weeds			
Accommodation of Traffic	Waste treatment		
Hazardous waste			
Water supply			
Spillage			
Storage			
Noise/lights			
Dust control	Selection of site		
Preserve indigenous vegetation			
Preserve topsoil			
Demarcate sensitive areas			
Maintenance of windrows	Selection of site		
Preserve indigenous vegetation			
Preserve topsoil			
	Preserve indigenous vegetation		
Preserve topsoil			
Management of weeds			
Overhaul	Spillage		
Storage			
Noise/lights			
Dust control			
Exhaust fumes			
Washing waste			
	Turning circles		

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Parking areas Restrict access to sensitive areas Protection of indigenous vegetation
Preserve topsoil
Clearing and grubbing Waste treatment
Hazardous waste
Water supply
Noise /lights
Dust control Selection of site
Preserve indigenous vegetation
Preserve topsoil Selection of site
Preserve indigenous vegetation
Preserve topsoil Protection of indigenous vegetation
Preserve topsoil
Drainage Waste treatment
Hazardous waste
Water supply
Spillage
Storage Selection of site
Preserve indigenous vegetation
Preserve topsoil Selection of site
Preserve indigenous vegetation
Preserve topsoil Preserve indigenous vegetation
Preserve topsoil
Management of weeds
Borrow pits Waste treatment
Hazardous waste
Water supply
Spillage
Storage Selection of site
Preserve indigenous vegetation
Preserve topsoil Selection of site
Preserve indigenous vegetation
Preserve topsoil Preserve indigenous vegetation
Preserve topsoil
Management of weeds
Stockpiling Waste treatment
Hazardous waste
Water supply
Spillage
Storage Selection of site
Preserve indigenous vegetation
Preserve topsoil Selection of site
Preserve indigenous vegetation
Preserve topsoil Preserve indigenous vegetation
Preserve topsoil
Management of weeds
Mass Earthworks Waste treatment
Hazardous waste
Water supply
Spillage
Storage Selection of site
Preserve indigenous vegetation
Preserve topsoil Selection of site

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Preserve indigenous vegetation
 Preserve topsoil Preserve indigenous vegetation
 Preserve topsoil
 Management of weeds
 Pavement layers Waste treatment
 Hazardous waste
 Water supply
 Spillage
 Storage
 Noise / lights
 Dust control Selection of site
 Preserve indigenous vegetation
 Preserve topsoil
 Demarcate sensitive areas
 Maintenance of windrows Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Preserve indigenous vegetation
 Preserve topsoil
 Management of weeds
 Asphalt works / sealing operations Waste treatment
 Hazardous waste
 Water supply
 Spillage
 Storage
 Noise / lights
 Dust control
 Smoke control
 Storage of materials Selection of site
 Preserve indigenous vegetation
 Preserve topsoil
 Turning circles
 Parking areas Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Preserve indigenous vegetation
 Preserve topsoil

 Ancillary roadworks Waste treatment
 Hazardous waste
 Water supply
 Spillage
 Storage Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Preserve indigenous vegetation
 Preserve topsoil
 Management of weeds
 Structures Waste treatment
 Hazardous waste
 Water supply
 Spillage
 Storage Selection of site

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Preserve indigenous vegetation
 Preserve topsoil Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Preserve indigenous vegetation
 Preserve topsoil
 Management of weeds
 Concrete pavements etc Waste treatment
 Hazardous waste
 Water supply
 Spillage
 Storage Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Selection of site
 Preserve indigenous vegetation
 Preserve topsoil Preserve indigenous vegetation
 Preserve topsoil
 Management of weeds

C3.4.3.3 PROVISION OF STRUCTURED TRAINING

CONTENTS

- C3.4.3.3.1 SCOPE**
- C3.4.3.3.2 GENERIC TRAINING**
- C3.4.3.3.3 ENTREPRENEURIAL SKILLS TRAINING**
- C3.4.3.3.4 MEASUREMENT AND PAYMENT**

C3.4.3.3 PROVISION OF STRUCTURED TRAINING

C3.4.3.3.1 SCOPE

This specification covers the requirements for the provision of structured training to be arranged by the contractor over the period of this contract.

C3.4.3.3.2 GENERIC TRAINING

C3.4.3.3.2.1 The contractor shall, from the commencement of the contract, implement a structured progressive training programme.

C3.4.3.3.2.2 The generic training will inter alia comprise, but not be limited to the following subjects:

COURSE DESCRIPTION	ESTIMATED No. OF TRAINEES	ESTIMATED DURATION (DAYS)
1 ROAD SAFETY FOR CONSTRUCTION WORKERS	
2 FLAGMEN	
3 CONCRETE HANDLING, PLACING AND FINISHING	
4 GUARDRAILS	
5 BITUMINOUS ROAD SURFACING	

C3.4.3.3.2.3 Training shall be at or by an approved accredited organisation and shall be delivered by suitably qualified and experienced trainers.

C3.4.3.3.2.4 The tenderer shall provide with his tender full details of the structured training programme he intends to implement, which details shall include the following:

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- (a) The name of the training institution and programme
- (b) The manner in which the training is to be delivered.
- (c) The numbers and details of the trainers

Such details shall be entered on or attached to Form RDP 6 (E) included herein.

C3.4.3.3.2.5 The contractor shall be responsible for the provision of everything necessary for the delivery of the generic training programme, including the following:

- (a) A suitable venue with sufficient furniture, lighting and power.
- (b) All necessary stationery consumables and study material
- (c) Transport of the students (as necessary)

C3.4.3.3.2.6 Generic training courses shall commence within one month of possession of site and be completed before the end of the contract period.

C3.4.3.3.2.7 The contractor's training programme shall be subject to the approval of the Employer's Agent, and the contractor shall if so instructed by the Employer's Agent alter or amend the programme and course content if a need is identified once the contract commences.

C3.4.3.3.2.8 The contractor shall keep comprehensive records of the training given to each student and whenever required shall provide copies of such records to the Employer's Agent. At the successful completion of each course each student shall be issued with a certificate indicating the course contents as proof of attendance and completion.

In addition to the above, a monthly return shall be submitted by the contractor. An example of the form is illustrated in Part C5 of this document (form RDP 10 (E))

C3.4.3.3.3 ENTREPRENEURIAL SKILLS TRAINING

C3.4.3.3.3.1 Small contractors, subcontractors and the Project Steering Committee (PSC) will be entitled to receive a structured training programme, which will comprise both management skills as well as business development skills.

C3.4.3.3.3.2 The contractor shall closely monitor the performance of all small subcontractors in the execution of their contracts and shall identify all such subcontractors who, in his opinion, display the potential to benefit from structured training as may be provided for in the contract and where required by the Employer's Agent, shall make recommendations in this regard. The final list of candidates will be decided between the contractor and the Employer's Agent.

C3.4.3.3.3.3 The training will be delivered by trainers who are accredited by the Civil Engineering Training Scheme (CEITS) or other institutions recognised by the Department of Labour. Accredited training refers to both the trainers as well as to the training material.

C3.4.3.3.3.4 The contractor shall facilitate in the delivery thereof, by instructing and motivating the subcontractor regarding attendance and participation therein.

C3.4.3.3.3.5 The contractor shall further make all reasonable efforts to co-ordinate the programming of the subcontractor's work with that of the delivery of the structured training.

C3.4.3.3.3.6 The structured training will comprise out of the following as decided by the Employer:

COURSE DESCRIPTION	ESTIMATED DURATION (DAYS)
1. BASIC BUSINESS PRINCIPLES	To be determined
2. BASIC SUPERVISION	To be determined
3. RUNNING A BUSINESS	To be determined
4. LEGAL PRINCIPLES	To be determined
5. ACHIEVING STANDARDS	To be determined

C3.4.3.3.3.7 The contractor shall provide with his tender, full details of the structured training programme, which he intends to implement, which details shall include the following:

- (a) The name of the training institution and programme
- (b) The various aspects of each type of training comprised in the programme
- (c) The manner in which the training is to be delivered
- (d) The numbers and details of the trainers to be utilised.

Tenderer

Witness 1

Witness 2

Employer

Witness 1

Witness 2



Such details of the proposed entrepreneurial training programme shall be entered on or attached to form RDP 7 (E) of the forms to be completed by the tenderer.

C3.4.3.3.3.8 The contractor shall be responsible for the provision of everything necessary for the delivery of the entrepreneurial training programme, including the following:

- (a) A suitably furnished venue (if required) with lighting and power.
- (b) All necessary consumables, stationery and study material
- (c) Transport of the subcontractors (as necessary)

C3.4.3.3.3.9 All entrepreneurial training shall take place within normal working hours.

C3.4.3.3.3.10 The contractor's training programme shall be subject to the approval of the Employer's Agent, and the contractor shall if so instructed by the Employer's Agent alter or amend the programme and course content if a need is identified once the contract commences.

C3.4.3.3.3.11 The contractor shall keep comprehensive records of the training given to each subcontractor and whenever required shall provide copies of such records to the Employer's Agent. At the successful completion of each course each subcontractor shall be issued with a certificate indicating the course contents as proof of attendance and completion.

In addition to the above, a monthly return shall be submitted by the contractor. An example of the form to be used is illustrated in Part C5 of this document, (form RDP 11 (E)).

C3.4.3.3.4 MEASUREMENT AND PAYMENT

ITEM	UNIT
Provision for accredited training	
(a) Generic skills	Provisional sum
(b) Entrepreneurial skills	Provisional sum
(c) Handling cost and profit in respect of sub-item (a) and (b) above	Percentage (%)
(d) Training venue (only if required)	lump sum

The prime cost sums are provided to cover the actual costs (including wages) for attendance of accredited training courses as agreed with the Employer's Agent and shall be expended in accordance with the provisions of sub-clause 10.1.2 of the general conditions of contract. The tendered percentage in sub-item E4.1(c) is a percentage of the amount actually spent under sub-items E4.1(a) and (b) which shall include full compensation for the contractor's handling cost, profit, mentoring, record keeping, reporting and all other costs in connection therewith.

The lump sum tendered for E4.1(d) shall include full compensation for the provision of the training venue, for all necessary lighting, power, furniture, stationery, consumables and study material and for transportation of the students to and from the training venue. Payment of the lump sum will be made in two installments as follows:

- (i) The first installment, 75% of the lump sum, will be paid after the contractor has met all his obligations regarding the provision of the training venue as specified.
- (ii) The second and final installment, 25% of the lump sum, will be paid after the provision of all the accredited training as specified in the document.

C3.4.3.4 HIV/AIDS REQUIREMENTS

CONTENTS

SH 01	SCOPE
SH 02	DEFINITIONS AND ABBREVIATIONS
SH 03	HIV/AIDS EDUCATION AND TRAINING
SH 04	PROVIDING WORKERS WITH ACCESS TO CONDOMS
SH 05	ENSURING ACCESS TO HIV/AIDS TESTING AND COUNSELLING
SH 06	MONITORING

C3.4.3.5 HIV/AIDS REQUIREMENTS

SH 01 SCOPE

Tenderer

Witness 1

Witness 2

Employer

Witness 1

Witness 2



This specification contains all requirements applicable to the Contractor for creating HIV/AIDS awareness amongst all of the Workers involved in this project for the duration of the construction period, through the following strategies:

- Raising awareness about **HIV/AIDS** through education and information on the nature of the disease, how it is transmitted, safe sexual behaviour, attitudes towards people affected and people living with HIV/AIDS, how to live a healthy lifestyle with **HIV/AIDS**, the importance of voluntary testing and counselling, the diagnosis and treatment of Sexually Transmitted Infections and the closest health Service Providers
Informing Workers of their rights with regard to **HIV/AIDS** in the workplace
- Providing Workers with access to condoms and other awareness material that will enable them to make informed decisions about sexual practices

SH.02 DEFINITIONS AND ABBREVIATIONS

SH 02.01 DEFINITIONS

Worker: Person in the employ of the Contractor or under the direction or supervision of the Contractor or any of his Sub-contractors, who is on site for a minimum period of 30 days in total.

SH 02.02 ABBREVIATIONS

HIV	:	Human Immunodeficiency Virus
AIDS	:	Acquired Immune Deficiency Syndrome
STI	:	Sexually Transmitted Infection

SH 03 HIV/AIDS EDUCATION AND TRAINING DISPLAYING OF PLASTIC LAMINATED POSTERS AND DISTRIBUTION OF INFORMATION BOOKLETS

The Contractor shall obtain a set of four laminated posters conveying different key messages and information booklets, which are available from all Regional Offices of the Department of Public Works

The above-mentioned posters and information booklets have been prepared to raise awareness and to share information about HIV/AIDS and STI's

Posters or display stands shall be displayed on site as soon as possible, but not later than 14 days after the date of site handover

Posters shall be displayed in areas highly trafficked by Workers, including toilets, rest areas, the site office and compounds

The posters on display must always be intact, clear and readable

Information booklets must be distributed to all Workers as soon as possible, but not later than 14 days after site handover, or as soon as the Worker joins the site

SH 04 PROVIDING WORKERS WITH ACCESS TO CONDOMS

The Contractor shall provide and maintain condom dispensers and make both male and female condoms, complying with the requirements of SABS ISO 4074, available at all times to all Workers at readily accessible points on site, for the duration of the contract.

The Contractor may obtain condom dispensers from the Department of Health and condoms may be obtained from the Local Clinic or the Department of Health.

At least one male and one female condom dispenser and a sufficient supply of condoms, all to the approval of the Representative/Agent, shall be made available on site within 14 days of site hand over. Contractors should note that arrangements to obtain condoms from the Department of Health Clinics prior to site hand over may be necessary, to ensure that condoms are available within 14 days of site handover.

Tenderer

Witness 1

Witness 2

Employer

Witness 1

Witness 2



Condoms shall be made available in areas highly trafficked by Workers, including toilets, the site office and compounds.

SH 05 ENSURING ACCESS TO HIV/AIDS TESTING AND COUNSELLING FACILITIES AND TREATMENT OF SEXUALLY TRANSMITTED INFECTIONS (STI)

The Contractor shall provide Workers with the names of the closest Service Providers that provide HIV/AIDS testing and counselling and Clinics providing Sexually Transmitted Infection (STI) diagnosis and treatment. Information on these Service Providers and Clinics must be displayed on a poster of a size not smaller than A1 in an area highly trafficked by Workers

SH 06. MONITORING

The Contractor shall grant to the Representative/Agent reasonable access to the construction site, in order to establish that the Contractor complies with his obligations regarding **HIV/AIDS** awareness under this contract

The Contractor must report problems experienced in implementing the **HIV/AIDS** requirements to the Representative/Agent

The attached **SITE CHECKLIST (SCHEDULE A)** shall be completed and submitted at every construction progress inspection to the Representative/Agent

C3.5 MANAGEMENT

C3.5.1 MANAGEMENT MEETINGS

The following meetings will be required as minimum for the management of the contract.

- (a) Monthly client site meeting (using standard agenda for management control).
- (b) Technical meetings as required for each phase of the work.
- (c) Monthly safety meetings in terms of the OHS requirements.
- (d) Weekly progress meetings

C3.5.2 QUALITY CONTROL

Contractor to supply details of quality plan and procedures. These shall include:

- Accommodation of traffic.
- Inspection and test plans.
- Approval process.
- Hold-points.
- Milestones.

Tenderer

Witness 1

Witness 2

Employer

Witness 1

Witness 2