CONSUMER DISTRIBUTION KIOSKS

(a) General

The kiosks shall be of adequate size to accommodate the number of outgoing consumer circuits specified.

The kiosks shall have two sections, namely:

(i) one section containing all incoming and outgoing switchgear and cables, and

(ii) one section containing the consumer meters and circuit breakers.

(b) Fabrication

The kiosks shall be fabricated from 3CR12 stainless steel of minimum thickness 2,5 mm and shall be mounted on a channel iron steel base.

A metal frame work, manufactured from solid angle iron, channel iron, or 2,5 mm 3CR12 folded sheet steel shall be mounted on the base of the kiosk. The kiosk shell shall be completely independent from the frame and equipment so that the kiosk shell can be removed and replaced without disconnecting any equipment. The kiosk shall be bolted down onto the base by means of four M16 high tensile bolts which shall be accessible from the inside of the kiosk only.

The kiosks shall be weatherproof, vermin and insect-proof and proved against tampering. To prevent the ingress of water onto live equipment, the door entry surrounds shall have a channel shape, at least 12 mm deep, to accommodate the door edge. A rubber or neoprene closer strip shall be so fitted to the edges of each door as to provide a seal to keep rain water and dust out of the kiosk.

The kiosk shall have a pitched roof that slopes downwards at the front and at the back with an overhang of at least 75 mm all round.

The kiosks shall be fitted with a door in the front and at the back of the kiosk. The maximum width per door shall be 600 mm. The doors shall provide free access to the equipment and shall provide a full view of all meters. The doors shall have well returning edges to fit into the channel of the door entry surrounds. Each door shall have three robust solid brass hinges each of length at least 100 mm. The hinges shall be completely concealed. Doors shall be fitted with lever locks equal or similar to the "Barker & Nelson" type. The locking mechanism shall facilitate three point latching at the top, side and bottom of the doors. In the case of double doors the first door shall be locked with two slides on the inside onto the kiosk shell. The second door shall close over a lip on the first one. Nylon door restraints shall be provided. The fixing points of the restraints at the door and the canopy shall be reinforced. The doors shall be earthed bonded to the frame by means of a copper braided strap, tooth washers, bolts and nuts.

Ventilation louvres with approximate size 225 x 150 mm shall be provided on both sides of the kiosk. Each ventilation louvre shall be covered on the inside with perforated plates with 2,5 mm□ holes so that

- it is not possible to push a steel wire through it into the interior of the kiosk, and
- it prevents vermin from entering into the kiosk.

A mounting panel shall be positioned in the centre of each kiosk, fixed to the frame work, for the mounting of the specified equipment.

(c) Mounting panel

The mounting panel shall consist of a minimum 3 mm thick mild steel plate.

The one section of the panel shall be equipped with copper busbars mounted on porcelain or similar insulators and of sufficient length to accommodate three 12 mm brass bolts for the connection of distribution cables and six consumer meter connections per phase. The busbars shall be tinned after the drilling of holes. The busbars shall be able to carry 250 Ampere at a current density of not more then 1,5 A/mm□. Each busbar shall be marked red, yellow and blue with black for the neutral bar. The busbars shall be able to withstand the thermal and dynamic forces resulting from short circuits without deformation taking place or parts breaking.

The specified consumer equipment shall be installed in the second section. The mounting panel and equipment shall be enclosed by a machine punched removable front panel through which the operating handles of the equipment and the face plates of the meters protrude.

(d) Equipment installed in kiosks

The equipment to be installed in the kiosks shall be as specified in the detail specification.

(e) Wiring of kiosks

The internal wiring in the kiosks shall be done with PVC insulated copper conductors. The wiring shall be done in neat horizontal and vertical columns. Each consumer circuit shall be wired from the phase busbars to the circuit breaker and from the circuit breaker to the meter.

Connections to busbars and terminals shall be done by means of cable lugs crimped in an approved manner to the conductor ends. Connections to the busbars shall be made by means of cadmium plated high tensile steel bolts and nuts with locking washers.

(f) Earthing

A 25 mm x 6 mm long tinned copper earth bar shall be installed at the bottom of the kiosk.

10 mm diameter holes shall be drilled through the earth bar to provide for the distribution cable and service cable earth conductors. All bolts used for the fixing of the earth conductors shall be cadmium plated and only one earth conductor shall be connected per bolt.

The metal work of the kiosk shall be earthed to the earth bar by means of a 70 mm□ stranded copper conductor. An earth stud shall be provided on the kiosk housing for this purpose.

(g) Cable gland plate

The cables shall be terminated on a removable galvanised gland plate of suitable dimension and strength. The gland plate shall cover the full length of the kiosk.

The gland plate shall be at least 300 mm below the nearest terminal of switchgear allowing sufficient space for bending the cable ends. Sufficient space shall be provided underneath the gland plate to allow for the installation of the cables without removing the gland plate. The gland plate shall be earthed to the earthbar by means of a 70 mm□ stranded copper earth conductor.

(h) Terminal blocks

A terminal block of the "Klippon SAK" or equivalent type suitable for the termination of 16 mm□ stranded copper conductors shall be provided. Terminals shall be of the screw type and a terminal shall be provided for each service connection cable.

(i) Labels

The kiosks shall be supplied with the following labels:

(i) An aluminium label with 40 mm high letters and numeral indicating the kiosk number.

(ii) Engraved trafolite labels with 6 mm high numerals under each circuit breaker, meter, and terminal on the terminal block indicating the consumer stand number.

The labels shall have a white background and black letters. The 40 mm labels shall be fixed by means of rivets and the 6 mm high labels shall be inserted in 25 mm wide aluminium label holder mounted at the bottom of the relevant equipment.

(j) Danger signs

The requirements of Regulation C-52 of the Machinery and Occupational Safety Act No 6 of 1983 shall be complied with. All doors shall be fitted with a 150 x 100 mm Danger/Gevaar/Ingozi signs.

(k) Painting and finishing

(i) Post-weld cleaning and passivation of 3CR12

Post-weld cleaning shall be undertaken on all welded areas. One of the following cleaning methods may be used to remove all surface discolouration and scale from welded areas.

(1) Wire brushing : Where it is possible to remove the discolouration and detritus from weld areas by brushing, stainless steel wire brushes, that have not been used on other material other than 3CR12, may be used.

(2) Grinding : Dedicated grinding wheels and discs based on alumina shall be used for the dressing of welds. The use of silicon carbide wheels and discs shall not be used.

(3) Abrasive blast cleaning : The abrasive used shall be washed silica sand or alumina totally free of metallic iron, iron oxides or chlorides.

(ii) Chemical cleaning (pickling)

The pickling of 3CR12 shall be carried out using formulations based on nitric (HNO3) and hydrofluoric (HF) acid. Formulations based on hydrochloric acids shall not be used. Acids used shall conform to commercial purity standards. Where proprietary pickling formulations are used, the manufacturer's directions concerning the application procedures shall be strictly adhered to.

(iii) Passivation

The passivation of the 3CR12 shall be carried out as soon as possible after the post-weld cleaning has taken place. A solution made up of nitric acid shall be used for the passivation of the 3CR12. The solution shall be generously applied to the steel by brush, cloth, spray or dipping. Care shall be taken that the solution does not dry on the steel surface. The steel shall be thoroughly washed with clean cold water to remove all traces of the acid use.

(iv) General

The entire process of cleaning, pickling, passivation and neutralization shall be completed in one working day.

Tenderers shall submit full details of the post weld process their suppliers intend to use.

(v) Painting

All interior metal work shall be thoroughly derusted and degreased and shall be prepared for painting in accordance with SANS 066.

Immediately after cleaning a zinc chromate red oxide primer with a dry film thickness of 25 micrometre shall be applied in accordance with SANS 679. An intermediate enamel coat shall be applied to the primed surface and thereafter the finishing coat of white enamel paint shall be applied to the interior and "light stone", colour C37 SANS 1091 to the exterior.

The bases and under sides must be treated in an approved manner and finished with two coats epoxy-tar paint.

(l) Drawings and information

Tenderers shall submit full details of the cubicles offered with the following drawings with the tender

- a drawing indicating all dimensions of the kiosks
- a drawing indicating the dimensions of the plinth with fixing arrangements
- a drawing indicating the general internal equipment layout of the kiosks.

The successful tenderer shall, before the manufacturing of the kiosks commences, submit the final drawings to the Engineer for approval.

A schematic wiring diagram of the kiosk, as wired and colour coded, shall be submitted at the completion of the contract.

(m) Inspection

The successful tenderer shall allow the representative of the Engineer access to the manufacturer's works at all reasonable times to inspect the progress of the work and to witness all test

HC 12.04 **Maintenance Work**

HC 12.04.01 **Monthly**

a) Inspect and secure access doors and covers.

b) Inspect distribution kiosks.

HC 12.04.02 **Annually**

a) Service all distribution and metering kiosks.

b) Measure phase voltages and line currents in distribution and metering kiosks and record in book.

HC 12.05 **Maintenance work measurement and payment.**

Refer to clause SA 06 of the ADDITIONAL SPECIFICATION : SA GENERAL MAINTENANCE.

TECHNICAL SPECIFICATION

HD SUBSTATION TRANSFORMERS

CONTENTS

HD 01	SCOPE
HD 02	STANDARD SPECIFICATIONS, REGULATIONS, CODES AND ADDITIONAL SPECIFICATIONS
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HD 04	TEST AND INSPECTION FOLLOWING COMPLETION OF REPAIR WORK
HD 05	LOGGING AND RECORDING PROCEDURES
HD 06	MAINTENANCE TOOLS AND SPARES
HD 07	QUALITY ASSURANCE SYSTEM
HD 08	RE-COMMISSIONING OF INSTALLATION
HD 09	REPAIR WORK TO INSTALLATIONS
HD 10	INSTALLATION MAINTENANCE
HD 11	SUBSTATION TRANSFORMERS: TECHNICAL DETAILS

HD 01 SCOPE

HD 01.01 This specification comprises all aspects regarding the maintenance and servicing of transformer systems. Transformers comprise:

- substation transformers
- pole mounted transformers.

HD 01.02 This specification shall form an integral part of the maintenance and servicing contract document and shall be read in conjunction with Part C, the Additional Specification included with this document.

HD 02 STANDARD SPECIFICATIONS, REGULATIONS AND CODES

HD 02.01 The latest edition, including all amendments up to date of tender of the following specifications, publication and codes of practice shall be read in conjunction with the specification and shall deemed to form part thereof.

HD 02.02 **SANS Specifications**

- SANS 0780
- SANS 10400
- SANS 10142
- SANS 10225
- SANS 01277
- SANS 1088
- SANS 1749
- SANS 1250
- SANS 1279
- SANS 1777
- SANS 1763
- SANS 1266
- ARP 035

HD 02.03 **Department of Public Works Specifications**

- PW 774

HD 02.04 **Occupational Health and Safety Act of 1993 (OHS-Act)**

HD 02.05 **Manufacturer's specifications and maintenance instructions**

HD 02.06 **Additional requirements**

Equipment and material installed shall be new and unused.
Air driers shall bear the SANS stamp. The Contractor shall ensure that all safety regulations and measures are applied and enforced during servicing and maintenance work on transformers.

HD 03 AS-BUILT INFORMATION AND OPERATING AND MAINTENANCE MANUALS

HD 03.01 **No current "as-built" information on the installation is available.**

The Contractor shall be responsible for the compilation of a complete set of as-built drawings, inventory list and Operating and Instruction Manuals. The Contractor shall be responsible for the verification of the correctness of all such information.

This shall be done in accordance with the Additional Specification SB-Operating and Maintenance manuals.

The Contractor shall allow for the required tools and equipment to establish the correct as-built information.

All information shall be recorded and reproduced in electronic format as well as supplying the Engineer with three sets of hard copies.

HD 03.02 Over and above what is specified in the Additional Specification - SB Operating and Maintenance manuals, the Operating and Maintenance Manual to be compiled shall be structured and shall at least include the following:

- System Description
  - Complete system description of the transformer system. This shall be done for each installation individually. The system description shall contain detailed information regarding the rating and diagram plates (SANS 780), connection and arrangements (MV and LV) as well as earthing and lightning protection arrangements.
- Commissioning Data
  - Complete commissioning, test and inspection data of the transformer system.

    This shall be done for each transformer installation individually. The commissioning data will comprise oil tests, megger tests and earth resistance tests.
- Operating data
  - Safety precautions to be implemented.
- Maintenance instructions
  - Projected frequency of replacement of drying agent.
  - Procedure to filter and purify oil.

HD 04 TEST AND INSPECTION FOLLOWING COMPLETION OF SERVICING WORK

HD 04.01 It is the responsibility of the Contractor to provide all labour, accessories and property calibrated and certified measuring instruments necessary to record the following parameters:

- no-load phase voltages
- earth resistance testing
- insulation resistance testing

The Contractor is responsible for the arrangement of such tests. He shall give at least 72 hours notice to the Engineer prior to the test date.

HD 05 LOGGING AND RECORDING PROCEDURES

HD 05.01 The Contractor shall as part of this Contract institute a Recording system as part of his Maintenance Control Plan as defined in the Additional Specification SA - General Maintenance. This shall consist of a Record book which shall be utilised to log and record all faults, system checks, services, overhauls, breakdowns, maintenance visits, inspections, etc.

HD 05.02 The logbook shall be stored in a safe place inside the substation and shall only be utilised by the Contractor. A copy of the monthly entries and recordings into this logbook shall be submitted by the Contractor together with his monthly report to the Engineer.

This logbook shall be structured to at least include the following:

- Monthly drier inspection and maintenance actions
- Bi-annual inspection of oil levels
- Annual earthing and insulation test report
- Breakdown / call out reports.

HD 06 MAINTENANCE TOOLS AND SPARES

HD 06.01 On commencement of the Maintenance Contract, the Contractor shall compile an inventory of the existing Tools and Spares in the presence of the Engineer. Any deficiencies or short fall or damaged Tools and Spares shall be replaced with new equipment / material, as part of the contract.

HD 06.02 The Tools and Spares shall be kept safe in a lockable store room on site. The Contractor shall provide his own lock for the designated store room. The inventory of the Tools and Spares shall be verified on a monthly basis. Any short fall shall be replaced by the Contractor as part of his responsibility under this contract.

HD 06.03 The Tools and Spares shall at least include the following:

Impact wrench

HD 07 QUALITY ASSURANCE SYSTEM

HD 07.01 Following formal approval of his Quality Assurance system by the Engineer, the Contractor shall implement the approved QA system.

HD 07.02 Records of this QA system shall be kept throughout the duration of the contract and shall be submitted to the Engineer as required.

HD 08 RE-COMMISSIONING OF INSTALLATION

HD 08.01 On completion of the repair work the transformer installations shall be put into operation.

HD 09 SERVICE WORK TO TRANSFORMER INSTALLATIONS

HD 09.01 The various transformer systems shall be serviced as measured in the bills of quantities, Installation A10, during the first period of the servicing and maintenance contract.

HD 09.02 The scope of the repair work shall include, but shall not be limited to the activities listed below.

HD 09.03 The Contractor shall record the repair actions in tabular format before the maintenance phase commences.

HD 09.04 Servicing work shall be executed within the approved period. This period shall be agreed at the start of the contract period.

HD 09.05 New equipment and material (e.g. air driers etc.) shall be supplied with a written guarantee confirming a defects liability period of 12 months from date of hand-over. These guarantees shall be furnished in favour of the User Client.

HD 09.06 The maintenance phase of this contract shall commence once the work on the installation have been commissioned and handed over to the satisfaction of the Engineer.

HD 10 INSTALLATION MAINTENANCE

HD 10.01 The various transformer systems shall be maintained for the duration of the 36 month contract period.

HD 10.02 The following maintenance actions will be required under this period of the contract:

- routine preventative maintenance
- corrective maintenance
- breakdown maintenance

These actions are defined in the Additional Specification SA - General Maintenance.

HD 10.03 The maintenance schedules and frequency of services and maintenance activities shall be developed under the maintenance control plan which will be instituted by the Contractor. The Contractor's responsibility in this regard is specified in the Additional Specification SA - General Maintenance.

HD 11 TRANSFORMERS: TECHNICAL DETAILS

HD 11.01 Installation description

This section describes the transformers that will be repaired and maintained in terms of this contract.

- Two 315kVA Miniature Substations
- Two 500kVA Miniature Substations

AREA	TYPE	MANUFACTURER	POWER RATING	SERIAL NO
Substation 1	Miniature Substation	Free State Transformers	315 kVA	TB090653
Substation 2	Miniature Substation	Free State Transformers	315 kVA	TB090654
Substation 3	Miniature Substation	Free State Transformers	500 kVA	TB090652
Substation 4	Miniature Substation	Free State Transformers	500 kVA	TB090651

HD 11.02 **Scope of servicing work**

Oil test: Specific tests to be carried out includes di-electric test, moisture content test, acidity test and gas analysis, per random sample.

Purification of transformer oil: oil to be drained purified and replaced.

Service transformer: Power wash at high pressure and high temperature. Check working of oil level gauge.

Clean and re-torque transformer bushings. Re-torque all loose bolts with impact wrench. Measure earth resistance.

Insulation resistance test: Perform at windings MV to LV, MV to earth and LV to earth. Fit drier: Fit silica gel air drier.

Check drier: Check condition of drying agent and replace, if necessary.

HD 11.03 **Service work**

Item		Unit
(a)	Service transformer	No

The unit of measure shall be the number of transformers serviced.

The tendered rate shall include full compensation for cleaning of the transformer, re-torque of bushings and bolts, check oil level gauge, tightening of terminations, replace gaskets, seals, record tap changer settings, etc.

Item		Unit
(b)	Oil test	No

The unit of measure shall be the number of transformers that is tested.

The tenderer shall include full compensation for the complete test to be performed, which include the following tests:

- di-electric tests
- moisture content tests
- accidity tests and
- gas analysis tests.

	Item	Unit
(c)	Oil purification	Item

The unit of measure shall be number of transformers which oil has been purified.

The tendered rate shall include full compensation for all labour, transport, draining, on site purification of transformer oil as per the oil test results or replacement of oil.

The tendered rate shall further include full compensation for the testing of the oil as per clause HD10.03 (b) and submitting the test results to the Representative.

	Item	Unit
(d)	Fit silica gel air drier	No

The unit of measure shall be the number of air driers installed.

The tendered rate shall include full compensation for the ordering, supply and installation of complete air driers to the supplier's specifications.

	Item	Unit
(e)	Replace drier gel The unit of measure shall be the number of driers where the drying agent is replaced.	No

The tendered rate shall include full compensation for the ordering, supply and installation of drier gel.

	Item	Unit
(f)	Add additional transformer oil	litres

The unit of measure shall be the number of litres of oil added to the transformer.

The tendered rate shall include full compensation for ordering, supply and adding additional oil (oil to SANS 0555 specification) to be supplied in 25 litre containers.

	Item	Unit
(g)	Repair oil leak	No.

The tendered rate shall include full compensation for the replacement of the transformer gasket if and when instructed by the engineer.

	Item	Unit
(i)	Re-tape LV and MV bushings and MV busbars.	item.

The unit of measure shall be a lump sum.

The tendered rate shall include full compensation to re-tape the LV and MV bushing and MV busbars to the bushings of the MV panel using PVC insulation tape.

HD 11.04 **Maintenance work**

HD 11.04.01 **General**

Refer to HD 10

HD 11.04.02 **Monthly**

Check oil levels
Check silica gel
Check for oil leaks
Visually inspect transformers and terminations.

HD 11.04.03 **Annual**

Service transformers
Record values in logbook
Test Oil
Purification if required

HD 11.05 **Maintenance work: measurement and payment**

Refer to clause SA 06 of the Additional Specification - SA General Maintenance.

Remuneration for the maintenance work shall form part of the overall Medium and Low Voltage Installation (Installation A10).

TECHNICAL SPECIFICATION

HE EXTERIOR LIGHTING SYSTEMS

CONTENTS

HE 01	SCOPE
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HE 04	TEST AND INSPECTION FOLLOWING COMPLETION OF REPAIR WORK
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HE 11	STREET LIGHTING: TECHNICAL DETAILS
HE 12	MAINTENANCE OF EXTERIOR LIGHTING SYSTEMS AND DISTRIBUTION KIOSKS

HE 01 SCOPE

HE 01.01 This specification comprises all aspects regarding the maintenance of external lighting systems. External lighting comprises:

i) Area lighting
ii) Security lighting along perimeter fences
iii) Street lighting

HE 01.02 This specification shall form an integral part of the maintenance and servicing contract document and shall be read in conjunction with Part C, the Additional Specifications included with this document.

HE 02 STANDARD SPECIFICATIONS, REGULATIONS AND CODES

HE 02.01 The latest edition, including all amendments up to date of tender of the following specifications, publication and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof.

HE 02.02 **SANS Specifications**

02.02.01	SANS 10400	National Building Regulation
02.02.02	SANS 10142	Wiring code
02.02.03	SANS 10225	Lighting masts
02.02.04	SANS 1277	Read lighting luminaires
02.02.05	SANS 1088	Spigot entries
02.02.06	SANS 1749	Glass polyester poles
02.02.07	SANS 1250	Capacitors, ballasts & lamps
02.02.08	SANS 1279	Floodlight luminaires
02.02.09	SANS 1777	Daylight switches
02.02.10	SANS 763	Galvanised coatings
02.02.11	SANS 1266	Discharge lamps
02.02.12	ARP 035	Streetlighting maintenance

HE 02.03 **Department of Public Works Specification PW 774**

HE 02.04 **Occupational Health and Safety Act of 1993: Construction Regulations, 2003 as promulgated in Government Gazette No 25207 and Regulation Gazette No 7721 of 18 July 2003.**

HE 02.05 **Manufacturer's specifications and installation instructions**

HE 02.06 **Additional requirements**

Equipment and material supplied and installed shall be new and unused.
Luminaires and control gear shall bear the SANS stamp. The Contractor shall ensure that all safety regulations and measures are applied and enforced during repair and maintenance work on cabling, wiring, luminaires, lighting poles and high masts.

HE 03 OPERATING AND MAINTENANCE MANUALS

HE 03.01 The Contractor shall be responsible for the compilation of a complete set of Operating-and-Maintenance manuals.

This shall be done in accordance with the Additional Specification SB – Operating and Maintenance manuals.

All information shall be recorded and reproduced in electronic format as well as supplying the Engineer with seven sets of hard copies.

HE 03.02 Over and above what is specified in the Additional Specification – SB Operating and Maintenance manuals, the Operating and Maintenance Manual to be compiled shall be structured and shall at least include the following:

03.02.01 Description of Installation

Complete system description of the lighting system. This shall be done for each lighting installation individually. The system description shall contain detailed information regarding the supply configuration (Distribution board, cabling, distribution kiosks, pole mounted distribution board), the switching arrangement (timers, photocells, override facilities) and the lighting (luminaire detail, lamp detail) as well as the earthing and lightning protection arrangement.

03.02.02 Commissioning Data

Complete commissioning, test and inspection data of lighting system.

This shall be done for each lighting installation individually. The commissioning data will comprise start-up and running current measurements at each termination point e.g. distribution board, kiosk and mast. Full data on lamps fitted with installation dates.

03.02.03 Operating data

a) Safety precautions to be implemented.
b) Operation of lighting systems; automatic, manual and bypass switching.

03.02.04 Maintenance instructions

a) Projected frequency of lamp replacement per lighting system.
b) Procedure to verify operation of photocell – controlled circuits.
c) Procedure to verify operation of timer – controlled circuits.
d) Trouble shooting diagram.
e) Luminaire details, including manufacturers brochures / pamphlets, order number, list of components and lamp specification.

f) Schedule of serviceable components per lighting system. These schedules shall include lamps, starters, ignitors, ballasts, lenses, etc.

HE 04 TESTS AND INSPECTIONS PRIOR TO PRACTICAL COMPLETION OF REPAIR WORK

HE 04.01 It is the responsibility of the Contractor to provide all labour, accessories and properly calibrated and certified measuring instruments necessary to record the following parameters:

04.01.01 Phase voltages
04.01.02 Current per phase
04.01.03 Illumination levels in lux
04.01.04 Insulation testing at 500V
04.01.05 Earthing resistance testing by means of wheatstone bridge instrument

The Contractor is responsible for the arrangement of such tests. He shall give at least 72 hours notice to the Engineer prior to the test date.

HE 05 LOGGING AND RECORDING PROCEDURES

HE 05.01 The Contractor shall as part of this Contract institute a Recording system as part of his Maintenance Control Plan as defined in the Additional Specification SA – General Maintenance. This shall consist of a Record book which shall be utilised to log and record all faults, system checks, breakdowns, maintenance visits, inspections etc.

HE 05.02 The logbook shall be stored in a safe place inside the prison maintenance supervisor's office and shall only be utilised by the Contractor and Engineer. A copy of the monthly entries and recordings into this logbook shall be submitted by the Contractor together with his monthly report to the Engineer.

This logbook shall be structured to at least include the following:

05.02.01 Monthly lamp inspection and maintenance actions.
05.02.02 Bi-annual inspection and testing of lighting systems.
05.02.03 Annual earthing test report.
05.02.04 Breakdown / call out reports.

HE 06 QUALITY ASSURANCE SYSTEM

HE 06.01 Following formal approval of his Quality Assurance system by the Engineer, the Contractor shall implement the approved QA system.

HE 06.02 Records of this QA system shall be kept throughout the duration of the contract and shall be submitted to the Engineer as required by the Department.

HE 07 RE-COMMISSIONING OF INSTALLATION

HE 07.01 On practical completion of the repair work and lamp replacement, the lighting installations shall be put into operation.

HE 07.02 Lighting installations shall be energised for a minimum continuous period of 96 hours immediately prior to the Engineer's Practical Completion inspection to verify lamp stability and reliability of power reticulation

HE 08 REPAIR WORK TO EXTERIOR LIGHTING INSTALLATIONS

HE 08.01 The various lighting systems shall be repaired as part of installation H during the first phase of the repair and maintenance contract

HE 08.02 The scope of the repair work shall include, but shall not be limited to the activities listed below.

HE 08.03 The Contractor shall record the repair actions in tabular format before the Contractor's responsibility for maintenance commences.

HE 08.04 Repair work shall be executed within the approved period for repairs.

HE 08.05 New equipment and material shall be supplied with a written guarantee confirming a defects liability period of 12 months from date of practical completion. These guarantees shall be furnished in favour of the Department of Public Works.

HE 08.06 The following measurement and payment items shall apply for repair work

	Item	Unit
HE 08.06(a)	**Excavate in all materials for trenches, backfill, compact and dispose of surplus material**	m^3

This rate shall apply to all the excavations.

The unit of measurement shall be the cubic metre of material excavated in trenches, classified according to the depth and width specified listed. The width classification shall be in accordance with the authorised dimensions and the depth classification in accordance with the total depth of the trench and not with the depth range in which the material is situated before excavation. The depth of excavation shall be measured to the underside of the bedding.

The tendered rate shall include full compensation for clearing and grubbing the trench areas and the temporary removal of improvements from the line of the trench, for excavating the trench, preparing the bottom of the trench, separating material unsuitable for backfill, keeping the excavations safe, dealing with any surface or subsurface water, measuring, classification and keeping of all records and for separating topsoil and selected backfill material where necessary.

The rate shall furthermore cover the costs of installing the 150mm sand bed and 200mm sand cover, backfilling, compacting and disposing of the surplus material.

	Item	Unit
HE 08.06(b)	**Extra over item HE 08.06(a) for excavating in hard material**	m^3

The unit of measurement shall be the cubic metre of material excavated and classified as hard, in accordance with the classification set out hereunder.

The tendered rate shall be paid over and above the rate tendered for excavation in respect of items HD 08.06(a) in full compensation for the additional cost of excavating in hard material instead of soft.

The tendered rate shall include full compensation for any overbreak as well as the additional backfilling required, reinstating the trench bottom, and for any other incidentals resulting from overbreak.

The materials excavated shall be classified as follows for payment purposes:
Hard material:

Material which cannot be excavated efficiently except with the use of pneumatic tools, blasting or wedging and splitting, and shall include boulders exceeding 0,15 m3 in volume.

Soft material:
All material not classified as hard material.
Notwithstanding the above classification, all material excavated from previously constructed fills, embankments, pavement layers and from above existing services shall be classified as soft material.

The decision of the Engineer as to the classification of the material shall be final and binding and any objection as to the classification shall be made before the excavation has been backfilled.

	Item	Unit
HE 08.06(c)	**Extra over item 3.10.1.1 for excavating by hand in all materials**	m^3

The unit of measurement shall be the cubic metre of trench material excavated by means of hand tools as instructed or authorised in writing by the Engineer where the use of conventional excavating equipment is either impractical or likely to cause damage to services, trees or property or where the electrical Contractor has to excavate by hand where he cannot excavate by machine.

The volumes of the trench excavation will be computed from the length and the depth to the bottom of the specified bedding layer and the minimum base widths specified in the drawings. The rate shall cover the cost of complying with the safety and protection requirements specified except where particular items are scheduled to cover particular costs for the excavation.

The tendered rate shall be paid extra over the rates tendered for item HE09.06(a).1in full compensation for the additional expense of excavating by means of hand labour instead of conventional trenching equipment.

	Item	Unit
HE 08.06(d)	**Extra over item HD09.06(a) for using backfill material obtained from sources provided by the Contractor**	m^3

The unit of measurement shall be the cubic metre of imported backfill material.

Item HD09.06(d) above will not be measured for payment unless importation has been ordered in writing. The volume will be computed from the trench width and the depth from ground level to the top of the sand bed cover as shown on the tender drawings. The rate for material from designated borrow pits shall cover the cost of excavation and selection of suitable material, the moving of the material to the backfilling site, and the disposal of the material that becomes surplus as a result of the importation, all within 0,5 km.

The tendered rate for item HE09.06(d) paid extra over item HE09.06(a) shall cover the cost of the acquisition of the material and of the disposal of the surplus material resulting from the importation together with all the costs of transporting the material to the site regardless of distance.

	Item	Unit
HE 08.06(e)	**Supply and Install Cable Sleeves**	m

The unit of measurement shall be the linear length in meter of cable sleeves supplied and installed.

The tendered rate shall include full compensation for the supply, delivery, handling and installing the cable sleeves including all the required couplings, steel draw wires and plugs.

	Item	Unit
HE 08.06(f)	**Supply and Install Plastic Warning Tape**	m

The unit of measurement shall be the length in meter of plastic warning tape supplied and installed.

The tendered rate shall include full compensation for the supplying, handling and laying the plastic warning tape.

	Item	Unit
HE 08.06(g)	**Supply and delivery of low-voltage cable**	m

The unit of measurement shall be the length of low-voltage cable supplied.
The tendered rate shall include full compensation for the manufacture, supply and delivery of the specified cable to the site.

Separate items shall be scheduled under this payment item for each size and type of cable required.

	Item	Unit
HE 08.06(h)	**Lay LV-cable**	m

The unit of measurement shall be the linear length in meter of LV-cable installed.

The tendered rate shall include full compensation for the handling, inspecting, laying, cutting and testing the cable. Cables shall be measured linearly over all lengths laid. Separate items shall be scheduled for each size and each type of cable laid.

	Item	Unit
HE 08.06 (i)	**Termination of LV-cables**	No

The unit of measurement shall be the number of LV-cable terminations.

The tendered rate shall include full compensation for providing the cable glands, shrouds and lugs, the cost of handling, fitting and cutting the cable. Separate items shall be scheduled for each size and type of cable.

	Item	Unit
HE 08.06(j)	**Supply bare copper earth conductor**	m

The unit of measurement shall be the length in meter of bare copper earth conductor supplied.

The tendered rate shall include full compensation for procuring, furnishing and laying the specified earth continuity conductor.

	Item	Unit
HE 08.06(k)	**Installation of bare copper earth conductor**	m

The unit of measurement shall be the length in meter of bare copper earth conductor installed.
The tendered rate shall include full compensation for procuring, furnishing and laying the specified earth continuity conductor.

	Item	Unit

HE 08.06(l) **Terminate and connect bare copper earth conductor** No

The unit of measurement shall be the number of bare copper earth conductors terminated and connected.

The tendered rate shall include full compensation for supplying all the material required to terminate and connect the bare copper earth conductors and the connecting thereof to the earth bars.

Item	Unit

HE 08.06(m) **Jointing of low-voltage cable** No

The unit of measurement shall be the number of LV-cables joints.

The tendered rate shall include full compensation for the cost of providing the kits, the cost of cutting the cable, handling and fitting the kits and the cost of testing the joints.

Item	Unit

HE 08.06(n) **Re-lamp luminaire** No

The unit of measurement shall be the number of luminaire lamps replaced.

The tendered rate shall include full compensation for the supply and installation of the lamp according to the manufacturer's instructions.
Separate items shall be scheduled for each type of lamp.

Item	Unit

HE 08.06(o) **Supply and installation of internal luminaire components** No

The unit of measurement shall be the number of internal luminaire components replaced.

The tendered rate shall include full compensation for the supply and installation of the components according to the manufacturer's instructions.
Separate items shall be scheduled for each component.

Item	Unit

HE 08.06(p) **Internal wiring of luminaire** No

The unit of measurement shall be the number of luminaires rewired with silicone insulated wiring.

The tendered rate shall include full compensation for the supply and wiring of a luminaire with silicone insulated wiring where the wiring are specified separately.

Item	Unit

HE 08.06(q) **Supply and install circuit breakers** No

The unit of measurement shall be the number of circuit breakers supplied and installed.

The tendered rate shall include full compensation for the supply and installation of the circuit breakers where the circuit breakers are specified separately.

	Item	Unit
HE 08.06(r)	**Supply and install isolators**	No

The unit of measurement shall be the number of isolators supplied and installed.

The tendered rate shall include full compensation for the supply and installation of the isolators where the isolators are specified separately.

	Item	Unit
HE 08.06(s)	**Supply and install contactors**	No

The unit of measurement shall be the number of contactors supplied and installed.

The tendered rate shall include full compensation for the supply and installation of the contactors where the contactors are specified separately.

	Item	Unit
HE 08.06(t)	**Supply and install of low tension fuses**	No

The unit of measurement shall be the number of fuses supplied and installed.

The tendered rate shall include full compensation for the supply and installation of the fuses where the fuses are specified separately.

	Item	Unit
HE 08.06(u)	**Supply and install photocell (plug-in type)**	No

The unit of measurement shall be the number of photocells supplied and installed.

The tendered rate shall include full compensation for the supply and installing of the photocells where the photocells are specified separately.

	Item	Unit
HE 08.06(v)	**Supply and install QAT-R type electronic timer**	No

The unit of measurement shall be the number of timers supplied and installed.

The tendered rate shall include full compensation for the supply and installing of the timers where the timers are specified separately.

	Item	Unit
HE 08.06(w)	**Supply and install 0-30A HRC fuses**	No

The unit of measurement shall be the number of fuses supplied and installed.

The tendered rate shall include full compensation for the supply and installing of the fuses where the circuit breakers are specified separately.

	Item	Unit
HE 08.06(x)	**Supply and install end connectors and insulating sleeves**	No

The unit of measurement shall be the number of end connectors and insulating sleeves supplied and installed.

The tendered rate shall include full compensation for the supply and installation of the end connectors at the light pole or where cables forms a looping system.

Item	Unit

HE 08.06 (y) **Replace pole**

The unit of measure shall be the number of poles replaced.

The tendered rate shall include full compensation for the removal of all equipment from the existing pole, removal of the existing pole from site, ordering, supply and installation of the pole in the position specified.

The contractor shall install all existing equipment onto the new pole

Item	Unit

HE 08.06 (z) **Replace Luminaire diffuser**

The unit of measure shall be the number of luminaire diffusers replaced.

The tendered rate shall include full compensation for the removal of the diffuser from the existing luminaire, ordering, supply and installation of the new diffuser as specified according to manufactures instructions.

Item	Unit

HE 08.06 (aa) **Replace pole mounted brackets**

The unit of measure shall be the number of pole brackets replaced.

The tendered rate shall include full compensation for the ordering, supply and installation of the pole bracket including all fixing accessories as specified according to manufactures instructions.

The tendered rate shall further include for the removal of all old equipment from the pole and the supply and installation of the new equipment onto the pole bracket including the connection of the equipment.

Item	Unit

HE 08.06 (ab) **Replace pole cover**

The unit of measure shall be the number of pole covers replaced.

The tendered rate shall include full compensation for the removal of the pole cover from the existing pole, ordering, supply and installation of the new pole cover as specified according to manufactures instructions.

Item	Unit
HE 08.06(ac) **Junction boxes including pole mount brackets.**	No.

The unit of measure shall be the number of junction boxes supplied and installed.

The tendered rate shall include full compensation for the supply and installation of junction boxes brackets and strapping. The junction box must be fitted with a neutral bar earth bar, din terminal rails and CBI circuit breaker clips to accommodate the maximum amount of terminals and circuit breakers.

	Item	Unit
HE 08.06(ad)	**Remove rust and paint kiosks**	

The unit of measurement shall be the total number of kiosks painted.

The tendered rate shall include full compensation for the removal of rust with a anti corrosion agent and the repainting of the whole kiosk.

	Item	Unit
HE 08.06(ae)	**Label kiosks**	No.

The unit of measure shall be the total number of kiosks labelled.

The tendered rate shall include full compensation for the labelling of kiosks circuit breakers, cable and the warning notification to be installed.

	Item	Unit
HE 08.06(af)	**Supply and install padlocks**	No.

The unit of measurement shall be the number of padlocks installed.

The tendered rate shall include full compensation for the ordering, supply, engraving and installation of the padlocks, locking devices and seals.

Lock shall be "keyed alike".

	Item	Unit
HE 08.06(ag)	**Replace distribution meter kiosks.**	No.

The unit of measurement shall be the number of distribution kiosks replaced.

The tendered rates shall include full compensation for the removal, the ordering, supply and installation of the new 6/4 way meter boxes complete with watt hour meters, circuit breakers, gland plate, labelling and concrete foot strip as specified.

CONSUMER DISTRIBUTION KIOSKS

(a) General

The kiosks shall be of adequate size to accommodate the number of outgoing consumer circuits specified.

The kiosks shall have two sections, namely:

(i) one section containing all incoming and outgoing switchgear and cables, and

(ii) one section containing the consumer meters and circuit breakers.

(b) Fabrication

The kiosks shall be fabricated from 3CR12 stainless steel of minimum thickness 2,5 mm and shall be mounted on a channel iron steel base.

A metal frame work, manufactured from solid angle iron, channel iron, or 2,5 mm 3CR12 folded sheet steel shall be mounted on the base of the kiosk. The kiosk shell shall be completely independent from the frame and equipment so that the kiosk shell can be removed and replaced without disconnecting any equipment. The kiosk shall be bolted down onto the base by means of four M16 high tensile bolts which shall be accessible from the inside of the kiosk only.

The kiosks shall be weatherproof, vermin and insect-proof and proved against tampering. To prevent the ingress of water onto live equipment, the door entry surrounds shall have a channel shape, at least 12 mm deep, to accommodate the door edge. A rubber or neoprene closer strip shall be so fitted to the edges of each door as to provide a seal to keep rain water and dust out of the kiosk.

The kiosk shall have a pitched roof that slopes downwards at the front and at the back with an overhang of at least 75 mm all round.

The kiosks shall be fitted with a door in the front and at the back of the kiosk. The maximum width per door shall be 600 mm. The doors shall provide free access to the equipment and shall provide a full view of all meters. The doors shall have well returning edges to fit into the channel of the door entry surrounds. Each door shall have three robust solid brass hinges each of length at least 100 mm. The hinges shall be completely concealed. Doors shall be fitted with lever locks. The locking mechanism shall facilitate three point latching at the top, side and bottom of the doors. In the case of double doors the first door shall be locked with two slides on the inside onto the kiosk shell. The second door shall close over a lip on the first one. Nylon door restraints shall be provided. The fixing points of the restraints at the door and the canopy shall be reinforced. The doors shall be earthed bonded to the frame by means of a copper braided strap, tooth washers, bolts and nuts.

Ventilation louvres with approximate size 225 x 150 mm shall be provided on both sides of the kiosk. Each ventilation louvre shall be covered on the inside with perforated plates with 2,5 mm holes so that

- it is not possible to push a steel wire through it into the interior of the kiosk, and
- it prevents vermin from entering into the kiosk.

A mounting panel shall be positioned in the centre of each kiosk, fixed to the frame work, for the mounting of the specified equipment.

(c) Mounting panel

The mounting panel shall consist of a minimum 3 mm thick mild steel plate.

The one section of the panel shall be equipped with copper busbars mounted on porcelain or similar insulators and of sufficient length to accommodate three 12 mm brass bolts for the connection of distribution cables and six consumer meter connections per phase. The busbars shall be tinned after the drilling of holes. The busbars shall be able to carry 250 Ampere at a current density of not more then 1,5 A/mm^2. Each busbar shall be marked red, yellow and blue with black for the neutral bar. The busbars shall be able to withstand the thermal and dynamic forces resulting from short circuits without deformation taking place or parts breaking.

The specified consumer equipment shall be installed in the second section. The mounting panel and equipment shall be enclosed by a machine punched removable front panel through which the operating handles of the equipment and the face plates of the meters protrude.

(d) Equipment installed in kiosks

The equipment to be installed in the kiosks shall be as specified in the detail specification.

(e) Wiring of kiosks

The internal wiring in the kiosks shall be done with PVC insulated copper conductors. The wiring shall be done in neat horizontal and vertical columns. Each consumer circuit shall be wired from the phase busbars to the circuit breaker and from the circuit breaker to the meter.

Connections to busbars and terminals shall be done by means of cable lugs crimped in an approved manner to the conductor ends. Connections to the busbars shall be made by means of cadmium plated high tensile steel bolts and nuts with locking washers.

(f) Earthing

A 25 mm x 6 mm long tinned copper earth bar shall be installed at the bottom of the kiosk.

10 mm diameter holes shall be drilled through the earth bar to provide for the distribution cable and service cable earth conductors. All bolts used for the fixing of the earth conductors shall be cadmium plated and only one earth conductor shall be connected per bolt.

The metal work of the kiosk shall be earthed to the earth bar by means of a 70 mm² stranded copper conductor. An earth stud shall be provided on the kiosk housing for this purpose.

(g) Cable gland plate

The cables shall be terminated on a removable galvanised gland plate of suitable dimension and strength. The gland plate shall cover the full length of the kiosk.

The gland plate shall be at least 300 mm below the nearest terminal of switchgear allowing sufficient space for bending the cable ends. Sufficient space shall be provided underneath the gland plate to allow for the installation of the cables without removing the gland plate. The gland plate shall be earthed to the earthbar by means of a 70 mm² stranded copper earth conductor.

(h) Terminal blocks

A terminal block type suitable for the termination of 16 mm² stranded copper conductors shall be provided. Terminals shall be of the screw type and a terminal shall be provided for each service connection cable.

(i) Labels

The kiosks shall be supplied with the following labels:

(i) An aluminium label with 40 mm high letters and numeral indicating the kiosk number.

(ii) Engraved trafolite labels with 6 mm high numerals under each circuit breaker, meter, and terminal on the terminal block indicating the consumer stand number.

The labels shall have a white background and black letters. The 40 mm labels shall be fixed by means of rivets and the 6 mm high labels shall be inserted in 25 mm wide aluminium label holder mounted at the bottom of the relevant equipment.

(j) Danger signs

The requirements of Regulation C-52 of the Machinery and Occupational Safety Act No 6 of 1983 shall be complied with. All doors shall be fitted with a 150 x 100 mm Danger/Gevaar/Ingozi signs.

(k) Painting and finishing

(i) Post-weld cleaning and passivation of 3CR12

Post-weld cleaning shall be undertaken on all welded areas. One of the following cleaning methods may be used to remove all surface discolouration and scale from welded areas.

(1) Wire brushing : Where it is possible to remove the discolouration and detritus from weld areas by brushing, stainless steel wire brushes, that have not been used on other material other than 3CR12, may be used.

(2) Grinding : Dedicated grinding wheels and discs based on alumina shall be used for the dressing of welds. The use of silicon carbide wheels and discs shall not be used.

(3) Abrasive blast cleaning : The abrasive used shall be washed silica sand or alumina totally free of metallic iron, iron oxides or chlorides.

(ii) Chemical cleaning (pickling)

The pickling of 3CR12 shall be carried out using formulations based on nitric (HNO_3) and hydrofluoric (HF) acid. Formulations based on hydrochloric acids shall not be used. Acids used shall conform to commercial purity standards. Where proprietary pickling formulations are used, the manufacturer's directions concerning the application procedures shall be strictly adhered to.

(iii) Passivation

The passivation of the 3CR12 shall be carried out as soon as possible after the post-weld cleaning has taken place. A solution made up of nitric acid shall be used for the passivation of the 3CR12. The solution shall be generously applied to the steel by brush, cloth, spray or dipping. Care shall be taken that the solution does not dry on the steel surface. The steel shall be thoroughly washed with clean cold water to remove all traces of the acid use.

(iv) General

The entire process of cleaning, pickling, passivation and neutralization shall be completed in one working day.

Tenderers shall submit full details of the post weld process their suppliers intend to use.

(v) Painting

All interior metal work shall be thoroughly derusted and degreased and shall be prepared for painting in accordance with SANS 066.

Immediately after cleaning a zinc chromate red oxide primer with a dry film thickness of 25 micrometre shall be applied in accordance with SANS 679. An intermediate enamel coat shall be applied to the primed surface and thereafter the finishing coat of white enamel paint shall be applied to the interior and "light stone", colour C37 SANS 1091 to the exterior.

The bases and under sides must be treated in an approved manner and finished with two coats epoxy-tar paint.

(l) Drawings and information

Tenderers shall submit full details of the cubicles offered with the following drawings with the tender

- a drawing indicating all dimensions of the kiosks
- a drawing indicating the dimensions of the plinth with fixing arrangements
- a drawing indicating the general internal equipment layout of the kiosks.

The successful tenderer shall, before the manufacturing of the kiosks commences, submit the final drawings to the Engineer for approval.

A schematic wiring diagram of the kiosk, as wired and colour coded, shall be submitted at the completion of the contract.

(m) Inspection

The successful tenderer shall allow the representative of the Engineer access to the manufacturer's works at all reasonable times to inspect the progress of the work and to witness all tests

	Item	Unit
HE 08.06(ah)	**Replace door hinges on meter and distribution kiosks.**	No.

The tendered rate shall include full compensation for the removal of damaged hinges, the supply, delivery and installation of new hinges.

	Item	Unit
HE 08.06(ai)	**Supply and install handles.** (Perano type lockable turn catch door handle (heavy duty)	No.

The unit of measure shall be the total number of handles installed.

The tendered rate shall include full compensation for the removal of the old handle and ordering, supply and installation of a lockable turn catch handle.

HE 09 AREA LIGHTING : TECHNICAL DETAILS

HE 09.01 Installation description

This section describes the electrical distribution network that will be repaired and maintained in terms of this contract.

Luminaries are suspended on fibreglass poles of various lengths. Area lights are controlled by means of photocells and manual on/off switches.

AREA /STREET	POLE / MAST INFORMATION		LUMINAIRE INFORMATION		
	MOUNTING HEIGHT	DESCRIPTION / MATERIAL	DESCRIPTION	SWITCHING	NUMBER
Kosi Bay: Control Area	7-9m	Fibreglass Pole	250W HPSE Streetlight	Photocell	7

HE 09.02 Scope of repair work

Open each pole cover and inspect fuse or circuit breaker, tray and shield plate as well as earthing connection. Check and replace cover seal if required.

Service each luminaire, open control gear enclosures and treat for moisture ingress and corrosion. Wash luminaires with detergent and clean lenses. Check and replace neoprene seals.

Re-lamp luminaires.

Replace luminaires: Remove existing damaged luminaires, supply and install similar and approved luminaires complete with lamps and control gear, if applicable.

Open upstream distribution board. Check and fasten cable terminations, fit labelling and blank face-plate covers. Check locking mechanism and fit padlock.

Open distribution kiosk. Clean inside and add termite and rodent poison. Fit circuit labelling. Check locking mechanism and fit padlock.

Service luminaries by washing with detergent and re-lamping where necessary. Clean lenses. Check condition of seals and glands and test for earth continuity.

Check consistency of aiming angles and tighten mounting bracket bolts

HE 09.03 **Repair work: Measurement and payment**

Item		Unit
(a)	**Relamp luminaire**	No

The unit of measurement shall be the number of lamps replaced.

The tendered rate shall include full compensation for the supply and installation of the lamp according to the manufacturer's instructions.

Item		Unit
(b)	**Service luminaire**	No

The unit of measurement shall be the number of luminaires opened and serviced.

The tendered rate shall include full compensation for the servicing of the luminaire, including washing, corrosion protection, checking of seals and glands, cleaning of the lenses, tightening of stirrup bracket bolts and the checking of earthing continuity, connections and aiming angle.

Item		Unit
(c)	**Service light distribution kiosk or DB**	No

The unit of measurement shall be the number of distribution boards or kiosks serviced.

The tendered rate shall include full compensation for the cleaning and opening of kiosk or DB, vermin protection, checking of MCB's, checking and tightening of wire terminations, fitting of labels and blank covers. The contractor is to submit a report on the general condition of the kiosk or distribution boards (damaged, rust marks, etc.)

Item		Unit
(d)	**Supply and install padlocks**	No

The unit of measurement shall be the number of 75mm padlocks installed.

The tendered rate shall include full compensation for the ordering, supply, engraving and installation of the padlocks, locking devices and seals. Locks shall be "key alike".

Item		Unit
(e)	**Service area light pole**	No

The unit of measurement shall be number of area light poles opened and serviced.

The tendered rate shall include full compensation for the opening of pole cover, visual inspections, tightening all connections and straightening of pole

Item		Unit
(f)	**Replace luminaire**	No

The unit of measurement shall be number of luminaires replaced.

The tendered rate shall include full compensation for the supply and installation of the specified luminaire complete with lamp and control gear according to manufacturer's instructions.

Item		Unit
(g)	**pole**	No

The unit of measure shall be the number of poles replaced.

The tendered rate shall include full compensation for the removal of all equipment from the existing pole, removal of the existing pole from site, ordering, supply and installation of the pole in the position specified.

The contractor shall install all existing equipment onto the new pole

Item		Unit
(h)	**Supply and install 25m High Scissor Light Mast**	No

The unit of measurement shall be the number of 25m high scissor light mast hot dip galvanised to SANS 121 ISO 1461 specification supplied and installed.

The tendered rate shall include full compensation for the manufacturing, delivery, assemble and erection of the 25m high scissor light mast complete with brackets to carry 9 x 400W HPS Floodlight luminaries, cabling, ring, wiring of luminaries, electrical distribution board and splitter box.

The tendered rate shall further include full compensation for grouting the gap between the mast base plate and the foundation with a Prostruct 531 mixture.

The earthing, excavations and casting of foundation of the mast will be measured elsewhere.

HIGH MAST SPECIFICATION

1. Construction

The masts shall be constructed from conical sections which, when assembled, will form a tapered column of circular cross section. There shall be no fillet welds of the overlaps. The sections shall be joined by friction fit only.

The masts shall be of lightweight construction and a base plate shall be welded to the bottom end of the lowest section suitably drilled for foundation bolts.

All welding to be subject to S.A.B.S. Spec 044 Part 3 Grade B and shall be carried out by S.A.B.S. coded welders only. Proof that all welders have been tested by the S.A.B.S. must be submitted on request. Inspection and acceptance certificates shall be furnished on request.

The steel used in the manufacture of the mast shall have an ultimate tensile strength of between 450 and 620 MPa and identical to SABS 1431 grade 300WA steel.

Proof must be supplied that the manufacturer is ISO 9001 accredited.

2 Dimensions

The masts offered shall give an overall floodlight mounting height of 25 m. The cross-section and wall thickness of the mast is determined on the basis of the working loads.

3. Working Loads

The masts shall be designed in accordance with the S.A.B.S. 0225 Code of Practice for the design and construction of lighting masts. The following site factors shall be considered:

Design wind speed	=	4Om/s
Class of structure	=	B
Categoryofterrain	=	2
Altitude of site	=	1200 m

The mast shall carry at its top 9 x 400W HPS Floodlights evenly around its circumference.

Data on wind induced oscillations and the dynamic behaviour of the mast shall be submitted.

4. Access Opening

An access door adequately protected against the weather shall be provided in the mast, with the bottom lintel 600mm above the base plate. The door shall be adequately protected against vandalism and secured by three screws requiring a special opening tool.

A doorframe shall reinforce the opening in the mast.

The mounting strips welded opposite the door opening shall be drilled for the mounting of a control board. Earth terminals, as well as a support bar for the incoming supply cables, shall be provided below the door opening.

5. Corrosion Protection

All parts of the mast and raising and lowering device, not specified as manufactured from stainless steel, shall be hot dip galvanised to SAB Specification No. 763/1977 and inspection certificates provided if required.

No welding, drilling, punching, bending or removal of burrs shall be carried out after galvanising.

6. Electrical Connection to the Luminaires

A fully enclosed distribution board shall be provided for each mast, containing:

1 x 3 pole isolator (main switch)

3 x single pole MCB's (lights)

1 x single phase switched socket outlet for the use of a power tool

1 x two pole earth leakage unit protecting the single phase outlet

1 x 7pinCEEsocket

1 x adequately rated contactor

1 x single pole MCB acting as by-pass switch

1 x single pole MCB protecting the contactor

All circuit breakers and isolators shall have a rupturing capacity of 5 kA and shall bear the mark of the S.A.B.S. and shall be accessible through cut-outs in the cover without having to remove the cover.

All equipment shall be clearly marked with engraved labels. No stick-on embossed tape shall be used.

The distribution board shall be fully wired and ready for connection to the incoming supply cables.

7. FOUNDATIONS

Each mast shall be supplied with foundation bolts and templates. The bolts shall be hot dip galvanised over their entire length to S.A.B.S. Specification No. 763/1977. Two galvanised nuts, two washers and one spring washer shall be supplied for each bolt. The number of foundation bolts shall be determined according to the design of I .3 above. Calculations shall be submitted upon request.

A foundation plan, adequately designed for the conditions as per I .3 of this specification, and based on a soil bearing capacity of 150 kPa, giving details of the reinforcing required shall be submitted. Soil pressure and overturning safety factor shall be stated.

All reinforcing and foundation bolts shall have a minimum of 100mm concrete cover. The 28 days cube strength of the concrete shall be 25 MPa.

All foundations shall have a circular flat base from which a square plinth shall rise to above the surrounding ground level.

One or two PVC, Class B cable sleeves shall be provided from the centre of the top of the foundation plinth, through the concrete to a point below ground level on the side of the plinth.

After casting of the foundation, the slab shall be covered by earth, properly compacted. The area around the plinth shall be brought to the original level and shall be left neat and tidy.

8. LUMINAIRES

- The floodlight luminaire shall be beam type 400W HPS.
- The floodlight shall be suitable for HST 1000W lamp.
- The body of the luminaire shall be of die-cast aluminium with polyurethane finish.
- The reflector shall be high purity bright anodised aluminium and shall provide a narrow asymmetrical beam.
- The peak intensity shall not be less than 48000 lumens.
- The front glass shall be heat resistant armoured glass.
- The gaskets shall be silicone rubber.
- The fasteners shall be stainless steel.
- The luminaire control gear shall be housed in an integral weatherproof container.

HE 10 SECURITY FENCE LIGHTING: TECHNICAL DETAILS

HE 10.01 Installation description

This section describes the electrical distribution network that will be repaired and maintained in terms of this contract.

Luminaires are suspended on fibreglass poles. Lights are controlled by means of photocells and manual on/off switches.

AREA /STREET	POLE / MAST INFORMATION		LUMINAIRE INFORMATION		
	MOUNTING HEIGHT	DESCRIPTION / MATERIAL	DESCRIPTION	SWITCHING	Number
Not Applicable					

HE 10.02 Scope of repair work

Open each pole cover and inspect fuse or circuit breaker, tray and shield plate as well as earthing connection. Check and replace cover seal if required. Wash luminaire and lens, replace neoprene seal and re-lamp luminaires.

Replace luminaires: Remove existing damaged luminaires, supply and install similar and approved luminaires complete with lamps and control gear, if applicable. Check aiming angle and adjust if necessary.

Open upstream distribution board. Check and fasten cable terminations, fit labelling and blank face-plate covers. Check locking mechanism and fit padlock.

Open distribution kiosk. Clean inside and add termite and rodent poison. Fit circuit labelling. Check locking mechanism and fit padlock.

Open each distribution Kiosk, clean inside provide termile and rodent poison. Check earth bar and earth continuity. Check and fasten cable terminations, fit labelling and blank face-plate covers. Check locking mechanism and fit padlock. Check earth connection to electrode.

Service luminaires by washing with detergent and re-lamping where necessary. Clean lenses. Check condition of seals and glands and test for earth continuity.

HE 10.03 Repair work: Measurement and payment

Item		Unit
(a)	**Service security light pole**	No

The unit of measurement shall be the number of security light poles opened and serviced.

The tendered rate shall include full compensation for the opening of pole box, visual inspections, corrosion protection, straightening of poles if necessary, treating of wooden poles with cresote and securing circuit breakers and terminations.

The contractor shall give a general report on the condition of the pole and equipment. The report should indicate if poles are wrotten (wood poles), bent (steel poles), broken (wood, steel, concrete or fiberglass poles) or if the pole should be painted (steel). Strap all cable to pole.

Item		Unit
(b)	**Re-lamp luminaire**	No

The unit of measurement shall be the number of security lamps replaced.

The tendered rate shall include full compensation for the supply and installation of the lamp according to the manufacturer's instructions.

Item		Unit
(c)	**Service distribution kiosk**	No

The unit of measurement shall be the number of distribution kiosks or boards opened and serviced.

The tendered rate shall include full compensation for the opening of kiosk or distribution board, vermin protection, cleaning of circuit breakers, earth testing, secure circuit breakers and terminations and fitting of blank covers. The contractor is to submit a report on the general condition of the kiosk or distribution board (damaged, rust marks, etc.)

Item		Unit
(d)	**Replace luminaires**	No

The unit of measurement shall be the number of security floodlight luminaires replaced.

The tendered rate shall include full compensation for the supply and installation of the luminaire complete with the lamp and control gear according to the manufacturer's instructions.

Item		Unit
(e)	**Service luminaire**	No

The unit of measure shall be the number of luminaires serviced.

The tendered rate shall include full compensation for the service of the luminaire, including washing, corrosion protection, checking of seals and glands, cleaning of lenses, tightening of brackets bolts, checking of earthing continuity, checking of aiming angle and adjust if necessary

HE 11 STREETLIGHTING: TECHNICAL DETAILS

HE 11.01 Installation description

This section describes the electrical distribution network that will be repaired and maintained in terms of this contract.

Luminaires are suspended on steel, wood, concrete and fibreglass poles of various lengths. Street lights are controlled by means of photocells and manual on/off switches.

AREA /STREET	POLE / MAST INFORMATION		LUMINAIRE INFORMATION		
	MOUNTING HEIGHT	DESCRIPTION / MATERIAL	DESCRIPTION	SWITCHING	NUMBER
Not applicable					

HE 11.02 **Scope of repair work.**

Open distribution kiosk, check locks, clean inside, provide termite and rodent poison.

Open each mast cover and inspect fuse or circuit breaker, tray and shield plate as well as earthing connection. Check and replace cover seal if required. Wash luminaire, replace neoprene seal, clean lens and re-lamp luminaires if required. Replace luminaires: Remove existing damaged luminaires, supply and install similar and approved luminaires complete with lamps and control gear, if applicable. Assess aiming angle and adjust if necessary

HE 11.03 **Repair work: Measurement and payment**

Item		Unit
(a)	**Service streetlight pole**	No

The unit of measurement shall be the number of security light poles opened and serviced.

The tendered rate shall include full compensation for the opening of pole cover, visual inspections, straightening of poles if necessary and securing circuit breakers and terminations.

The contractor shall give a general report on the condition of the pole and equipment. The report should indicate if poles are wrotten (wood poles), bent (steel poles), broken (wood, steel, concrete or fiberglass poles) or if the pole should be painted (steel). Strap all cable to pole.

Item		Unit
(b)	**Re-lamp luminaire**	No

The unit of measurement shall be the number of street light lamps replaced.

The tendered rate shall include full compensation for the supply and installation of the lamp according to the manufacturer's instructions.

Item		Unit
(c)	**Service street Luminaire**	No

The unit of measure shall be the number of luminaires serviced.

The tendered rate shall include full compensation for the service of the luminaire, including washing, corrosion protection, checking of seals and glands, cleaning of lenses, tightening of brackets bolts, checking of earthing continuity, checking of aiming angle and adjust if necessary

Item		Unit
(d)	**Replace streetlight luminaire**	No

The unit of measurement shall be the number of streetlight luminaires replaced.

The tendered rate shall include full compensation for the supply and installation of the luminaire complete with the lamp and control gear as per manufacturer's instructions.

Item		Unit
(e)	**Supply and install photocell bypass**	No

The unit of measure shall be the number of photocell bypasses installed.

The tendered rate shall include full compensation for the design supply and installation of the photocell bypass.

Item		Unit
(f)	**Replace 125MV choke in control gear.**	No

The unit of measure shall be the number of chokes installed.

The tendered rate shall make full compensation for ordering, supply and installation of chokes.

Item		Unit
(g)	**Replace connection to streetlight luminaire.**	No

The unit of measure shall be the number of connections replaced from the streetlight luminaire to the overhead line.

The tendered rate shall make full compensation for ordering, supply and connection of the luminaire to the overhead line with silicon cable or airduct and cable clamps on to the overhead line.

HE 12 MAINTENANCE OF THE INSTALLATION

HE 12.01 The various lighting systems shall be maintained in perfect working order following the initial repair work. The maintenance contract shall run for the balance of the 36-month contract period.

HE 12.02 The following maintenance actions will be required under this phase of the contract:

12.02.01 Routine preventative maintenance
12.02.02 Corrective maintenance
12.02.03 Breakdown maintenance

These actions are defined in the Additional Specification SA – General Maintenance.

HE 12.03 The maintenance schedules and frequency of maintenance activities shall be developed under the maintenance control plan which will be instituted by the Contractor. The Contractors responsibility in this regard is specified in the Additional Specification SA – General Maintenance.

HE 12.04 **The following shall be used as guidelines to ensure effective maintenance:**

12.04.01 Scope of maintenance work on area lighting

a) Monthly

i) Verify operation of switching element
ii) Check lamps
iii) Check mast door for weatherproof seal
iv) Check earth connection at footing, record value

b) Annual

i) Service all luminaires
ii) Measure earth resistance of electrode
iii) Measure earth resistance of trench earth
v) Record values in record book

12.04.02 Scope of maintenance work on security lighting

a) Monthly

i) Verify operation of switching element.
ii) Check lamps.
iii) Check that all pole covers are secure.
iv) Visually check distribution kiosk.

b) Annual

Measure phase voltages and line currents in distribution kiosk or local distribution board. Record values in record book. Do vermin protection. Service all luminaires.

12.04.03 Scope of maintenance work on street lighting

a) Monthly

i) Verify operation of switching element.
ii) Check lamps.
iii) Check that all pole covers are secure.
iv) Visually check distribution kiosk.

b) Annual

Measure phase voltages and line currents in distribution kiosk. Record values in Record book. Do vermin protection. Service all luminaries and distribution kiosks.

HE.12.05 Maintenance shall include all repairs, replacing of components or materials, routine setting or any other actions necessary to ensure a perfect functional condition.

HE.12.06 **Maintenance work measurement and payment.**

Refer to clause SA06 of the ADDITIONAL SPECIFICATION : SA GENERAL MAINTENANCE

TECHNICAL SPECIFICATION

JC CONVENTIONAL FIRE FIGHTING EQUIPMENT

CONTENTS

JC 01	SCOPE
JC 02	STANDARD SPECIFICATIONS
JC 03	OPERATING AND MAINTENANCE MANUALS
JC 04	TRAINING OF OPERATORS FOR THE OPERATION OF THE INSTALLATION AND EQUIPMENT
JC 05	LOGGING AND RECORDING PROCEDURES
JC 06	REPAIR WORK TO INSTALLATIONS, SYSTEMS AND EQUIPMENT
JC 07	MAINTENANCE TO INSTALLATIONS, SYSTEMS AND EQUIPMENT

JC 01 SCOPE

This specification covers the general maintenance of the conventional fire fighting equipment installations, which include the following:

(a) Fire hydrants
(b) Fire hose reels
(c) Fire extinguishers
(d) Fire booster pumps

This specification shall form an integral part of the maintenance and servicing contract document and shall be read in conjunction with the additional and particular specifications compiled as part of this document.

This specification shall act as a guideline to the Particular Specification. In the event of any discrepancies between the Technical Specification and the Particular Specification, the latter shall take precedence.

JC 02 STANDARD SPECIFICATIONS

JC 02.01 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition, including all amendments up to date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall deemed to form part thereof.

JC 02.01.01 SANS and other specifications and codes

SANS 6172; ICS 13.220.10	- Fire extinguishers, classification system, fire ratings
CKS 532; ICS 13.220.10	- Fire extinguishers, foams
SANS 10105-1; ICS 13.220.10	- Fire extinguishers, portable, classification system, control systems
SANS 1322; ICS 13.220.10	- Fire extinguishers, portable, non-refillable
SANS 1567;	- Fire extinguishers, portable, rechargeable, carbon

ICS 13.220.10		dioxide
SANS 1573; ICS 13.220.10	-	Fire extinguishers, portable, rechargeable, foams
SANS 1475-1; ICS 13.220.10	-	Fire extinguishers, portable, reconditioning
SANS 810; ICS 13.220.10	-	Fire extinguishers, powder, portable, rechargeable
SANS 1522; ICS 13.220.10	-	Fire extinguishers, powders
SANS 1571; ICS 13.220.10	-	Fire extinguishers, transportable, rechargeable
SANS 889; ICS 13.220.10	-	Fire extinguishers, water fire extinguishers, portable, rechargeable
SANS 10105-1; ICS 13.220.10	-	Fire fighting equipment, fire extinguishers, portable
SANS 1322; ICS 13.220.10, 23.020.30	-	Fire fighting equipment, fire extinguishers, portable, non-refillable
SANS 543; ICS 13.220.10	-	Fire fighting equipment, fire hose reels
SANS 10105-2; ICS 13.220.10	-	Fire fighting equipment, fire hose reels
SANS 1128-2; ICS 13.220.10, 23.040.60	-	Fire fighting equipment, fire hose, pipe couplings, pipe connections
SANS 1128-1; ICS 13.220.10, 23.060.99	-	Fire fighting equipment, fire hydrants
SANS 810; ICS 13.220.10	-	Fire fighting equipment, powder fire extinguishers, portable, rechargeable
SANS 1475-1; ICS 13.220.10	-	Fire fighting equipment, reconditioning, fire extinguishers, portable
SANS 889; ICS 13.220.10	-	Fire fighting equipment, water fire extinguishers, portable, rechargeable
SANS 543; ICS 13.220.10	-	Fire hose reels
SANS 10105-2; ICS 13.220.10	-	Fire hose reels, classification systems, control systems
SANS 1475-2; ICS 13.220.10	-	Fire hose reels, reconditioning
SANS 1456-5; ICS 13.220.10	-	Fire hoses, collapsible, delivery pipes (fire fighting), oil resistance tests, chemical resistance tests
SANS 1456-2; ICS 13.220.10	-	Fire hoses, collapsible, delivery pipes (fire fighting), percolating hoses
SANS 1456-1; ICS 13.220.10	-	Fire hose, collapsible, delivery pipes (fire fighting), testing

SANS 1456-4; ICS 13.220.10	-	Fire hoses, collapsible, delivery pipes, coated materials, non-percolating hoses
SANS 1456-3; ICS 13.220.10	-	Fire hoses, collapsible, delivery pipes, uncoated materials, non-percolating hoses
SANS 1128-2; ICS 13.220.10, 23.040.60	-	Fire hoses, pipe couplings, pipe connections
SANS 1128-1; ICS 13.220.10, 23.060.99	-	Fire hydrants, fire-fighting equipment
SANS 1056-1; ICS 23.060.20	-	Fire safety, ball valves
SANS 10400	-	Application of the NBR
SANS 10287	-	Automatic sprinkler installations for fire fighting purposes.
FPO/82/6E(STS 10)	-	Standard technical specification for a pump installation for automatic sprinkler fire extinguishing systems.

JC 02.01.02 **Department of Public Works Specifications:**

F.P.O/G.61/3E	-	Fire Security: A guide to Architects
PW 371	-	Specification of Materials and Methods to be used

JC 02.01.03 **Occupational Health and Safety Act of 1993**

All regulations and statutory requirements as laid down in the latest edition of the Occupational Health and Safety Act of 1993. Construction Regulations, 2014 as promulgated in Government Gazette No 37305 of 04 April 2014 shall be adhered to.

JC 02.01.04 **Manufacturers' specifications, codes of practice and installation instructions**

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

In the event of a discrepancy between the statutory codes and the manufacturer's codes, the discrepancy shall be brought to the attention of the Engineer, who, in collaboration with the Employer and Local Authority, will prescribe the steps to be taken.

JC 02.01.05 **Municipal regulations, laws and by-laws**

All municipal regulations, laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

JC 03 OPERATING AND MAINTENANCE MANUALS

No operating and maintenance manuals will be developed for this section.

The contractor shall use the Maintenance Control Plan (see SA Maintenance) to schedule routine preventative maintenance activities.

Over and above the afore-mentioned, the Contractor shall also be responsible for the compilation of the following:

(a) Cataloguing of the fire-fighting equipment

All the fire-fighting equipment must be catalogued under the following headings:

(i) Location and details of equipment
(ii) Service date
(iii) Service frequency
(iv) Condition of equipment
(v) History: Usage incidents, breaking, etc.

(b) Provision of a "Fire Plan"

The Contractor shall provide a Fire Plan indicating positions, and keeping up to date any changes of the equipment position, status and operation.

JC 04 TRAINING OF OPERATORS FOR THE OPERATION OF THE INSTALLATION AND EQUIPMENT

The end user shall be trained by the supplier of the fire fighting equipment to operate the individual fire fighting equipment.

Fire fighting training shall be done by a nationally accredited training institute (Fire Protection Association of South Africa).

JC 05 LOGGING AND RECORDING PROCEDURES

The Contractor shall under this repair and maintenance contract institute a logging and recording system as part of his maintenance control plan as defined in Additional Specification SA: General Maintenance. This shall consist of a log and record book, which shall be utilised to log and record all service records, system checks, breakdowns, maintenance visits, inspections, etc.

The logbook shall be stored in a safe place as agreed with the User Client and the Engineer and shall only be utilised by the Fire Protection Officer, the Contractor and the Engineer. The Contractor shall submit copies of the monthly entries and recordings into the logbook , together with his monthly report, to the Engineer.

The logbook shall be structured to include at least the following:

(a) Service records
(b) Inspection and maintenance actions
(c) Breakdown reports
(d) Fire safety officer's comments
(e) Inspection and test comments and reports.

The Contractor shall also institute an attendance register, which shall be kept in a safe place as agreed with the User Client and Engineer. This register shall be completed by all persons visiting the installation, including:

(a) Fire safety officer
(b) Contractor
(c) Inspectors
(d) Department personnel
(e) Engineer.

The register shall state the date, time-in, time-out, name, company and reason for visit.

A copy of the register shall be submitted by the Contractor together with his monthly report.

JC 06 REPAIR WORK TO INSTALLATIONS, SYSTEMS AND EQUIPMENT

JC 06.01 GENERAL

During the repair and maintenance contract all the systems, installations and equipment shall be repaired as specified in the Particular Specification. This repair work shall include, but no be limited to the specified Particular Specification details.

All repair work shall be executed using approved materials and equipment suitable to the systems and/or installations they serve. The said repair work shall be executed in accordance with the relevant codes of practice, standards, regulations, municipal laws and by-laws, manufacturer's specifications and codes of practice and all applicable additional and particular specifications included in this document.

The repair work items are listed in the Particular Specification and Schedule of Quantities with all relevant details, such as capacity, size, manufacturer, model number, etc.

All repair work shall be executed within the specified durations listed in the Appendix to Tender. All new equipment, materials and systems shall be furnished with a written guarantee of a defects liability period of 12 months commencing on the date of issue of a certificate for completion of the repair work. These guarantees shall be furnished in favour of the Department of Public Works.

Repair work items for the fire fighting equipment shall be categorised under the following headings:

(a) Fire hydrants
(b) Fire hose reels
(c) Fire extinguishers.

JC 06.02 REPAIR WORK TO EXISTING EQUIPMENT

The Contractor shall at the start of the repair and maintenance contract inspect, record and report on all the existing fire fighting equipment listed in this specification.

This inspection and report shall comprise the following:

(a) Establishing the condition of all equipment;

(b) Reporting all defects to equipment;

(c) Compliance of equipment in respect of the governing regulations at the start of the Contract;

(d) Recording all equipment with an identifying system;

(e) Details of all equipment;

(f) Suitability of equipment regarding the purpose it serves;

(g) Water supply pressure;

(h) Listing of latest service.

The Contractor shall report on the above in writing to the Engineer. No repair, service and/or replacement work shall commence prior to approval by or directives from the Engineer.

JC 06.03 FIRE HYDRANTS

Repair work to the fire hydrants system is detailed in the Particular Specification and shall include, but not be limited to the following:

(a) Replacement of damaged, broken, leaking, corroded pipe work and fittings;

(b) Replacement of main hydrant seal;

(c) Repair/replacement of quick coupling catches;

(d) Replacement of damaged shaft ends (right angle wheel type);

(e) Replacement of damaged and expired or missing 65 mm diameter hose streamers;

(f) Replacement of damaged or missing 65 mm diameter hose nozzle;

(g) Replacement of damaged valve stem seal;

(h) Replacement, repair and repainting of concrete pedestals;

(i) Replacement of fire damaged, missing or shortfall fire signage to equipment;

(j) Hydrants shall be labelled with identifying tags and details recorded.

JC 06.04 **FIRE HOSE REELS**

Repair work to the fire hose reel systems is detailed in the Particular Specification and shall include but no be limited to the following:

(a) Replacement of the hose drum seal where leaks occur;

(b) Replacement of the 30 m hose where perished, damaged or missing;

(c) Repair damaged hose drums and, where directed by the Engineer, replace with new;

(d) Replace gland packing and gaskets to hose reel shut-off valve;

(e) Replace missing hose reel shut-off valve wheel handles;

(f) Number and catalogue hose reel;

(g) Where hose reels shut-off valves are damaged beyond repair, these shall be replaced with new;

(h) All hose reel mountings shall be checked and where loose or damaged, replaced with new;

(i) Where paintwork of equipment has deteriorated, such equipment items shall be replaced and repainted in accordance with the manufacturer's specification;

(j) Hose reels shall be labelled with identifying tags and details recorded, including service record.

JC 06.05 **FIRE EXTINGUISHERS**

Repair work to the fire extinguishers is detailed in the Particular Specification and shall include, but not be limited to the following:

(a) Replace wall mounting boards and brackets where damaged or missing.

(b) Dry chemical powder extinguishers shall be repaired and serviced and shall include at least the following:

(i) Replace discharge hose and nozzle where damaged or missing;

(ii) Replace gauge on bottle where reading is incorrect, damaged or missing;

(iii) Check, service and repair activation mechanism;

(iv) Replace DCP powder;

(v) Recharge discharge cylinder to the required capacity;

(vi) Reseal discharge mechanism;

(vii) Replace instructions on extinguishers where necessary;

(viii) Extinguishers shall be labelled with identifying tags and details recorded, including service record.

(c) CO_2 extinguishers shall be repaired and serviced and shall include at least the following:

(i) Replace discharge nozzle and pipe where damaged or missing;

(ii) Replace gauge on bottle where reading is incorrect, damaged or missing;

(iii) Repair activation mechanism;

(iv) Recharge with CO_2 to required capacity;

(v) Reseal discharge mechanism;

(vi) Replace instructions on extinguishers where necessary;

(vii) Extinguishers shall be labelled with identifying tags and details recorded, including service record.

(d) Water extinguishers shall be repaired and serviced and shall include at least the following:

(i) Check cylinder for corrosion and report to Engineer. Where directed, the complete unit shall be replaced;

(ii) Replace discharge hose and nozzle where damaged and missing;

(iii) Replace gauge on bottle where damaged, missing or where reading is incorrect;

(iv) Check service and repair activation mechanism;

(v) Replace water content;

(vi) Recharge discharge cylinder to the required capacity;

(vii) Reseal discharge mechanism;

(viii) Replace instructions on extinguisher where damaged or missing;

(ix) Extinguishers shall be labelled with identifying tags and details recorded, including service record.

(e) Foam type extinguisher shall be serviced and repaired and shall include at least the following:

(i) Check cylinder for corrosion and report to Engineer. Where directed, the complete unit shall be replaced;

(ii) Replace discharge hose and nozzle where damaged or missing;

(iii) Replace gauge on bottle where damaged, missing or incorrect;

(iv) Check, service and repair activation mechanism;

(v) Replace foam concentrate content;

(vi) Recharge discharge cylinder to required capacity;

(vii) Reseal discharge mechanism;

(viii) Replace instructions on extinguisher where damaged or missing;

(ix) Extinguishers shall be labelled with identifying tags and details recorded, including service record.

JC 07 MAINTENANCE TO INSTALLATIONS, SYSTEMS AND EQUIPMENT

JC 07.01 GENERAL

Annual maintenance responsibilities for each installation including all units and components as specified shall commence with access to the site. A difference shall be made in payment prior to and after practical completion of the work.

Maintenance of the completed installation shall commence upon the issue of a certificate of practical completion for repair work, and shall continue for the remainder of the 36-month contract period.

This part of the Contract shall include:

(a) Routine preventative maintenance;
(b) Corrective maintenance, and
(c) Breakdown maintenance,

as defined in Additional Specification SA: General Maintenance, for the specified installations described under JC 01 of this specification.

The maintenance work to be performed and executed shall be done strictly in accordance with Additional Specification SA: General Maintenance and as specified in Particular Specification PJC and this specification.

The said maintenance work shall be executed in accordance with the relevant codes of practice, statutory regulations, standards, regulations, municipal laws and by-laws and the manufacturers' specifications and codes of practice.

The maintenance schedules and frequency shall be developed under the maintenance control plan to be instituted by the Contractor, as specified in Additional Specification SA: General Maintenance.

All new equipment, components and materials supplied and installed under the maintenance contract shall be furnished with a prescribed manufacturer's guarantee.
The maintenance work and items are to be categorised for each maintenance activity under the following headings:

(a) Fire hydrants
(b) Fire hose reels
(c) Fire extinguishers
(d) Fire booster pumps

The Contractor shall be remunerated monthly, based on his performance, for maintaining the complete installation in a perfect functional condition.

JC 07.02 ROUTINE PREVENTATIVE MAINTENANCE

The routine maintenance of the installations, systems and equipment shall be done in accordance with Additional Specification SA: General Maintenance, and the Particular Specification related to this work.

The routine maintenance work to be performed and executed shall include, but not be limited to the items listed below under the respective headings.
These actions and findings shall be logged and reported on the relevant approved schedules and reports.

JC 07.02.01 Fire hydrants

Maintenance work shall include at least the following actions and shall be scheduled in accordance with the relevant regulations and requirements and include monthly and six-monthly inspections and services.

(a) Check hydrant valve seal.

(b) Check right angle wheel for tightness.

(c) Check valve stem and or top for damage.

(d) Check valve stem seal and readjust.

(e) Check operation of quick couplers.

(f) Check operation (opening and closing movement of valve).

(g) Check water pressure and flow.

(h) Check stand pipe for rigidness and leaks.

(i) Log maintenance schedule.

(j) Report defects for processing and repair.

(k) For fire water pipe systems see Technical Specification AA.

(l) For fire pump see Technical Specifications FN and JA.

JC 07.02.02 Fire hose reels

Maintenance work shall include at least the following actions and shall be scheduled in accordance with the relevant regulations and requirements and include monthly and six-monthly inspections and services.

(a) Check drain seal.

(b) Roll down hose and check for cracks or perishing.

(c) Check operation of PWD type nozzle.

(d) Check operation of drain.

(e) Check operation of fire hose reel valve.

(f) Lubricate moving parts of drum.

(g) Check pressure and flow of fire hose reel.

(h) Check piping for leaks and damages.

(i) Log maintenance schedules.

(j) Report defects for processing and repair.

(k) For fire water pipe systems see Technical Specification AA.

(l) For fire pumps see Technical Specifications FN and JA.

JC 07.02.03 **Fire extinguishers**

Maintenance work shall include at least the following actions and shall be scheduled in accordance with the relevant regulations and requirements and include monthly and six-monthly inspections and services.

(a) General

(i) Check mounting of backboard and bracket.

(ii) Check charge of the extinguisher.

(iii) Check the condition of the discharge.

(iv) Check the mechanism condition of the discharge hose.

(v) Update the log entry on the extinguisher.

(vi) Log maintenance schedule.

(vii) Report defects for processing and repair.

(b) Individual types of extinguishers

Over and above the preceding requirements, the following shall apply to individual types of extinguishers.

(i) DCP extinguishers:
Check charge and replace powder at prescribed intervals.

(ii) CO_2 extinguisher:
Check charge.

(iii) Water extinguisher:
Replace water at pre-described intervals.

(iv) Foam extinguisher:
Check foam mix and replace at predetermined intervals.

(c) Fire booster pumps

JC 07.03 **CORRECTIVE MAINTENANCE**

This corrective maintenance of the installations, systems and equipment shall be done in accordance with Additional Specification SA: General Maintenance, and the Particular Specification related to this work.

The Contractor shall inspect and check all equipment, materials, systems and installations for any pending breakdowns, maladjustments or anomalies of equipment.

The Contractor shall report and take actions to correct such shortfall.

JC 07.04 **BREAKDOWN MAINTENANCE**

Breakdown maintenance of the installations, systems and equipment shall be done in accordance with Additional Specifications SA: General Maintenance.

All breakdown problems experienced shall be acted upon within the time limitations allowed in the General Maintenance specifications.

All breakdown maintenance shall be done in accordance with the relevant specifications, standards, regulations and codes.

The Contractor shall have access to the necessary spares, equipment and tools for any possible breakdowns.

TECHNICAL SPECIFICATION

KA WATER AUDIT

CONTENTS

KA 01 SCOPE
KA 02 STANDARD SPECIFICATIONS
KA 03 EXECUTION OF REPAIR WORK
KA 04 MAINTENANCE
KA 05 MEASUREMENT AND PAYMENT

KA 01 SCOPE

This specification covers the material, equipment, testing and work required for the implementation of a water audit. It covers only the external water services comprising the water supply from the point of delivery and the associated distribution system.

This specification shall form an integral part of the maintenance and servicing contract document and shall be read in conjunction with portion 3: Additional Specifications included in this document.

This specification shall act as a guideline to the Particular Specification and, in the event of any discrepancies between the Technical Specification and the Particular Specification, the latter shall take precedence.

KA 02 STANDARD SPECIFICATIONS

KA 02.01 GENERAL STANDARD SPECIFICATIONS, REGULATIONS AND CODES

The latest edition including all amendments up to the date of tender, of the following specification, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

SANS 1200 DB - Earth works (pipe trenches)
SANS 1200 LB - Bedding and pipes
SANS 10306 - Management of potable water in distribution systems
BS 1780 - Specification for Bourdon tube pressure and vacuum gauges

KA 02.02 OCCUPATIONAL HEALTH AND SAFETY ACT OF 1993

All regulations and statutory requirements as laid down in the latest edition of the Occupational Health and Safety Act of 1993: Construction Regulations, 2003 as promulgated in Government Gazette No 25207 and Regulation Gazette No 7721 of 18 July 2003 shall be adhered to.

KA 02.03 MANUFACTURERS' SPECIFICATIONS, CODES OF PRACTICE AND INSTALLATION INSTRUCTIONS

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

KA 02.04 MUNICIPAL REGULATIONS, LAWS AND BY-LAWS

All municipal regulations laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

KA 02.05 MECHANICAL PRESSURE GAUGES

(a) Analogue mechanical or Bourdon tube pressure gauges shall be of the bottom entry type and shall have faces at least 60 mm in diameter with clear, readable markings and indicators. The screw-in fitting shall be compatible with the pipe fitting, which shall be the metric equivalent of a ½ inch BSP internal thread unless otherwise specified. Threads shall be in accordance with BS 21 for jointing threads or BS 1387 for long screw threads. The Contractor shall provide the relevant details in the operation and maintenance manuals.

(b) The indicated range on the gauge shall span 120 % of the operational pressure range specified for the relevant equipment. Accuracy shall be within 3 % of the full-scale deflection value. An adjustable indicator shall be set to indicate the maximum operational system pressure clearly.

(c) It shall be possible to isolate the pressure gauge from the pressure pipe by means of a valve or a gauge cock, which shall be supplied and installed by the Contractor and shall be included in the tendered rate for the equipment.

(d) A gauge protector shall be fitted where a gauge has to indicate pressures in corrosive media or liquids that could easily clog the pressure ports. It is a requirement that gauge protectors be fitted where sludge is the working medium.

(e) Pressure gauges fitted to hydraulic pipelines shall be glycerine-filled for damping purposes, and gauges fitted to pneumatic or gas pipelines shall be vacuum-damped.

(f) The circumferential positioning of pressure gauges on water and sewerage pipes shall be in accordance with BS 5316: Part 1 class C, and the static head tapping shall also comply with these standards.

(g) Bourdon type pressure gauges shall comply with BS 1780.

KA 02.06 DATA LOGGER SPECIFICATION

KA 02.06.01 Special features required

The following special features are required of the data logger:

- Recording of analogue values (pressure) and flow simultaneously;
- Inputs may be used for either digital or analogue sensing devices;
- Three independent memories (day, hour and events);
- Positive and negative data logging;
- LC-display;
- Alarm contact;
- Battery-powered (independent of the mains power supply);
- Appropriate software included.

KA 02.06.02 Technical data

Protection	IP68
Casing	Cast aluminium
Operating temperature	0 to 50 °C
Storage temperature	-10 to + 70 °C

System clock	Read time
Output	V.24/RS 232-compatible data interface to connect to the PC. All socket connectors are waterproof.
Alarm contact	FET open drain - 1 max 100 mA; U max 50 V

KA 02.06.03 **Pressure sensor**

The sensor may be either:

- direct-connected to a 3/8" NPT thread nipple, or
- connected by an adapter to a 3/8" Whitworth female connection.

Material:

All parts which are in contact with the media and the housing must be manufactured from stainless steel.

Storage temperature	-55 to +100 °C
Operating temperature	-40 to +100 °C
Operating temperature interface	0 to +70 °C
Compensated range	0 to +70 °C
Media temperature	-40 to +125 °C
Humidity	0 to 100 % (RH)
Shock	50 g
Accuracy	± 1,0 % FS at constant temperature
Non-linearity	± 0,2 % FS
Repeatability	± 0,5 % FS
Thermal effects	0 °C to 70 °C
Response time	1,0 ms

Pressure ratings (bar):	Operating pressure	Proof pressure[2]	Burst[3]
	0 - 20,70	31,0	345

(a) Sensor including interface;

(b) Maximum pressure without causing damage to the sensing elements;

(c) The media will be contained until this extreme pressure limit is exceeded.

Measuring range: 0,0 to 20,7 bar

KA 03 EXECUTION OF REPAIR WORK

KA 03.01 GENERAL

The Contractor shall investigate and inspect all areas of the installation to confirm the extent of the repair work required and shall report to the Engineer. The Engineer will thereafter demarcate any areas to be repaired and shall instruct the Contractor with regard to the repair work to be done.

KA 03.02 INSTALLATION OF WATER METERS

This section covers the installation and repair of all water meters that will be used as part of the water audit process.

KA 03.02.01 **Bulk water meters**

Bulk water meters at reservoirs shall be repaired or replaced depending on the condition of the meter. Meters not installed in accordance with the manufacturer's instructions shall also be rectified.

All reservoir outlets shall be metered.

All boreholes will be metered.

KA 03.02.02 **Zone meters**

Zone meters shall be installed within the network where significant benefit can be obtained from dividing the area into zones so that the consumption pattern can be monitored and discrepancies between the supply and consumption within the area compared.

Zone meters will also be used for the measurement of night flows where required.

KA 03.02.03 **Individual connections**

All individual connections within the reticulation shall be metered. Such connections shall include meters for individual buildings.

KA 03.02.04 **Domestic water meters**

Meters for domestic water consumption shall be provided in above ground installations, but underground in secure areas.

KA 03.02.05 **Combination water meters**

The installation of combination water meters shall be considered for all installations where connections larger than 80 mm are used for institutions that have peak flows exceeding 400 times the minimum anticipated flow.

KA 03.02.06 **Fire flow connections**

Where fire flow connections are provided, measures shall be taken to ensure that the fire flow and domestic water consumption are metered separately. The Engineer will indicate where the meters are to be installed.

KA 03.03 **ROUTINE INSPECTIONS OF PIPELINE ROUTES**

KA 03.03.01 **Water pipelines**

The routes of all water supply pipelines shall be inspected for visible leaks. All leaks shall be properly logged and reported for repair.

KA 03.03.02 **Sewer manholes**

Sewer manholes shall be inspected for excessive night flows. The households in areas with high night flow rates shall be inspected for leakages resulting from leaking cisterns, etc., which occur on the consumers' side of the meters.

KA 03.04 **COMPILATION OF DATABASE**

The Contractor shall compile a database to assist in effective management of the system. The database shall contain the following information:

(a) Meter serial number
(b) Meter size
(c) Meter make
(d) Installation position
(e) Meter reading on installation
(f) Date of installation
(g) Date last calibrated
(h) Consumer name
(i) Postal and residential address
(j) Length and diameter of pipeline.

The above-mentioned data may also be provided as part of the User Client's billing system.

In the compilation of the database the Contractor shall ensure that the information required for the "water audit" software is also collected.

KA 03.05 **LEAK DETECTION AND REPAIR**

This clause covers the providing of additional equipment for implementing a water loss management programme in identified areas. Areas with significantly high unaccounted for water flows will be identified for measuring night flows.

KA 03.05.01 **Provision of data loggers**

Data loggers shall be provided in accordance with Particular Specification PA: Measuring instruments. The data loggers will enable the monitoring of flow patterns and detailed inspection of the minimum night flow in a particular area.

KA 03.05.02 **Measurement of night flows**

Measurement of the night flow shall be done as instructed by the Engineer.

KA 03.05.03 **Meter management**

All metered consumers must be incorporated into a billing system for the accurate compilation of monthly accounts for water consumed.

The billing system shall be user-friendly and cover at least the following aspects:

(a) Meter serial number;
(b) Consumer name;
(c) Postal and residential address;
(d) Meter reading at start and end of period;
(e) Dates of meter reading;
(f) Volume of water consumed;

(g) Tariff applicable for payment;

(h) Estimated interim accounts;

(i) Accounts in arrears;

(j) Unreadable accounts with associated reasons;

(k) Incorporation of prepayment meters and associated consumption.

KA 03.05.04 **Provision of software**

Software packages shall be provided to enable the following:

(a) Establishment of a meter database;

(b) Establishment of a user-friendly database;

(c) Water audit;

(d) Night-flow evaluation.

KA 03.05.05 **Training and capacity building**

This clause covers the training of representative staff of the User Client to acquire a level of competency so that they will be able to manage the water control plan.

The training programme shall include the following aspects:

(a) Software application for water balance, water audit and billing system;

(b) Meter reading;

(c) Use of data loggers.

SANS 10306 will be used as a basis for the training.

KA 04 MAINTENANCE

This specification must be read in conjunction with Additional Specification SA: General Maintenance.

All components of the water control plan including the associated water meters, as well as software and hardware for the computers, shall be maintained during the maintenance phase of the Contract. Maintenance of the system shall ensure reliable functioning and optimum service life thereof. Commencement of maintenance of the system shall mean that the system has been repaired to its original level of serviceability and shall leave the Contractor with an as-new system to maintain for the remaining period of the 36 month contract.

Remuneration for maintaining the system, services and parts of the infrastructure in perfect functional condition is provided for in the Schedule of Quantities by means of monthly payment items.

Maintenance implies and shall include monthly routine preventative maintenance and corrective maintenance, as well as breakdown maintenance on all components of the specified installation. Maintenance shall include all repair work, replacing of components, fixing defects or any other actions or rectifying measures necessary for complete operation of the water control plan.

KA 04.01 SCOPE OF MAINTENANCE

Maintenance work for the water control plan shall comprise the following:

KA 04.01.01 Monthly maintenance

(a) Check operation of water meters;
(b) Read all water meters;
(c) Verify sample meter readings;
(d) Update database;
(e) Issue consumer accounts;
(f) Repair visible leaks;
(g) Compile monthly water balance on volume and costs.

KA 04.01.02 Four-monthly maintenance

(a) Check sewer night flows three-monthly;

(b) Install data loggers to measure night flows at bulk and zone meters three-monthly;

(c) Analyse data from data loggers;

(d) Implement leak detection in areas indicated as problematic through data logger analysis.

KA 04.01.03 Six-monthly maintenance

(a) Clean strainer units at water meters;

(b) Confirm settings and operation of pressure-reducing valves.

KA 05 MEASUREMENT AND PAYMENT

KA.01 COMPILATION OF DATABASE ..... Unit: sum

The tendered sum shall include for the provision of the software and the input of all the initial data.

KA.02 MEASUREMENT OF NIGHT FLOWS ..... Unit: number

The unit of measurement shall be the number of periods during which a night flow is measured per water meter installation, irrespective of the duration of the measuring period.

The tendered rate shall include for the installation of data loggers, downloading of data, presentation and analysis of results and all associated incidental charges.

KA.03 METER MANAGEMENT SYSTEM ..... Unit: sum

The unit of measurement shall be a sum for the complete compilation of a meter management system sufficient for management of the installation.

The tendered rate shall include for the input of all related data.

KA.04 **PROVISION OF SOFTWARE** ..... Unit: number

The unit of measurement shall be the number of software packages provided.

The tendered rate shall include for the supply, delivery and installation of the relevant software. All associated labour costs shall be included but, the associated computer hardware costs are to be excluded.

Separate pay items will be listed in the Schedule of Quantities for different software packages.

KA.05 **TRAINING AND CAPACITY BUILDING** ..... Unit: sum

The unit of measurement shall be a sum to cover the respective training and capacity building offered.

The tendered rate shall include for the labour, transport, materials and all other related costs.

Separate items will be listed in the Schedule of Quantities for different courses required.

KA.06 **SUPPLY AND INSTALLATION OF PRESSURE GAUGES** ..... Unit: number

The unit of measurement shall be the number of pressure gauges supplied and installed.

The tendered rate shall include full compensation for the supply and installation of the pressure gauges, including site handling, correct positioning, testing and all material and labour required to obtain a fully functional pressure gauge.

KA.07 **SUPPLY AND DELIVERY OF DATA LOGGERS** ..... Unit: number

The unit of measurement shall be the number of data loggers supplied and delivered. There will be different items for different data loggers.

The tendered rate shall include full compensation for the corrosion protection, patent rights, royalties, transport and all other costs and actions required for the supply and delivery of data loggers as specified.

KA.08 **INSTALLATION, TESTING AND COMMISSIONING OF DATA LOGGERS AS SPECIFIED** ..... Unit: number

The unit of measurement shall be the number of data loggers installed, tested and commissioned as specified.

The tendered rates shall include full compensation for the site handling, positioning, installation, testing and commissioning of the data loggers as specified, including all other costs and actions required to obtain a fully functional system for flow measurement.

All actions required as part of the software installation shall be included.

Particular Specifications

PAA	:	Plumbing and drainage installations
PAM	:	Mobile structures
PBF	:	Pest Control
PFD	:	Heating ventilation and air-conditioning systems
PJC	:	Conventional fire-fighting equipment

PARTICULAR SPECIFICATION

PAA PLUMBING AND DRAINAGE INSTALLATION

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PAA 01 SCOPE

(a) This specification covers the particulars of the maintenance work to the plumbing and drainage installations at Kosi Bay Port of Entry. This particular specification shall be read in conjunction with the Technical Specification AA: Plumbing and Drainage Installation, and all additional and technical specifications compiled as part of this document, in particular the following Additional Specifications:

SA: General Maintenance
SB: Operating and Maintenance Manuals
SC: General Decommissioning, Testing and Commissioning Procedures
SD: General Training

The intended maintenance work to this installation will restore the existing installations to safe, efficiently functional systems that comply with all statutory regulations and applicable standards, in the process repairing all defects and shortfalls. On completion of the repair work, the completed installations shall be maintained and serviced by the Contractor for the remainder of the 36-month contract period.

The various sites consist of various facilities, as listed below, which form part of the maintenance and servicing contract for plumbing and drainage installation.

PAA 01.01 KOSI BAY PORT OF ENTRY

All the buildings at Kosi Bay are connected to water meters. Other items in buildings are described below:

QTY	Location	Taps Valves (No)	WC Pan (No)	WC Cistern (No)	Urinal (No)	WHB (No)
42	Kosi Bay Port of Entry	20	6	6	4	6
14	*Kosi Bay Housing (Manguzi)*	8	2	2	0	2

QTY	Location	Zink (No)	Wash Trough (No)	Bath (No)	Shower (No)	Geyser (No)
INSTALLATION A2: Kosi Bay **- RESIDENTIAL BUILDINGS: PLUMBING AND DRAINAGE**						
10	Kosi Bay Port of Entry	4	4	0	0	2
14	Kosi Bay Housing (Manguzi)	4	4	2	2	2

PAA 02 GENERAL DESCRIPTION OF INSTALLATIONS

The existing plumbing and drainage installations provide potable hot and cold water to the various buildings on these sites. The potable cold-water installation is provided with supply points from the underground reticulation networks outside the buildings to an above ground reticulation network via service ducts, ceiling voids and chased into walls to outlet points. The potable hot-water installation is provided with supplies from various domestic or industrial geysers where applicable.

This contract also provides for repair and maintenance of the fire water piped reticulation network, excluding the fire fighting equipment which is dealt with under Particular Specification PJC: Conventional Fire Fighting equipment.

Technical details of sanitary and brassware, as well as the plumbing and drainage installations are given in PAA 03.

PAA 03 TECHNICAL DETAILS OF EXISTING INSTALLATIONS

At the time of compilation of this document the existing installations consisted of the equipment and plant listed below with their relevant technical details.

PAA 03.01 SANITARY AND BRASSWARE: GENERAL

	SANITARY WARE	BRASSWARE	TRAP
WCs (cistern)	Armitage Shanks/Vaal: white, floor-mounted, vitreous china	Brass shut-off valves	Not applicable
Cistern (WC)	Wall-mounted, white, CI; Wall-mounted, white, vitreous china; Wall-mounted, white, plastic	Brass shut-off valves	Not applicable
Urinals (flush)	Armitage Shanks, white, wall-mounted, vitreous china; Citimetal stainless steel wall-mounted.	Junior flush valve, exposed type, shut-off valves; Brass shut-off valves	CP bottle trap. Flexi P-trap; Flexi S-trap
WHBs	Armitage Shanks, white wall-mounted, white enamel; Wall-mounted stainless steel	Cobra 15 mm, CP star handle pillar taps	Flexi P-trap; Flexi S-trap
Showers		15 mm CP under-tile stop-cocks	

	SANITARY WARE	BRASSWARE	TRAP
Wash troughs	Stainless steel, double bowl, wall-mounted	Cobra 15 mm, CP star handle wall type taps	Flexi P-trap
Baths	Steel enamel, white, 2 m long	Cobra 20 mm, CP star handle wall type taps	Not applicable
Sinks	Stainless steel, cabinet-mounted	20 mm CP star handle taps, 20 mm Cobra taps CP sink mixer with over arm swivel outlet	Flexi P-trap, lead P-trap
Wash tubs	Concrete double bowl	CP wall type taps	Lead P-trap

PAA 03.02 **SANITARY DRAINAGE PIPING: GENERAL**

	PIPE	FITTINGS	EQUIPMENT
Gullies	VCP	CI or plastic grating	Not applicable
Waste pipes	GMS, uPVC	Brass, uPVC	Not applicable
Soil pipes	S&S CI, uPVC	S&S CI, uPVC	Not applicable
Cleaning eyes	CI (ABC), uPVC	Not applicable	Not applicable
Vent pipes	S&S CI	S&S CI	Not applicable

PAA 03.03 **DOMESTIC WATER PIPING: GENERAL**

	PIPE	FITTINGS	EQUIPMENT
Cold-water piping	Cu GMS	Conex, soldered GMS	Brass gate shut-off valve Brass gate shut-off valve
Hot-water piping	Cu GMS	Conex, soldered GMS	Brass gate shut-off valve Brass gate shut-off valve

PAA 03.04 **FIRE WATER PIPING: GENERAL**

	PIPE	FITTINGS	EQUIPMENT
Fire water piping	GMS, Cu	GMS, Conex soldered	See specifications

PAA 03.06 **FIRE WATER INSTALLATION QUANTITIES**

The fire fighting equipment currently installed is listed in Particular Specification PJC: Conventional Fire Fighting Equipment. The piped reticulation networks to these equipment items shall form part of this contract where applicable.

PAA 04 STATUS OF EXISTING INSTALLATION

The status of the equipment and installation at the time of compilation of this document is summarised below:

PAA 04.01 **SANITARY AND BRASSWARE**

The condition of sanitary and brassware varies between the different buildings and are therefore grouped as shown earlier.

(1) Kosi Bay Port of Entry:

(a) The operational buildings at Kosi Bay are newly constructed buildings and all plumbing fixtures are new.
(b) The Residential area has been previously repaired and maintained up to date. Only maintenance will be required.
(c) Two houses at Kosi Bay will be repaired during the corrective maintenance phase of this Contract.

PAA 04.02 PLUMBING AND DRAINAGE INSTALLATION

(1) Kosi Bay Port of Entry:

(a) Only maintenance is required. Visible damages must be reported and repaired.

PAA 05 DETAILS OF REPAIR WORK

The following work shall form part of the repair work to Building Services. This work shall be done in accordance with the relevant regulations, codes, specifications and Technical Specification AA: Plumbing and Drainage Installations, as set out in this document. The work to be included is set out in PAA 05.01 and PAA 05.02 below and shall be read in conjunction with the Schedule of Quantities and Technical Specifications.

The repair work shall be carried out in accordance with the requirements of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures.

PAA 05.01 GENERAL DESCRIPTION OF REPAIR WORK

PAA 05.01.01 The Contractor shall at the start of the Repair and Maintenance Contract inspect the items, systems, equipment, components and installations listed below. This inspection shall involve the determination of any defects, leaks, damages, shortfalls, structural soundness, repairs required, details of existing equipment, suitability of equipment for the purpose it serves, etc. The Contractor shall report back to the Engineer in writing on all the above and the following items. No repair work shall commence prior to approval by the Engineer:

(a) Sanitary and brassware, including traps, brackets, piping, pan connectors, etc;

(b) Sanitary drainage installation, including fittings, traps, floor drains, gullies, cleaning eyes, manholes, grease and oil separators, etc;

(c) Domestic water piped installation, including fittings, valves, strainers, lagging and cladding, non-return valves, safety valves, etc;

(d) Fire water piped installation, including fittings, valves, non-return valves, pressure gauges, etc;

(e) Bracketing system;

(f) Domestic geysers including valves, pressure reducing valves, strainers, vacuum breakers, safety valves, non-return valves, lagging and cladding, etc.

(g) Industrial geysers including valves, pressure reducing valves, strainers, vacuum breakers, safety valves, non-return valves, lagging and cladding, etc.

PAA 05.01.02 The general scope of work at the time of going on tender is defined as follows:

(a) Replacing of irreparably damaged, missing and unsuitable sanitary and brassware, including the isolation, removal and stripping of the existing equipment;

(b) Replacing of irreparably damaged, corroded and unsuitable sanitary drainage piping, including fittings, brackets, traps, floor drains, oil and grease separators, cleaning eyes and gullies, etc;

(c) Replacing of irreparably damaged, corroded and unsuitable domestic water piping, including fittings, brackets, valves, strainers, water meters, lagging and cladding, etc;

(d) Replacing of irreparably damaged, corroded and unsuitable fire water piping, including fittings, brackets, valves, non-return valves, pressure gauges, etc;

(e) Replacing of irreparably damaged and corroded domestic or industrial geysers, including valves, pressure-reducing valves, air release valves, strainers, non-return valves, vacuum breakers and safety valves;

(f) Servicing, cleaning and repair of existing sanitary ware including removal of stains, repair of chipped enamel, replacing of damaged and missing seats and lids, de-scaling and cleaning of cisterns and servicing of filling and flushing mechanisms, fixing of loose fixtures and brackets, cleaning of traps, etc;

(g) Servicing, overhauling and cleaning of existing brassware, including dismantling, de-scaling, repair kits, replacing of washers, gland packing and gaskets, replacing of missing tap handles and flushing assemblies, etc;

(h) Servicing, cleaning and repair of existing domestic water and drainage pipe installations, including traps, floor drains, gullies, manholes, valve chambers, grease and oil separators, brackets, valves, vacuum breakers, strainers, pipe lagging and cladding, etc;

(i) Servicing and repair of existing fire water piped reticulation, including fittings, valves, pressure gauges, brackets, etc;

(j) Servicing, cleaning and repair of domestic geysers, including de-scaling, testing for leaks, replacing of elements, safety valves and thermostats if required, etc;

(k) Handing over of complete systems on completion of the repair work to the satisfaction of the Engineer, when the maintenance period shall commence;

(l) The supply and compilation of operating and maintenance manuals;

(m) The testing, adjusting and commissioning of all systems;

(n) The introduction of a maintenance control plan, including logging, recording and control procedures.

PAA 05.02 **REPAIR WORK TO PLUMBING AND DRAINAGE INSTALLATION**

The repair work to this installation shall at least include, but not be limited to the work listed below. Any items, components or installations not detailed in particular but found to be defective or inoperative during the inspection and report phase, shall be repaired or replaced as instructed by the Engineer.

PAA 05.02.01 **Various Sites**

(i) Service and repair domestic hot and cold-water installations, including pressure testing of existing systems, and replace items that are beyond repair. Where necessary, replace entire system with capillary soldered copper pipe system.

(ii) Service and repair drainage system, including rodding of system, and replace damaged or leaking pipes and fittings, manhole covers, cleaning and inspection eyes, gullies and gully gratings.

(iii) Service and repair brassware, such as taps, stop-cocks and flushing mechanisms with repair kits, and replace items that are missing or beyond repair.

(iv) Service and repair sanitary ware, including chip repair, de-staining and re-coating of baths, WC bowls and wash hand basins, dent removal and de-staining of wash troughs and kitchen sinks and replacement of damaged or missing parts such as WC seats and lids and cistern lids. Replace missing or irreparably damaged equipment. The following replacement items shall be installed where required:

(1) Ceramic and Plastic cisterns
(2) Steel enamel bathtubs
(3) Stainless steel wash troughs
(4) Ceramic wash hand basins

(v) Service and repair domestic geysers, including de-scaling, testing for leaks, replacement of electrical heating elements if required, servicing or replacement of valves, or replace leaking and corroded geysers where necessary.

PAA 06 MEASUREMENT AND PAYMENT

All new building work and repair work to existing structures and buildings necessitated by repairs to the plumbing and drainage services as scheduled, shall be done in accordance with the structural and building section of the Technical and Particular Specifications. The costs of such building and repair works shall be deemed to be included in the tendered rates for the applicable items as scheduled in this section.

PAA.01 **INSPECTION AND REPORT ON EXISTING INSTALLATIONS** .....Unit: installation

The unit of measurement shall be the installation reported on.

The tendered rate for the installation shall include full compensation for the inspection and written report on all items, systems, components, equipment and installations, including the establishment of defects, leaks, damage, shortfalls, structural soundness, repairs required, details of existing equipment and suitability of the equipment for the purpose it serves.

PAA.03 **ISOLATION, STRIPPING, DISMANTLING AND REMOVAL OF EXISTING BRASSWARE, SANITARY WARE AND PIPING INSTALLATIONS** .....Unit: number, metre

The unit of measurement shall be the number of each item of brassware and sanitary ware and metre of piping removed, including fixtures and fittings.

The tendered rates shall include full compensation for the isolation, dismantling and removal of irreparably damaged, broken and/or unsuitable brassware (flush valves, taps, mixers, shower roses, under tile stop-cocks, demand bib taps, hose bib taps, shut-off valves, etc) and sanitary ware (water closets, cisterns, basins, urinals, baths, wash troughs, sinks, etc) including all associated pipe work, brackets, traps, pan connectors, etc.

The tendered rates shall also include full compensation for the isolation, stripping, dismantling and removal of irreparably damaged, broken or unsuitable pipe work installed on surface, underground, chased into walls, in ceiling voids and/or service ducts, as well as the plugging off of connections to this pipe work.

The tendered rate shall also include full compensation for the removal off site and/or to storage of all removed items as mentioned above.

PAA.04 **ISOLATION, STRIPPING, DISMANTLING AND REMOVAL OF EXISTING GEYSER INSTALLATIONS** .....Unit: number

The unit of measurement shall be the number of each geyser installation removed, including associated pipe work and fittings.

The tendered rates shall include full compensation for the isolation, stripping, dismantling and removal of irreparably damaged, broken and/or corroded domestic geysers, including shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc, and the removal off site.

PAA.05 **SUPPLY AND INSTALLATION OF SANITARY WARE AND BRASSWARE** .....Unit: metre, number

The unit of measurement shall be the number of each item of sanitary and brassware supplied and installed, including all associated pipe work and fittings.

The tendered rate shall include full compensation for the supply, delivery, positioning, installation, testing, cleaning, commissioning and hand-over of sanitary and brassware including all necessary pipe work, traps, brackets, fittings, bends, junctions, cleaning eyes, etc, to connect the sanitary and brassware to the existing water supply and/or drainage installation.

The tendered rate shall also include full compensation for chasing and/or building into walls and the reinstating of existing surfaces such as floors, walls, ceilings, etc.

PAA.06 **SUPPLY AND INSTALLATION OF DRAINAGE PIPING INSTALLATION** .....Unit: metre

The unit of measurement shall be the metre of each type of piping in the installation supplied and installed, including all fixtures and fittings.

The tendered rates shall include full compensation for the supply, delivery, installation, testing, cleaning, commissioning and handover of new drainage piping, installed on surface against walls or soffits, underground, in ceiling voids, chased or built into walls and/or service ducts, including all necessary bends, junctions, tees, cleaning eyes, covers, traps, floor drains, gratings, brackets, hangers, etc, to hand over a complete and effective installation that complies with local government regulations.

The tendered rates shall also include full compensation for the necessary underground works such as excavation, pipe bedding, fill blanket, backfilling and compaction and for the reinstatement of existing surfaces such as floors, walls, ceiling, roads, paving, etc, as well as connection to the existing drainage installation.

PAA.07 **SUPPLY AND INSTALLATION OF DOMESTIC WATER PIPING INSTALLATION** ..... Unit: metre

The unit of measurement shall be the metre of each type of piping in the installation supplied and installed, indicating all fixtures and fittings.

The tendered rates shall include full compensation for the supply, delivery, installation, testing, cleaning, sterilising, commissioning and hand-over of new water piping installed on surface against walls or soffits, underground, in ceiling voids, chased or built into walls and/or in service ducts, including all necessary bends, tees, reducers, elbows, valves, strainers, adapters, brackets, hangers, etc, to hand over a complete and effective installation that complies with local government regulations.

The tendered rates shall also include full compensation for the supply and installation of hot-water pipe insulation and cladding.

The tendered rates shall also include full compensation for the necessary underground works such as excavation, pipe bedding, fill blanket, backfilling and compaction and for the reinstatement of existing surfaces such as floors, walls, ceilings, roads, paving, etc, as well as connection to the existing domestic water installation.

PAA.08 **SUPPLY AND INSTALLATION OF DOMESTIC GEYSER INSTALLATION**.....Unit: number

The unit of measurement shall be the number of each geyser installation supplied and installed, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of domestic geysers, including shut-off valves, non-return valves, strainers, pressure-reducing valves, vacuum breakers, air release valves, safety valves, etc, as well as connection to existing piping and electrical supply.

PAA.09 **SUPPLY AND INSTALLATION OF FIRE WATER RETICULATION PIPEWORK**..... Unit: metre

The unit of measurement shall be the metre of each type of pipe work supplied and installed in the firewater reticulation, including all fixtures and fittings.

The tendered rate shall include full compensation for the supply, delivery, installation, testing, cleaning, commissioning and hand-over of new fire water reticulation pipe work installed on surface against walls or soffits and/or underground, including all necessary bends, tees, reducers, elbows, valves, adapters, brackets, hangers, pressure gauges, etc, to hand over a complete and effective installation that complies with local government regulations.

The tendered rates shall also include full compensation for the necessary underground work such as excavation, pipe bedding, fill blanket, backfilling and compaction and for the reinstatement of existing surfaces such as floors, walls, ceilings, roads, paving, etc, as well as connection to the existing fire water reticulation network.

PAA.10 **SERVICING, CLEANING AND REPAIR OF SANITARY WARE**.....Unit: number

The unit of measurement shall be the number of each item of sanitary ware serviced, cleaned and repaired, including all associated pipe work and fittings.

The tendered rate shall include full compensation for the repair or replacement of all damaged or missing parts, servicing of all movable parts, cleaning of stained sanitary ware with approved cleaning agent, fixing of loose fixtures and brackets according to manufacturer's specifications, de-scaling and cleaning of cisterns and servicing of filling and flushing mechanisms, cleaning of all traps, fixing or replacing of damaged or missing shower, urinal and channel outlet gratings and any other work or action required to hand over an effective system that complies with local government regulations.

PAA.11 **SERVICING, OVERHAULING AND CLEANING OF BRASSWARE**..... Unit: number

The unit of measurement shall be the number of each item of brassware serviced, overhauled or cleaned, including all associated pipe work and fittings.

The tendered rate shall include full compensation for dismantling, cleaning and de-scaling, replacement of all gaskets, gland packing and seals on all valves, repair or replacement of all damaged or missing parts, replacement kits for worn or leaking flush valves, taps and mixers, repair or replacement of leaking, corroded or damaged flush pipes, readjusting of timing mechanisms on flush valves and metering taps and any other work or action required to hand over an effective system that complies with local government regulations.

PAA.12 **SERVICING, CLEANING AND REPAIR OF DOMESTIC WATER AND DRAINAGE PIPE INSTALLATIONS**..... Unit: number, metre, item

The unit of measurement shall be the metre of each type of pipe installation serviced, cleaned and repaired, including all fixtures and fittings.

The tendered rates shall include full compensation for inspection, sampling testing, servicing, cleaning and repair of existing piping and equipment such as:

(a) Video surveying of all underground drainage pipe work to establish root ingress, damaged and corroded pipe work, fat build-up, blockages, incorrect falls, sagging and to provide as-built information;

(b) Initial unblocking and cleaning of all drainage pipe work, traps, floor drains and gullies;

(c) Pressure testing of piping and taking of water piping samples to determine state of corrosion and scaling;

(d) Repair work to damaged manholes, gullies, cleaning eyes, valve chambers, etc, including builders' work and benching;

(e) Repair of existing bracketing systems including fixing and repair of existing brackets and hangers, as well as the supply and installation of additional brackets where required;

(f) Emptying, cleaning, checking, testing and repair of oil and grease separators;

(g) Service and repair to all valves, strainers, pressure-reducing valves, water meters, non-return valves, air release valves and vacuum breakers, including new gaskets, gland packing and seals;

(h) Taking of water samples and bacteriological testing to determine the compliance with the relevant codes of practice;

(i) Repairing and/or replacement of damaged hot-water pipe lagging and cladding;

(j) Preparation, painting and repainting of pipe work and;

(k) Any other work or action to hand over an effective installation that complies with local government regulations.

PAA.13 **SERVICING, CLEANING AND REPAIR OF DOMESTIC GEYSERS** ..... Unit: number

The unit of measurement shall be the number of domestic geysers serviced, cleaned and repaired, including all fixtures and fittings.

The tendered rate shall include full compensation for the isolation, servicing, cleaning and repair of domestic geysers in accordance with the manufacturer's specifications, including de-scaling, testing for leaks, replacing of elements, replacement of safety valve and replacement of thermostat and set point, and replacement of connections if required and any other work or action to hand over an effective system that complies with local government regulations.

PAA.14 **SERVICING AND REPAIR OF FIRE WATER PIPED RETICULATION NETWORKS** ..... Unit: metre

The unit of measurement shall be the metre of each type of piping in the firewater network serviced and repaired, including all fixtures and fittings.
The tendered rates shall include full compensation for the inspection, testing, servicing and repair of existing piping and equipment such as:

(a) Pressure testing of piping and taking of pipe samples to determine the extent of corrosion and scaling;

(b) Repair or replacement of damaged, leaking, broken and corroded pipe work or fittings;

(c) Repair and service to all valves, including new gaskets, gland packing and seals;

(d) Repair, service, adjustment and calibration of all pressure gauges;

(e) Repair and fixing of existing brackets and hangers and the installation of additional brackets and hangers where required;

(f) Any other work or action to hand over an effective system that complies with local government regulations.

PAA.15 **CLEANING OUT SEPTIC TANKS AND DISPOSE OF CONTENTS OFF-SITE** ..... Unit: number

The unit of measurement shall be the number of septic tanks thoroughly cleaned and pumping the waste into a tanker and disposing of all the waste off site at a wastewater dumping area.

PAA.16 **SUPPLY AND INSTALLATION OF DOMESTIC GEYSER INSTALLATION**.....Unit: number

The unit of measurement shall be the number of each geyser installation supplied and installed, including all associated pipe work and fittings.

The tendered rates shall include full compensation for the supply and installation of industrial geyser installations including isolating lever-ball valves (from 22 to 50mm), 400kPa expansion relief valve, drain connection, overflow pipe, inline circulating pump (25mm), Temperature and pressure safety valve, electrical control panel, bulk hot water vessel, pump supply cable, dual thermostat, hot water outlet, y-strainer, pressure gauge, non-return valve, temperature gauge, balanced cold water and expansion valve stand pipe.

PAA.17 **SERVICING, CLEANING AND REPAIR OF INDUSTRIAL GEYSERS**..... ..... Unit: number

The unit of measurement shall be the number of industrial geysers serviced, cleaned and repaired, including all fixtures and fittings.

The tendered rate shall include full compensation for the isolation, servicing, cleaning and repair of industrial geysers in accordance with the manufacturer's specifications, including de-scaling, testing for leaks, servicing, checking or replacing of isolating lever-ball valves (from 22 to 50mm), 400kPa expansion relief valve, drain connection, overflow pipe, inline circulating pump (25mm), Temperature and pressure safety valve, electrical control panel, dual thermostat, y-strainer, pressure gauge, non-return valve, temperature gauge, and any other work or action to hand over an effective system that complies with local government regulations.

PAA.18 **RE-INSTALLATION OF EXISTING GEYSER INSTALLATIONS AT LOCATION INDICATED BY ENGINEER** .....Unit: number

The unit of measurement shall be the number of each geyser re-installed including associated pipe work and fittings.

The tendered rates shall include full compensation for the re-installation of the isolated domestic geysers, including servicing, cleaning and repair of domestic geysers in accordance with the manufacturer's specifications scaling, testing for leaks, replacing of elements, and replacement of thermostat and set point, replacement of two shut-off valves, non-return valve, strainer, two vacuum breakers, safety valve and replacement pipe work not exceeding 10m from the previous location according to SANS specifications and any other work or action to hand over an effective system that complies with local government regulations.

PAA.19 **SUPPLY AND INSTALLATION OF DOMESTIC GALVANISED GEYSER DRIP TRAY**.....Unit: number

The unit of measurement shall be the number of each geyser drip tray installation supplied and installed, including isolation and re-installation of geyser.

The tendered rates shall include full compensation for the supply and installation of the geyser drip trays including isolation of geyser and re-installation of geyser on drip tray.

PAA 07 DETAILS OF MAINTENANCE WORK

PAA 07.01 GENERAL

The Contractor shall be responsible for the complete maintenance of all the equipment, components, installations and systems forming part of this repair and maintenance contract and as set out in PAA 03.05. The Contractor shall strictly adhere to Additional Specification SA: General Maintenance, and Technical Specification AA: Plumbing and Drainage Installations, with regard to the maintenance period, obligations, responsibilities, actions and activities, etc, which shall also include the following maintenance actions:

(a) Routine preventative maintenance. A guideline to the required actions is provided in specification AA. The actions will not be limited to these guidelines, but shall include all additional actions, work, materials, etc. necessary to maintain this installation at an acceptable level.

(b) Corrective maintenance as described and defined in Additional Specification SA: General Maintenance.

(c) Breakdown maintenance as described and defined in Additional Specification SA: General Maintenance.

Fatal breakdown shall be defined as any equipment, components and systems preventing the supply of water to fire hydrants and fire hoses due to a failure of this system at the particular point of incident.

Emergency breakdown shall be defined as any equipment, components and systems preventing the provision of water and the drainage of the equipment to the consumer points due to a failure of part of this system at the particular point of incident.

PARTICULAR SPECIFICATION

PAM STRUCTURAL AND BUILDING INSTALLATION: MOBILE STRUCTURES

CONTENTS

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PAM 07	MAINTENANCE WORK
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PAM 09	MAINTENANCE WORK ENTAILS.

PAM 01 SCOPE

The specification provides the general and detail requirements for the repair and maintenance work to the Mobile structures/mobile homes and form a part of Structural and Building Installations at Kosi Bay Port of Entry, and includes Civil and Structural as well as Electrical and Mechanical work. The mobile structures are located at:

- Kosi Bay Port of Entry, which is situated on the borderline of South Africa and Mozambique
- The seven mobile structures are placed within the border post perimeter.

The intended corrective maintenance work will restore the existing mobile structures to safe, efficiently functional systems that comply with all statutory regulations and applicable standards, in the process repairing all defects and shortfalls in order to improve the efficiency and safety of the mobile structures. On completion of the repair work, the completed installations shall be maintained and serviced by the Principal Contractor (referring to the Contractor with overall responsibility) for the remainder of the 36-month contract period.

When repairing mobile structures it requires attention to detail, and therefore it's important to work with a professional who has experience working with these types of structures. The Contractor shall prepare all-inclusive documentation for quotations and appointment of a Service Provider/Subcontractor for the specialised corrective maintenance on seven mobile structures. All documentation shall be approved by the Engineer before the Service Provider is appointed for the specialised corrective maintenance work. This work can only be done by a registered Service Provider with minimum of five years of experience – see Clause PAM 06.01.

With the approval of the Departmental Project Manager and Engineer, the outdated or malfunction equipment than has reach the end of life cycle to be replaced or repaired. This includes electrical, plumbing, as well as heating, ventilation and air-conditioning units or any other equipment. A motivation report must be submitted by the Contractor as prepared by the professional Subcontractor who specialised in the repair of mobile structures for the replacement of these systems.

This particular specification shall be read in conjunction with the following Additional and Supplementary Services Specifications:

PAM 02 STANDARD SPECIFICATIONS

The latest edition, including all amendments up to date of tender of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof.

PAM 02.01 ADDITIONAL SUPPLEMENTARY SERVICES SPECIFICATIONS

Additional and Supplementary Services specifications are:

SA: General Maintenance
SC: General Decommissioning, Testing and Commissioning Procedures
SD: General Training
SI: Occupational Health and Safety
BF: Pest Control
AA: Plumbing and drainage
BJ: Paintwork
FD: Heating ventilation and air-conditioning systems
PFD: Heating ventilation & air-conditioning systems
HC: Low voltage reticulation
JC: Conventional firefighting equipment
SJ: Covid-19 Compliance

PAM 02.02 OCCUPATIONAL HEALTH AND SAFETY ACT OF 1993

The Contractor shall be required to comply with the Occupational Health and Safety Act 85 of 1993, Construction Regulations 2014 and related regulations. Non-compliance with these regulations, in any way whatsoever, will be adequate reason for suspending the Works.

PAM 03 GENERAL DESCRIPTION OF INSTALLATIONS

The existing mobile structures provide office space and ablution facilities to Departmental staff working at the Kos Bay Port of Entry.

The mobile structures are built and supplied by:

- Fabricated Steel Manufacturing Company (FSM) (Pty) Ltd.
- Africabin Building Systems (Pty) Ltd.

The mobile structures are:

- 1 x Department of Agriculture and Fisheries: Sized 3 x 2 metres
- 1 x Department of Home Affairs: Sized 6 x 2 metres
- 1 x IT server: Sized 2 x 2 metres
- 1 x Port Health: Sized 4 x 5 metres
- 1 x SAPS: Sized 3 x 2 metres
- 1 x SAPS: Sized 6 x 2 metres
- 1 x SARS: Sized 3 x 2 metres

1 x SARS: Sized 6 x 4 metres: This is a new unit and shall be maintained by the Contractor, but corrective maintenance work will only occur once the mobile structure have been successfully been handed over to DPWI assets)

NOTE: The number of units is not limited to above-mentioned.

PAM 04 TECHNICAL DETAILS OF EXISTING INSTALLATION

At the time of compilation of this document the existing mobile structures as listed below with their relevant general technical details, varies between manufacturers:

PAM 04.01 MOBILE STRUCTURES: GENERAL TECHNICAL DETAILS

CHASSIS

- The steel chassis consists of two 175 x 50 mm lipped-channel, longitudinal beams. Beams and cross-members are of 75 x 38 mm channel.
- Full-length, full-width structurally welded steel chassis with two 250 x 75 mm lipped-channel longitudinal beams. Outriggers and cross-members are of 75 x 38 mm channel.
- The chassis could be coated with a waterproof, malleable compound to form a tenacious wax-like surfacing.

SIDEWALL

The standard exterior and interior finish is approximately 0,5 mm chromadek, which is a galvanised, prepainted finish. The perimeter and internal walls are fully insulated with 40 mm thick high-density foam.

ROOF AND CEILING

The roof is a pitched roof construction, which consists of:

- Exterior roof is of galvanised sheeting. Ceiling insulation is 40 mm thick high-density foam sandwiched between 0,5 mm sheeting. Ceiling finish is 0,5 mm white chromadek ceiling.

WINDOWS

Window frames are aluminium, top-hung and fitted with 4 mm thick glass.

FLOORS

Treated timber floorboards, 18 mm thick, are glued and screwed to cross-members and covered in 2 mm industrial vinyl welded at joints.

PLUMBING

Copper or Polycop (only for cold water) piping is used for water supply. PVC fittings installed for sewerage and wastewater.

ELECTRICAL SYSTEM

The units are wired for connecting to 220 volt supply, in accordance with SABS 0142:1987 and fitted with earth-leakage protection and distribution board. Lights, plugs, geyser and interior electrical fittings are installed as specified.

The above-mentioned information must be verified by the Contractor before the preparation of documentation for the appointment of a Service Provider/Subcontractor – see Clause PAM 01, for Scope above.

PAM 05 STATUS OF EXISTING INSTALLATION

The status of the mobile structures at the time of compilation of this document is summarised below:

PAM 05.01 FRAME/CHASSIS

The condition of the mobile structures chassis varies.

The chassis of the mobile structures at Kosi Bay Port of Entry which are equipped for ablution/office facilities are rusted probable due to the moisture content of the surrounding climate.

All other lipped-channel longitudinal beams, channels, beams and cross-members are rusted.

PAM 05.02 EXTERIOR WALLS

The paint work of exterior walls are fading and showing rust in certain areas near the basis.

PAM 05.03 ROOFS AND CEILINGS

The low pitched roof construction has not been sealed recently, and constant sealing and maintenance work shall be required in accordance with specifications.

PAM 05.04 FLOORS

Treated timber floorboards at the facilities are damaged by water penetration and to be repaired and sealed to prevent further water penetration.

PAM 05.05 PLUMBING

PVC fittings installed for sewerage and wastewater showing leaks and to be fixed.

PAM 05.06 ELECTRICAL SYSTEM

The earth-leakage protection and distribution board, lights, plugs, geyser and interior electrical fittings to be inspected and replaced/repair if required in accordance with the relevant regulations, codes and specifications.

PAM 06 CORRECTIVE MAINTENANCE WORK

The corrective maintenance work shall form part of the repair work to Building and Structural Installations. This work shall be done in accordance with the relevant regulations, codes and specifications.

The corrective maintenance work shall be carried out in accordance with the requirements of Additional Specification SC: General Decommissioning, Testing and Commissioning Procedures.

Corrective maintenance work entails subsequent action to restore mobile structures to the functional condition as before. The meaning of corrective maintenance could also mean repair.

The corrective maintenance work to mobile structures is a specialised field, which requires detailed training and expertise in the construction and repair of mobile structures. This work can only be done by a registered service provider with five years of experience.

PAM 06.01 **APPOINTMENT OF A SERVICE PROVIDER**

The Contractor shall prepare relevant documentation in order to acquire three Quotations for the "specialised corrective maintenance work" at the beginning of the contract. The Engineer shall verify all three Quotations and the procurement for a Service Provider shall then commence. A Service Provider must be appointed by the Contractor as a Subcontractor not later than 3 months after site handover. The following shall form part of the appointment of a Service Provider:

a) The Contractor shall arrange a briefing meeting on site with the three candidates.

b) The Registered Service Provider must have a minimum of at least 5 years' experience. The specialised corrective maintenance work shall be completed over a period of 9 months and the defects liability period is 12 months.

c) A Temporary rental mobile unit of the same size shall be included in the tendered rate to facilitate the User Department and not to cause any disruptions to the day to day operations of the respective User Department that is being affected by the "corrective maintenance" activities.

d) Three Quotations shall be obtained within 7 weeks after site handover for a Registered Service Provider in terms of corrective maintenance work for the mobile structures as to be found at the above-mentioned site. The Quotation shall provide a breakdown per mobile structure as well as a total for corrective maintenance of all existing mobile structures. The Quotation must include a fixed cost for a "Detailed Report" (including photographs) as well as a description how the work will be executed. The Detailed Report shall only follow after the Registered Service Provider has been appointed as a Subcontractor. The Subcontractor shall prepare the Detailed Report and construction program to be shared with the User Department.

e) The Engineer shall be responsible for the assessment of the three Registered Service Provider candidates and approval of a Subcontractor for the dedicated corrective maintenance work with regard to seven mobile structures.

f) The Quotation shall include all labour, equipment, material, travelling, accommodation and all other expenses. The Quotation for the corrective maintenance shall include full compensation for the Detailed Report, which shall include inspection/assessment and written report on all items, systems, components, equipment, including the establishment of defects, leaks, damages, shortfalls, structural soundness in terms of every mobile structure on site, which shall be submitted within 4 weeks after the Registered Service Provider has been appointed as a Subcontractor. The Detailed Report shall include photographs and work execution/implementation as well as a breakdown of cost per mobile structure. The Quotation shall include all OHS Act responsibilities from PPE, to site safety REP and compiling and updating the OHS files. OHS files to be approved by the Engineer and the Principle Contractors OHS agents respectively.

g) The Contractor shall compile a written agreement between the Contractor and Subcontractor (Service Provider), which shall be approved by the Engineer. The agreement shall be signed by all parties before corrective maintenance work commences.

h) Replacement of complete mobile structures is not recommended in this repair, maintenance and serving contract, unless appropriate motivation can be provided to the Engineer.

i) The Registered Service Provider (Subcontractor) shall provide and maintain hard-cover A4 files for corrective maintenance records for each mobile structure for the duration of the Contract. All schedules, checklists, breakdown reports, component replacement records and monthly reports shall be filed.

j) The monthly report shall include at least the following with regard to project progress and must be submitted on the first day of each month:

- Updated Construction Program
- Mobile structure reference number indicated on layout plan;
- Temporary unit attained and occupied;
- Repair/supply and install chassis;
- Repair/supply and install floorboards;
- Replacement of floor vinyl;
- Replacement of skirting;
- Replacement of doors and door locks;
- Replace damaged wall panels;
- Replace damaged roof panels;
- Sealing of roof panels;
- Repair/replace windows;
- Interior paint work;
- Exterior paint work;
- Levelling of units;
- Supply new concrete levelling blocks;
- Plumbing work;
- Electrical work, which include wiring and fittings, etc;
- HVAC system on mobile units;
- Quality control;
- Milestones;
- Human resources available on site;
- Plant and equipment on site;
- Material on site;
- Health, Safety and Environmental matters (OHS Act);
- Covid-19/pandemic regulations and comment;
- Site inspections and testing of units;
- Testing and issuing of Certificate of Compliance (COC);
- Delays and site issues;
- Payment
- Photo report.

k) The Subcontractor shall attend monthly site meetings on invitation and site corrective maintenance records shall be submitted at each meeting.

See summary of responsibilities on the following page.

The responsibilities of all roll players involved, can be summaries as follows:

No.	Description	Format	Responsibility			Remarks
			Contractor	Service Provider	Engineer	
1	**Compile documentation for:**	Doc	yes			After site handover
1.1	*Description of work to be done;*		yes			
1.2	*Requirements, etc;*		yes			
1.3	*Approved.*				yes	
2	**Arrange a briefing meeting**	Minutes	yes			5 weeks > site handover
3	**Acquire three Quotations:**	Quote	yes			7 weeks > site handover
3.1	*At least 5 years' experience;*		yes			
3.2	*Repair phase is12 months;*		yes			
3.3	*Defects liability is 12 months.*		yes			
4	**Quotation shall provide:**	Quote		Yes		
4.1	*Breakdown per mobile structure;*	Table		Yes		
4.2	*Include cost of "Detailed Report:.*	Table		Yes		
4.3	Contents of "Detailed Report":			Yes		
4.4	*Implementation/execution;*	Report		Yes		
4.5	*Breakdown of cost per unit;*	Table		Yes		
4.6	*Photographs of each unit.*	Report		Yes		
	Cost shall include (in quotation):	Quote		Yes		
4.7	*Labour;*			Yes		
4.8	*Equipment;*			Yes		
4.9	*Material;*			Yes		
4.10	*Travelling;*			Yes		
4.11	*Accommodation;*			Yes		
4.12	*All other expenses and costs.*			Yes		
4.13	*Ample files for record purposes.*	Quote		Yes		
4.14	*Submit reports on request.*	Quote		Yes		
4.15	*Attend site meetings.*	Quote		Yes		
5	**Assessment of Quotations**	Quote			yes	
6	**Compile an agreement**	Agree	yes			
6.1	*Approval of agreement.*	Agree			yes	
7	**Appointment: Subcontractor:**	App	yes			12 weeks > site handover
7.1	*Sign agreement by all parties.*	Agree	yes	Yes		
8	**Subcontractor:**					
8.1	*Submits Detailed Report*			Yes		15 weeks > site handover
8.2	*Approval of Detailed Report*				yes	
	LEGEND:					
	Contractor is the:	The Principal Contractor				
	Service Provider becomes the:	Subcontractor after agreement was signed				
	Engineer is the representative of:	The Client (Principal Agent/Consultant)				

PAM 06.02 **CORRECTIVE MAINTENANCE**

The Registered Service Provider (Subcontractor) for mobile structures shall be responsible for the corrective maintenance work with regard to seven mobile structures and the following observations were made during the time of compilation of this document and can be used as a guideline:

a) The replacing of severely rusted channels and tubing of steel frames/chassis - treating new steel work to prevent rusting.

b) The levelling and jacking of mobile structures. Levelling is required to avoid stress to the frame/chassis of the structure. Suitable and sufficient supporting in strategic positions is extremely important. Galvanised tripods jacks and supporting concrete blocks (35 MPa) for the jacks could be included with the approval of the Engineer.

c) The cleaning, de-rusting (using a high quality rust converter), applying high quality primer and top coat to steel frames/chassis as specified by manufacture.

d) Spray painting the external side walls to match the original colour.

e) Sealing and painting of roofs. High quality sealant shall be used and must be UV resistant.

f) Rotten/damaged floorboards to be replaced and silicon sealed to prevent further water penetration.

FRAME/CHASSIS AND LEVELLING

The chassis of the mobile structures is so close to the ground and open to the elements and irrigation systems, that the steel frames have corroded/rusted, making it brittle and prone to cracking or buckling under the weight of the mobile structure and its contents.

The steel frame must be inspected annually by the Contractor as a preventative maintenance responsibility and treated with a highly effective rust converter and applied as specified by the manufacture. Add a high quality primer and top coat to steel work.

Mobile structures are more prone to requiring floor levelling after having been installed for a couple of years. Levelling is required to avoid stress to the framing of the structure. Adequate and sufficient supporting in strategic positions is extremely important.
Brick support is not ideal because the likelihood that this support is millimetre perfect is highly unlikely meaning that either there is a gap between the top brick and the chassis, meaning that the chassis is flexing.

If the supports under the mobile structure are not correct, or they have not stood up well with time, they could be replaced with galvanised tripod jacks including blocks/slabs underneath. These jacks do not rust, and they are merely there to act as a support. With their screw adjustment they merely are wound to make contact with the chassis, and not to lift it. A specialist team has to be appointed to carry out the specialised operation.

EXTERIOR WALLS

The exterior walls which are rusted and deteriorated shall be treated and painted as prescribed by the manufactures of mobile structures.

ROOF

Mobile structures roofs tend to leak because of changes in temperature, harsh weather conditions and limited slope. Ugly stains on the ceiling are an indication that the roof is leaking. It is important to repair the leaky roof before fixing the stains caused by the leak.

Dirt and moisture on the roof can cause corrosion over time. Clear away soil, leaves and moss regularly to keep it as clean as possible. Check the condition of the roof at least once a year. Inspecting roof seams, vents and pipes for signs of corrosion. Apply a waterproof,

airtight coating to prevent rust from forming on the roof. Rain water goods shall be inspected and cleaned once per month during the rainy season.

PAM 07 **MAINTENANCE WORK**

The Contractor shall at the start of the Repair and Maintenance Contract inspect the structures, systems, equipment, components of all mobile structures. This inspection shall involve the determination of any defects, leaks, damages, shortfalls, structural soundness, repairs required, details of existing equipment, suitability of equipment for the purpose it serves, etc. The Contractor shall report back to the Engineer in writing on all the mobile structures.

PAM 07.01 **CONTRACTOR'S RESPONSIBILITY**

The Contractor shall maintain the complete installation for the 36-month Contract period as defined in specification SA for General Maintenance.

Maintenance implies and shall include monthly preventative maintenance, corrective maintenance, as well as breakdown maintenance on all components of the specified installation.

The Maintenance Control Plan (specified in Clause SA 03) will be developed by the Contractor, to schedule the frequency of routine inspections and format of reports. The Contractor shall carry out inspections on the equipment as detailed in the Technical and Particular Specifications and the Maintenance Control Plan. Each inspection, test or breakdown shall be recorded in an approved Excel format and listed in a monthly report (part of the Maintenance Control Plan). The monthly report with regard to mobile structures shall be submitted to the Engineer at the beginning of each month – see Clause PAM 06.01(j).

Continued training shall be included in the scope of maintenance work for the duration of the 36-month Contract, in accordance with Additional Specification SD: General Training.

The Contractor shall, as part of his maintenance responsibilities repair or replace faulty equipment upon logging of a breakdown, within the down-time as defined in Clause SA 05.02 at the Contractor's cost, except in the event of replacement being labelled as exceeding liability as specified in Clauses SA 02.02 and SA 02.03 of the General Maintenance specification of the Contract, in which case the Department of Public Works and Infrastructure (DPWI) will bear part of the costs.

The Contractor shall rectify any faulty condition of which he becomes aware, even if it has not been logged. Such rectification shall also be logged and listed in the monthly report.

PAM 07.02 **COMMUNICATION**

The Maintenance Control Plan (Clause SA 04) will provide, after agreement between the Contractor and the Engineer, for the following communication and complaint logging procedure:

(a) The Contractor shall establish a telephone and email, fax line and a cellular telephone connection to ensure that he can be reached at any time.

(b) The Contractor shall primarily be responsible for determining the items requiring preventative, corrective and breakdown maintenance, and shall communicate this information directly to his maintenance workforce.

(c) Should the Engineer or operating personnel of the User Department determine or suspect that preventative, corrective or breakdown maintenance is required, a call shall be logged through the Call Centre to reach the Contractor as soon as possible.

(d) Reaction times will be as described in Clause SA 05.02.

(e) All complaints of the User Department shall be reported to the Engineer via the Call Centre, as set out in the Maintenance Control Plan, and the Engineer shall issue instructions to the Contractor. After the Contractor has attended to the complaint, the Engineer will provide feedback to the Call Centre both telephonically and via email or fax.

The Call Centre logs the details of the Engineer's call and provides feedback to the complainant.

PAM 08 MEASUREMENT AND PAYMENT

PAM.08.01 **APPOINTMENT OF A REGISTERED SERVICE PROVIDER AS A SUBCONTRACTOR** PC Sum: Installation (Mobile Structures)

The unit of measurement for the corrective maintenance of mobile structures shall be a PC Sum (Provisional Sum). The Contractor shall produce all invoices, vouchers and supporting receipts in respect of payments made by him in documents connection with provisional cost items when he requires payment for these items.

The Subcontractor shall be responsible for the corrective maintenance, which includes Civil and Structural as well as Electrical and Mechanical work of mobile structures at Kosi Bay Port of Entry as described above.

The corrective maintenance work shall form part of the repair work to Building and Structural Installations. This work shall be done in accordance with the relevant regulations, codes and specifications as well as in accordance with the agreement between the Contractor and Subcontractor, which shall be approved by the Engineer.

PAM 08.01.01 **Charge required by the Contractor on subitem PAM 08.01**..... Unit: Percentage (%)

PAM.08.02 **INSPECTION AND DETAILED REPORT ON EXISTING INSTALLATIONS BY CONTRACTOR**..... Unit: Installation (Mobile Structures)

The unit of measurement shall be the mobile structures reported on by the Contractor.

The tendered rate for the installation shall include full compensation for the inspection and written report on all items, systems, components, equipment and installation, including the establishment of defects, leaks, damage, shortfalls, structural soundness, repair work required, details of existing equipment and suitability of the equipment for the purpose it serves. The Detailed Report shall be prepared by the Subcontractor for the Contractor.

PAM.08.03 **PERFORMANCE-BASED PAYMENT FOR CONTRACTOR**

It is important to note that Remuneration for all Value-Related as well as all Time-Related preliminary and general charges shall be deemed included in the monthly maintenance payments for the various installations.

PAM 08.03.01 Score-card

The Engineer shall inspect each installation monthly after Practical Completion of the repair phase of the mobile structures. The Engineer shall use a Score-card to measure the quality of preventative and corrective maintenance rendered by the Contractor during the preceding month, on all components that form part of the mobile structures, in accordance with the maintenance specifications. The Engineer will record his inspection directly onto the Score-card. The Score-card shall serve to evaluate ten performance indicators each month as described in Specification SA.

PAM 08.04 **MAINTENANCE OF A COMPLETE INSTALLATION BY THE CONTRACTOR**.....Unit: Point

The unit of measurement shall be a point. Each month shall represent a maximum of ten points and a minimum of zero points, depending on the performance and quality of maintenance. Ten points per month, determined by using the tendered rate per point, shall include full compensation for all liabilities and obligations described or implied in the Contract document and deemed by the Contractor to be applicable to the maintenance phase of the Contract, for the complete monthly maintenance of all mobile structures, and all appurtenant works deemed to form part thereof, as defined in the Particular Specification.

The combined tendered rate for ten points shall include full compensation for complete preventative, corrective and breakdown maintenance (as defined in this General Maintenance Specification), including full compensation for all costs related to resetting, repair, procurement, supply, delivery, replacement, protecting, furnishing, installing, testing and commissioning of all items and material required to maintain the mobile structures in a perfect functional condition. The only items not to be included in the rate for monthly maintenance points are:

- Supply, delivery, installation and testing of special equipment/materials that will be measured elsewhere, and
- Special testing of mobile structures.

Although ten points per month shall include full compensation for preventative, corrective and breakdown maintenance, the Contractor might fail to achieve all points applicable in the event of unsatisfactory performance, in which case he shall still perform all maintenance requirements according to specification, but at his own cost where a reduction in points awarded is insufficient to cover his cost.

PAM 08.05 **ADDITIONAL TESTS**

PAM 08.05.01 **WHERE ORDERED BY THE ENGINEER** ..... Unit: Rand (R)

PAM 08.05.02 **CHARGE REQUIRED BY THE CONTRACTOR ON SUBITEM**..... Unit: percentage (%)

An amount has been allowed in the Schedule of Quantities to cover the cost of additional tests required by the Engineer. The Engineer will have the sole authority to spend the amount or part thereof under subitem SA.03.01 as described in the SA Specification.

PAM 09 **MAINTENANCE WORK ENTAILS**

PAM 09.01 **GENERAL**

The Contractor shall be responsible for the complete maintenance of all mobile structures, which forms part of this repair and maintenance contract. The Contractor shall strictly adhere to Additional Specification SA: General Maintenance with regard to the maintenance period, obligations, responsibilities, actions and activities, etc., which shall also include the following maintenance actions:

(a) Routine preventative maintenance necessary to maintain the mobile structures to a satisfactory condition.

(b) Corrective maintenance as described and defined in Additional Specification SA: General Maintenance.

(c) A "fatal breakdown" shall imply any critical breakdown maintenance repair work that must be repaired immediately that was caused by a fire, electrical fault, etc. in order to rectify a component or unit that disables the mobile structures from functioning at its designed in terms of the Technical/Particular Specification.

(d) "Emergency maintenance repairs" shall imply any breakdown maintenance repair work required to rectify a component or unit of the installation that disables the installation from functioning at its designed in terms of the Technical/Particular Specification.

(e) "Ordinary maintenance repairs" shall imply all breakdown maintenance repair work required other than immediate response or emergency maintenance repairs.

Should the actual down-time exceed the maximum down-time, the Contractor shall be liable to a payment reduction for the difference between actual down-time and maximum down-time as stipulated in Additional Specification SA 05.02.

PARTICULAR SPECIFICATION

PBF PEST CONTROL

CONTENTS

PBF 01 SCOPE
PBF 02 PESTS ATTACKING TIMBER
PBF 03 PESTS ATTACKING CARPETS & FABRICS
PBF 04 ANTS
PBF 05 RATS AND MICE

PBF 01 SCOPE

This specification covers the application of pesticides for the specific purpose of eliminating pest which may cause structural damage. This specification includes the breakdown of various buildings and installations included within the facility and the specific dimensions of each building.

PBF 02 PESTS ATTACKING TIMBER

PBF 02.01 PESTS

Pests that caused damage to timber shall include but not be limited to the following:
mould, blue stain, powder post beetle, shot-hole borer, brown house borer, Cossonid woodborer, drywood termite, subterranean wood-destroying termites, false furniture beetle, furniture beetle, Italian beetle, decay and discolouring fungi.

PBF 02.02 LIST OF LOCATIONS

ITEM NO.	LOCATION	DESCRIPTION	DIMENSIONS $m/m^2/m^3$
02.02.01	Residential Buildings	Wooden beams and planks used in the roof. Ceiling boards. Wooden skirting and cornices. All insulations.	
02.02.02	Operational Buildings	Wooden beams and planks used in the roof. Ceiling boards. Wooden skirting and cornices. All insulations.	

PBF 02.03 PEST CONTROL PROGRAMME AND REPORTING

The pest control program submitted in terms of sub-clause BE 04.01 shall include but shall not be limited to:

(a) Initial inspection of all buildings and installations to ascertain the damage caused to timber by the activity of the various pests.
(b) If pests are found an initial "clean up" process is to be conducted.
(c) Continuous monitoring of the activity of pests.
(d) A comprehensive quarterly inspection of the buildings and installations.

(e) Reporting on the damage caused by and the activity of the pests together with recommendations (To follow quarterly inspection).
(f) Execution of the recommendations once approved by the Engineer.

PBF 03 PESTS ATTACKING CARPETS AND OTHER FABRICS

PBF 03.01 PESTS

Pests that cause damage to carpets and other fabrics shall include but not be limited to carpet beetles, clothes moths and fish moths.

PBF 03.02 LIST OF LOCATIONS

ITEM NO.	LOCATION	DESCRIPTION	DIMENSIONS $m/m^2/m^3$
03.02.01	N/A	N/A	

PBF 03.03 PEST CONTROL PROGRAMME & REPORTING

A thorough inspection of the buildings and installations at each facility shall be conducted with specific attention to the relevance of preventative pest control. The Contractor shall compile a comprehensive pest control programme to be submitted to the Engineer for review and approval.

The preventative pest control programme may only commence upon instruction from the Engineer.

The pest control programme shall include but shall not be limited to:
(i) Initial inspection of all buildings and installations to ascertain the damage caused to carpets and other fabrics by the activity of the various pests.
(ii) If pests are found an initial "clean up" process is to be conducted.
(iii) A comprehensive inspection is to be conducted at the intervals specified below:
Bi-annually in residential units.
Bi-annually in office facilities.
Two monthly in cell units.
Monthly in all food preparation areas.
(iv) Reporting on the damage caused by the activity of the pests together with recommendations (To follow inspection as above).
(v) Execution of the recommendations once approved by the Engineer.

PBF 04 ANTS

PBF 04.01 PESTS

Ants shall include all ants irrespective of size, colour or species.

PBF 04.02 LIST OF BUILDINGS AND INSTALLATIONS

ITEM NO.	LOCATION	DESCRIPTION	DIMENSIONS $m/m^2/m^3$
04.02.01	N/A	N/A	N/A

PBF04.03 PEST CONTROL PROGRAMME & REPORTING

A thorough inspection of the buildings and installations at each facility shall be conducted with specific attention to the relevance of preventative pest control. The Contractor shall compile a comprehensive pest control programme to be submitted to the Engineer for review and approval.

The preventative pest control programme may only commence upon instruction from the Engineer.

The pest control programme submitted in terms of sub-clause BE 04.01 shall include but not be limited to:

(a) Initial inspection of all the buildings and installations facilities to ascertain the damage caused by the activity of ants.
(b) If ants are found an initial "clean up" process is to be conducted.
(c) A comprehensive inspection is to be conducted at the intervals specified below:

Bi-annually in residential units.
Bi-annually in office facilities.
Two monthly in cell units.
Monthly in any food preparation area.

(d) Reporting on the damage caused by the activity of the ants together with recommendations (To follow inspection as above).
(e) Execution of the recommendations once approved by the Engineer.

PBF 05 RATS AND MICE

PBF 05.01 PESTS

Rats and mice shall include but shall not be limited to house mice, Norway rats and roof rats.

PBF 05.02 LIST OF LOCATIONS

ITEM NO.	LOCATION	DESCRIPTION	DIMENSIONS m/m²/m³
05.02.01	N/A	N/A	

PBF 05.03 PEST CONTROL PROGRAMME & REPORTING

The pest control programme submitted in terms of sub-clause BE 04.01 shall include but not be limited to:

(a) Initial inspection of all buildings and installations to ascertain the damage caused by the activity of rats and mice.
(b) Closing off of all potential entry points for rats and mice.
(c) If rats and/or mice are found an initial "clean up" process is to be conducted.
(d) Continuous baiting to assist in control and monitoring is to be conducted.
(e) A comprehensive inspection is to be conducted at the intervals specified below:

Bi-annually in residential units.
Bi-annually in office facilities.
Two monthly in cell units.
Monthly in any food preparation area.

(f) Reporting on the damage caused by the activity of mice and rats together with recommendations (To follow inspection as above).
(g) Execution of the recommendations once approved by the Engineer.

PBF 06 COCKROACHES

PBF 06.01 PESTS

Cockroaches shall include all roaches irrespective of size, colour or species.

PBF 06.02 LIST OF BUILDINGS AND INSTALLATIONS

ITEM NO.	LOCATION	DESCRIPTION	DIMENSIONS m/m²/m³
06.02.01	Operational Buildings	Walls, storage areas, windows and all areas where entrance may be gained.	

PBF06.03 **PEST CONTROL PROGRAMME & REPORTING**

A thorough inspection of the buildings and installations at each facility shall be conducted with specific attention to the relevance of preventative pest control. The Contractor shall compile a comprehensive pest control programme to be submitted to the Engineer for review and approval.

The preventative pest control programme may only commence upon instruction from the Engineer.

The pest control programme submitted in terms of sub-clause BE 04.01 shall include but not be limited to:

(f) Initial inspection of all the buildings and installations facilities to ascertain the damage caused by the activity of cockroaches.

(g) If cockroaches are found an initial "clean up" process is to be conducted.

(h) A comprehensive inspection is to be conducted at the intervals specified below:

Bi-annually in residential units.
Bi-annually in office facilities.
Two monthly in cell units.
Monthly in any food preparation area.

(i) Reporting on the damage caused by the activity of the ants together with recommendations (To follow inspection as above).

(j) Execution of the recommendations once approved by the Engineer.

PARTICULAR SPECIFICATIONS

PFD HEATING VENTILATION AND AIR CONDITIONING SYSTEM

CONTENTS

PFD 01 SCOPE
PFD 02 GENERAL DESCRIPTION OF INSTALLATIONS
PFD 03 TECHNICAL DETAILS OF INSTALLATION
PFD 04 DETAILS OF REPAIR WORK
PFD 05 DETAILS OF MAINTENANCE WORK

PFD 01 SCOPE

(a) This specification encompasses all aspects regarding the particulars of the maintenance work to the Heating Ventilation and Air-conditioning systems at Kosi Bay Port of Entry. This particular Specification shall be read in conjunction with the Technical Specification FD: Heating, Ventilation and air-conditioning systems and all additional and technical specifications compiled as part of this document, and in particular the following Additional specifications.

SA: General Maintenance
SB: Operating and Maintenance Manuals
SC: General Decommissioning, Testing and Commissioning Procedures

The intended repair and maintenance work to this installation will restore the existing installation to a safe, efficiently functional system that complies with all statutory regulations and applicable standards, in the process repairing all defects and shortfalls. On completion of the repair work, the equipment shall be maintained and serviced by the Contractor for the remainder of the 36-month Contract period.

The installations which have to be maintained under this Contract include the following equipment and are referred to as Installation: A11.

(i) Ninety Six (96) off existing split unit and under ceiling unit air conditioning units in various buildings at the operational area of Kosi Bay Port of Entry.

(ii) Twelve (12) off existing split unit and window unit air conditioning units at the residential area of Kosi Bay Port of Entry.

PFD 02 GENERAL DESCRIPTION OF INSTALLATIONS

(a) The split, window and wall unit air conditioning units are inside the offices and at the residential area for a cooler working condition for workers, residents, public and the electronic equipment.

PFD 03 TECHNICAL DETAILS OF INSTALLATION

At the time of this document the existing installation consisted of the equipment and plant as listed below with their relevant technical detail (Heating detail not provided).

PFD 03.01 **AIR CONDITIONING UNITS**

Installation ID:	Type 1	Type 2	Type 3	Type 4
Equipment Details	12 of	5 of		
Manufacturer	LG	LG		
Type	High Wall Split Unit	Window Unit		
Model	HSUH 0966B4A1 S096GH	M126BH SCO		
Cooling (Btu/h)	12000	9000		
Cooling power (Watt)	2638W	1350W		
Cooling Amps	4.2	5.7A		

* Note: Number of units are not limited to quantities mentioned above

PFD 04 DETAILS OF REPAIR WORK

PFD 04.01 GENERAL DESCRIPTION OF REPAIR WORK

PFD 04.01.01 The Contractor shall at the start of the Repair and Maintenance Contract inspect the items, systems, equipment, components and installations listed below. This inspection shall include the establishing of any defects, leaks, conditions, damages, shortfalls, structural soundness, repairs required, details of existing equipment, suitability of equipment for the purpose it serves, etc. The Contractor shall report back to the Engineer in writing on all the above and the following items. No repair work shall commence prior to approval by the Engineer:

(a) Air-conditioning units;

(b) Support and bracketing system;

(c) Drainage installations to equipment;

(d) Electrical supply, wiring to and control of equipment.

PFD 04.01.02 The general scope of repair work to this installation shall at least include, but not be limited to the following. Any items, components, installations and systems not detailed in the Particular Specification shall be repaired and/or replaced if found to be defective and/or inoperative.

(a) All statutory inspections required for steam-driven equipment shall be inspected, tested and certified by an approved third party inspection authority where required by the Occupational Health and Safety Act as amended;

(b) Dismantling, stripping, overhauling, repair, service, reassembling, testing and commissioning of all equipment that form part of this installation;

(c) Implementation of a maintenance control plan;

(d) Supplying as-built information and drawings, as well as operating and maintenance manuals for all equipment that form part of this installation.

PFD 04.02 DETAILS OF REPAIR WORK TO EQUIPMENT

The following work shall form part of the repair work the heating, Ventilation and Air Conditioning Systems. This work shall be done in accordance with the relevant regulations, codes of practice, specifications and Technical specification FD: Heating

ventilation and air conditioning, as set out in this document. The following work shall be included.

PFD 04.02.01 **Air-Conditioning Units**

(a) Clean air intake screen.

(b) Replace filters

(c) De-rust, neutralise and touch up paintwork

(d) Replace canvas collars

(e) Clean housing, ensure all panels are properly secured and door panels close properly. Replace panel seals.

(f) Check setting and operation of all pressure switches, reset if required.

(g) Check setting and operation of all safety switches, i.a. LP&HP switches, oil pressure switch.

(h) Check setting and operation of thermostats.

(i) Check timers and reset if required.

(j) Check operation of seven-day timer.

(k) Check running current of fans and compressor and settings and operation of overloads.

(l) Check tightness of all electrical terminals.

(m) Ensure operation of local and remote isolators.

(n) Check condition of all cables and whether cables are neatly strapped and reposition and strap if required

(o) Ensure correct operation of emergency stop.

(p) Carry out a leak test on all refrigeration piping and components inclusive of evaporator and condenser.

(q) All leaks shall be repaired. Should a leak on a component be of such a nature that it cannot be repaired, the component shall be replaced. The procedure to follow is as set out in section FD 03.02

(r) The superheat setting of the thermostatic expansion valve shall be checked and adjusted if required (setting approximately 8°C).

(s) The filter dryer shall be replaced.

(t) Check compressor vibration mounts.

(u) Test oil acidity.

(v) Check refrigerant charge sight glass being clear or flashing.

(w) Check moisture indication being dry.

(x) Clean condensate tray and test drainage operation.

(y) Clean evaporator and condenser fan blades and check unbalance.

(z) Replaced suction line insulation.

(aa) Check all service valves for full operation, replaced caps if missing.

PFD 05.01 **HEATING VENTILATION AND AIRCONDITIONING SYSTEM REPAIR WORK: MEASUREMENT AND PAYMENT**

Item

PFD 05.01.01 **Service air conditioning units** .....Unit: number

The unit of measurement shall be the number of AC units serviced.

The tendered rate shall include full compensation for the servicing of the units as per Manufacturer's instructions. Cleaning of filters, evaporator coils, condenser coils, cleaning of the housing, check gas pressure, gas leaks, checking of all switches, thermostat and compressors as described in clause PFD 04.02.01.

Item

PFD 05.01.02 **Replace AC temp controller** .....Unit: number

The unit of measurement shall be the number of defective controllers/remotes replaced.

The tendered rate shall include full compensation for the removal of the defective controller or remote, the supply and installation of the new controller/remote as well as testing.

Item

PFD 05.01.03 **Vacuum, re-gas and re-lubricate AC unit** .....Unit: number

The unit of measurement shall be the number of AC units vacuumed, re-gassed and re-lubricated.

The tendered rate shall include full compensation for the evacuation of the unit, the re-filling of the gas and the lubrication of all fan bearings.

Item

PFD 05.01.04 **Replace air conditioning unit** .....Unit: number

The unit of measurement shall be the number of specified AC units replaced (Heating & Cooling).

The tendered rate shall include full compensation for the removal of the defective unit, the supply, installation, testing and commissioning of the new unit including all piping, drainage, electrical connection complete with unistrut galvanized brackets, anti vibration rubbers and galvanized trunking.

Item

PFD 05.01.05 **Replace isolation** .....Unit: number

The unit of measurement shall be the linear length of Class O Armaflex SS self-seal tubes supplied and installed.

The tendered rate shall include full compensation for the removal of the existing isolation: supply, handling and installation of the specified type of isolation.

This rate shall further include for the supply of all cable ties, clamps and other material necessary to ensure that the installation conforms to the specification.

Item

PFD 05.01.06 **Replace Control (PC) Board** .....Unit: number

The unit of measurement shall be the number of defective PC Boards diagnosed and replaced.

The tender rate shall include full compensation for the removal of the defective boards as well as the supply, installation and testing of the new PC board.

Item

PFD 05.01.07 **Replace Compressor** .....Unit: number

The unit of measurement shall be the number of defective compressors replaced

The tender rate shall include full compensation for the removal of the defective compressor as well as the supply, installation, of the new compressor, re-gas system and testing and commissioning of the unit.

Item

PFD 05.01.08 **Replace Capacitor** .....Unit: number

The unit of measurement shall be the number of defective capacitors diagnosed and replaced.

The tender rate shall include full compensation for the removal of the defective capacitor as well as the supply, installation and testing of the new capacitor.

Item

PFD 05.01.09 **Remove and re-install air conditioners** .....Unit: number

The unit of measurement shall be the number of air conditioners removed and re-installed at a different position.

The tender rate shall include full compensation for the removal of the complete unit with brackets and the re-installation, of the complete unit at a different position, re-gas of the system and testing and commissioning of the unit.

PFD 06 DETAILS OF MAINTENANCE WORK

PFD 06.01 GENERAL

The Contractor shall be responsible for the complete maintenance of all the equipment, components, installations and systems forming part of this repair and maintenance contract for Installation: A11. The Contractor shall strictly adhere to Additional Specification SA: General Maintenance, and Technical Specification FD: HVAC with regards to the maintenance period, obligations, responsibilities, actions and activities, etc, which shall also include the following maintenance actions:

(a) Routine preventative maintenance. A guideline to the required actions is provided in specification FD. The actions will not be limited to these guidelines, but shall include all additional actions, work, materials, etc, necessary to maintain this installation at an acceptable level.

(b) Corrective maintenance as described and defined in Additional Specification SA: General Maintenance.

(c) Breakdown maintenance as described and defined in Additional Specification SA: General Maintenance.

(d) For this particular installation an emergency breakdown shall be defined as a breakdown, resulting in non-operation of HVAC equipment.

Emergency breakdown shall be defined as failure to any equipment, resulting in the room conditions exceeding the temperature norms as defined by the Occupational Health and Safety Act as amended.

PARTICULAR SPECIFICATION

PJC CONVENTIONAL FIRE FIGHTING EQUIPMENT

CONTENTS

PJC 01	SCOPE
PJC 02	GENERAL DESCRIPTION OF INSTALLATION
PJC 03	TECHNICAL DETAILS OF EXISTING INSTALLATION
PJC 04	STATUS OF EXISTING INSTALLATION
PJC 05	DETAILS OF REPAIR AND SERVICE WORK
PJC 06	MEASUREMENT AND PAYMENT
PJC 07	DETAILS OF MAINTENANCE WORK

PJC 01 SCOPE

(a) This specification covers the particulars of the maintenance work to the conventional fire fighting equipment installation at the various sites. This Particular Specification shall be read in conjunction with Technical Specification JC: Conventional Fire Fighting Equipment, and all additional and technical specifications compiled as part of this document, in particular the following Additional Specifications:

SA: General Maintenance
SB: Operating and Maintenance Manuals
SC: General Decommissioning, Testing and Commissioning Procedures

The intended maintenance work to this installation will restore the existing installation to a safe, efficiently functional system that complies with all statutory regulations and applicable standards, in the process repairing all defects and shortfalls. Monthly maintenance responsibilities for each installation shall commence with access to the site. A difference shall be made in payment for maintenance prior to and after practical completion of repair work. The Contractor shall be responsible to take over the completed installation which shall be maintained and serviced by the Contractor for the remainder of the 36-month Contract period. Additional repair work will also form part of the Maintenance work in the Contract.

(b) The fire fighting equipment to the ports of entries, its associated residential areas shall form part of this maintenance and servicing contract and is referred to as Installation A12. The piped fire water reticulation network to the equipment, such as hydrants and hose reels are also included in the maintenance.

PJC 02 GENERAL DESCRIPTION OF INSTALLATION

(a) KOSI BAY PORT OF ENTRY

The Port of Entry consists of fire hydrants, hose reels and fire extinguishers. The residential and operational area is in a fully functional state.

PJC 03 TECHNICAL DETAILS OF EXISTING INSTALLATION

The equipment that is listed in the table below will be maintained as part of the Repair and Maintenance Contract. Newly installed fire fighting equipment shall also form part of the Contractors maintenance responsibilities.

PJC 03.01 **EXISTING FIRE FIGHTING EQUIPMENT**

QTY	Location	Fire Hydrant	Fire Fighting Hose Reel	Fire Fighting Extinguisher	Cabinet
	Kosi Bay Port of Entry				
22	***Operational***		4	7	11

PJC 04 **STATUS OF EXISTING INSTALLATION**

At the time of compilation of this document the status of the equipment and installation was briefly as described below.

The existing fire fighting equipment at the residential area is currently being maintained by a Contractor.

The existing fire fighting equipment at the operational area is new.

FACILITIES

Equipment is generally in a good condition and fire extinguishers that are not according to SABS specifications will be replaced. New fire fighting equipment will be installed where necessary. Damaged fire fighting equipment will be replaced.

PJC 05 DETAILS OF REPAIR AND SERVICE WORK

The following work shall form part of the intended repair work to the fire fighting equipment. This work shall be done in accordance with the relevant regulations, codes, specifications and Technical Specification JC: Conventional Fire Fighting Equipment.

The description of the repair work as set out below shall be read in conjunction with the Schedule of Quantities and Technical Specifications

PJC 05.01 GENERAL DESCRIPTION OF REPAIR WORK

PJC 05.01.01 The Contractor shall, at the start of the Repair and Maintenance Contract, have the items, systems, equipment and installations listed below inspected by qualified personnel. This inspection shall include the establishing of any defects, leaks, conditions, damages, shortfalls, repairs required, details of existing equipment, suitability of equipment for the purpose it serves, etc. The Contractor shall report to the Engineer in writing on all the above and the following items. No repair work shall commence prior to approval by the Engineer.

(a) Correlation of all fire fighting equipment;

(b) Last service record;

(c) Inventory list of all equipment;

(d) Compliance with present governing regulations;

(e) Accessibility to equipment;

(f) Dynamic water pressure under flow conditions of equipment;

(g) As-built information.

PJC 05.01.02 The general scope of work at the time of going on tender is defined as follows:

(a) Replacing of irreparably damaged, missing and unsuitable fire fighting equipment;

(b) Servicing and overhauling of all fire hose reels and fire hydrants;

(c) Servicing and recharging of all fire extinguishers;

(d) Replacing of missing and damaged fire extinguisher brackets;

(e) Replacing damaged fire hose reel cabinets;

(f) Supply and installation of additional fire hose reels, hydrants and extinguishers where necessary, in accordance with the requirements of SABS 0400;

(g) Servicing and overhauling of fire booster and pump connections;

(h) Compilation of fire plan for each of the service buildings;

(i) Compilation of inventory list with all relevant details and an identification system to all equipment.

PJC 05.02 **REPAIR WORK TO FIRE FIGHTING EQUIPMENT**

The repair work to this installation shall include, but not be limited to at least the following items. Any items, components or installations not detailed in this specification but found to be defective or inoperative during the inspection and report phase, shall be repaired or replaced as instructed by the Engineer.

PJC 05.02.01 **Kosi By as listed in PJC 02**

(a) Service existing fire extinguishers

(b) Service existing fire hose reels

(c) Add additional fire fighting equipment according so SANS 0400.

PJC 06 **MEASUREMENT AND PAYMENT**

All new building work and repair work to existing structures and buildings resulting from repairs to the conventional fire fighting equipment as scheduled, shall be done in accordance with the Specifications for the structural and building section included elsewhere in this Tender Document. The costs of such building and repair works shall be deemed to be included in the tendered rates for the applicable items scheduled in this section.

PJC.01 **INSPECTION AND REPORT ON EXISTING INSTALLATIONS** .....Unit: item

The tendered sum shall include full compensation for the inspection and written report on all items, systems, components, equipment and installations, including the establishment of any defects, leaks conditions, damages, shortfalls, structural soundness, repairs required, details of existing equipment and suitability of the equipment for the purpose it serves.

PJC.02 **AS-BUILT INFORMATION AND OPERATING AND MAINTENANCE MANUALS** Unit: sum

The tendered sum shall include full compensation for the compilation and submission of seven complete sets of inventory lists and operating and maintenance manuals in accordance with Additional Specification SB: Operating and Maintenance Manuals.

The tendered sum shall also include full compensation for all equipment necessary to establish the exact position and level of underground services, as well as the recording of all information on electronic drawing format.

PJC.03 **ISOLATION, STRIPPING, DISMANTLING AND REMOVAL OF EXISTING FIRE FIGHTING EQUIPMENT** Unit: number

The tendered rates shall include full compensation for the isolation, stripping, dismantling and removal of irreparable damaged, broken or unsuitable fire hydrants, fire hose reels and fire extinguishers, including all valves, cabinets, mounting brackets, streamers, etc, as well as removal off site and/or storage of all removed items mentioned above.

PJC.04 **SUPPLY AND INSTALLATION OF FIRE HYDRANTS EQUIPMENT** Unit: number

The tendered rate shall include full compensation for the supply, delivery, positioning, installation, testing, commissioning and hand-over of fire hydrants, including all necessary pipe work, fittings, bends and the reinstating of existing surfaces such as walls, floors, ceilings, etc.

The tendered rate shall also include full compensation for the supply, delivery, positioning, installation of cabinets, cupboards, valves, brackets,

The tendered rate shall also include full compensation for the supply, delivery and positioning and fixing of all fire signage as required by regulation.

The tendered rate shall also include full compensation for the labelling with identifying tags and recording of details of all equipment.

PJC.05 **SUPPLY AND INSTALLATION OF FIRE HOSE REELS** ..... Unit: number

The tendered rate shall include full compensation for the supply, delivery, positioning, installation, testing, commissioning and hand-over of fire hose reels, including all necessary pipe work, cabinets, cupboards, valves, brackets, fittings, bends and the reinstating of existing surfaces such as walls, floors, ceilings, etc.

The tendered rate shall also include full compensation for the supply, delivery and positioning and fixing of all fire signage as required by regulation.

The tendered rate shall also include full compensation for the labelling with identifying tags and recording of details of all equipment.

PJC.06 **SUPPLY AND INSTALLATION OF FIRE EXTINGUISHERS** ..... Unit: number

The tendered rate shall include full compensation for the supply, delivery, positioning, installation and hand-over of the fire extinguishers, including all necessary brackets, backboards, etc.

The tendered rates shall also include full compensation for the supply, delivery, positioning and fixing of all fire signage as required by regulation.

The tendered rate shall also include full compensation for the labelling with identifying tags and recording of details of all equipment.

PJC.07 **SERVICING, CLEANING AND REPAIR OF FIRE HYDRANTS** ..... Unit: number

The tendered rate shall include full compensation for the repair or replacement of damaged, broken, leaking or corroded pipe work and fittings, main hydrant seals, quick coupling catches, shaft ends for right-angle hand wheel type hydrants, streamers, hose nozzles, valve steam seals, fire cupboard doors and locks, damaged, missing or shortfall fire signage, etc.

The tendered rate shall also include full compensation for the labelling with identifying tags and recording of details of all equipment.

PJC.08 **SERVICING, CLEANING AND REPAIR OF FIRE HOSE REELS** ..... Unit: number

The tendered rate shall include full compensation for the repair or replacement of damaged hose drums, mountings and shut-off valves, replacement of damaged or missing 30 m hoses, hose nozzles, shut-off valve wheel handles, hose drum seals where leaks occur, gland packing and gaskets of shut-off values, repainting of deteriorated paintwork, replacement of fire cupboard doors and locks, damaged, missing or shortfall fire signage, etc.

The tendered rate shall also include full compensation for the labelling with identifying tags and recording of details of all equipment.

PJC.09 **SERVICING, CLEANING, RECHARGING AND REPAIR OF FIRE EXTINGUISHERS** ..... Unit: number

The tendered rate shall include full compensation for the repair or replacement of all damaged, faulty or missing discharge hoses and nozzles, pressure gauges, operating instructions, the recharging of discharge cylinder to required capacity for DCP, water and foam extinguishers, and the recharging of CO_2 extinguisher to capacity, repair, resealing of CO_2 discharge mechanism, checking, servicing and repairing of activation mechanisms, replacement of water and foam extinguishers that have corroded cylinders, replacement of DCP, water or foam content of extinguishers, the replacement of fire cupboard and cabinet doors and locks, damaged, missing or shortfall fire signage, brackets and backboards, etc.

The tendered rate shall also include full compensation for the labelling with identifying tags and recording of details of all equipment.

PJC.10 **SUPPLY AND INSTALLATION OF FIRE EQUIPMENT SIGNAGE** ..... Unit: number

The tendered rate shall include full compensation for the supply, delivery, positioning, installation and hand-over of the fire signage as required by regulation, including all necessary brackets, frames, etc. as described in the schedule of quantities.

PJC.11 **SERVICING, CLEANING AND REPAIR OF FIRE PUMP ROOM** ..... Unit: number

The tendered rate shall include full compensation for the execution of a full engine service as per the manufacturer's recommendations including air, fuel and oil filters, oil, replacement of wiring, V-belts and hoses as needed and other consumables required including the steam cleaning of the assembly.

The tendered rate shall also include full service of all the listed equipment in PJC.02(a) that includes the pumping equipment and motor control centre and replacing the batteries in the motor control centre.

PJC.12 **FIRE FIGHTING TRAINING** ..... Unit: number

The tendered rate shall include the number of training sessions conducted for a maximum of 20 attendees including all training material, transport and training aids required.

The end user shall be trained, by the supplier of the fire fighting equipment, to operate the individual fire fighting equipment. Fire Fighting training shall be done by a national accredited training institute (Fire Protection Assotiation of South Africa).

PJC.13 **LABELLING OF ALL CONVENTIONAL FIRE FIGHTING EQUIPMENT WITH IDENTIFYING TAGS AND RECORDING OF DETAILS** ..... Unit: number

The tendered rate shall include full compensation for the supply, delivery, positioning, and installation of identifying tags which must be in a printed or engraved format on each type of fire fighting equipment and bracket or holder.

The tendered rate shall also include full compensation for the supply, delivery, positioning, installation of labels on existing cabinets, cupboards, valves, brackets,

PJC 07 DETAILS OF MAINTENANCE WORK

PJC 07.01 GENERAL

The Contractor shall be responsible for the complete maintenance of all the equipment, components, installations and systems forming part of this repair and Maintenance Contract for Installation A12. The Contractor shall adhere strictly to Additional Specification SA: General Maintenance, and Technical Specification JC: Conventional Fire Fighting Equipment, with regard to the maintenance period, obligations, responsibilities, actions and activities, etc, which shall also include the following maintenance actions:

(a) Routine preventative maintenance. A guideline to the required actions is provided in Technical Specification JC. The actions will not be limited to these guidelines, but shall include all additional actions, work, materials, etc, necessary to maintain this installation at an acceptable level.

(b) Corrective maintenance as described and defined in Additional Specification SA: General Maintenance.

(c) Breakdown maintenance as described and defined in Additional Specification SA: General Maintenance.

Emergency breakdown shall be defined as a failure of equipment, components and systems of this particular installation.

Additional Specifications

SA	:	General Maintenance
SB	:	Operating and maintenance manuals
SC	:	General decommissioning, testing and commissioning procedures
SD	:	General training
SF	:	General Operation
SH	:	HIV / AIDS requirements
SI	:	Occupational Health and Safety (OHS Act)
SJ	:	COVID- 19 Occupational Health and Safety
SN	:	Implementation of EPWP

ADDITIONAL SPECIFICATION

SA GENERAL MAINTENANCE

CONTENTS

SA 01	SCOPE
SA 02	MAINTENANCE APPROACH
SA 03	MAINTENANCE REQUIREMENTS
SA 04	MAINTENANCE CONTROL
SA 05	COMMUNICATION
SA 06	PERFOMANCE MEASUREMENT
SA 07	PREVENTATIVE MAINTENANCE
SA 08	MANDATORY PERIODICAL SERVICES
SA 09	FREQUENT SERVICING OF INSTALLATIONS
SA 10	MEASUREMENT AND PAYMENT

SA 01 SCOPE

Maintenance of the specified systems, services and/or parts of buildings and infrastructure shall all be referred to as "Maintenance of an Installation". Maintenance of all completed installations shall ensure reliable functioning and optimum service life thereof. Monthly maintenance responsibilities for each installation including all units and components as specified shall commence with access to the Site.

Maintenance of an installation shall be performed in accordance with the Technical and Particular Specifications, the Operating and Maintenance Manuals (where applicable) and the Maintenance Control Plan.

Remuneration for maintaining "installations" (systems, services and/or buildings and parts of the infrastructure) in good functional condition is provided for in the Schedules of Quantities by means of monthly payment items.

This Additional Specification covers maintenance requirements, development of a maintenance control plan, identification of equipment, site maintenance administration, maintenance performance measurement, as well as the items for measurement of the Contractor's service level and resulting payment.

The residential area at the Kosi Bay Port of Entry form part of an existing Repair and Maintenance Programme.

The various installations are in perfect working order. This places the emphasis of this Contract on maintenance.

No distinction will be made between prior to practical completion and completed installations for the purpose of maintenance.

The maintenance of the operational area for the plumbing and building electrical work will be divided into Section A and Section B as follows:

The Contractor will have the opportunity at the start of the contract to point out items which are not in perfect working order which in turn will be serviced/repaired as per the relevant tendered

rates. The Contractor must submit a written report of these items within 28 days of the date of site hand over. Failing to submit the report within the allowed time will render any and all defective items part of the Contractor maintenance responsibly as set out in the relevant Technical and Particular Specifications.

The Contractor will further more at the start of the contract perform annual maintenance on all the installations as per the items listed in the different Technical and Particular Specifications as part of the Contractor's maintenance obligation.

Maintenance of each of these installations will be the responsibility of the Contractor and will be evaluated on a monthly basis by the Engineer. The remuneration for maintenance work and responsibilities will be certified accordingly.

SA 02 MAINTENANCE AND SERVICING APPROACH

The Contractor is expected to be represented on **site full time**. Contractor must allow for the appointment of a qualified project manager to be available on site on a full time basis for the duration of the contract.

SA 02.01 ROUTINE PREVENTATIVE MAINTENANCE VISITS

When submitting the maintenance control plan (MCP), the Contractor shall schedule "routine preventative maintenance visits" to the site. A "routine preventative maintenance visit" shall be scheduled for the intervals as indicated in the table below. The duration of the "routine preventative maintenance visits" will depend on a time required to complete all routine preventative maintenance, corrective maintenance as well as breakdowns logged during the course of the month as specified. However, a "'routine preventative maintenance visit" may never be less than the minimum period specified in the table below. The Engineer will carry out a site inspection on any arbitrary day and measure the quality of maintenance and servicing. The Engineer will also inspect correction/repair of breakdowns that were logged with

INSTALLATION	FREQUENCY OF ROUTINE MAINTENANCE VISIT	MINIMUM DURATION OF ROUTINE MAINTENANCE VISIT
KOSI BAY PORT OF ENTRY	**5 days a week** (Monday, Tuesday, Wednesday, Thursday, Friday)	8 hours

* Note: Operational hours is not limited from above, and will vary from season to season. Operational hour changes will be confirmed by the User Client

The Contractor should indicate to the Engineer within 21 days after the site handover the days of the week which he will visit the site for his scheduled routine preventative maintenance visit including the various resources allocated for the different preventative maintenance actions, site keeping and cleaning services to be performed (at least 6 months in advance). Qualified electrician and plumber should also be available for the above-mentioned dates.

SA 02.02 EMERGENCY BREAKDOWN VISIT

Whenever an emergency breakdown is logged with the contractor, an "emergency breakdown repair visit" shall be carried out by the contractor to attend to the repair of the emergency breakdown within **12 hours** after it was logged with the contractor.
Remuneration for the material and labour required to attend to repair of the emergency breakdown shall be deemed included in the payment item for maintenance of an installation based on a point system and measured monthly. Payment for the "emergency breakdown repair visit" will be measured separately in the schedule of quantities to cover the cost of the call-out, in terms of travel and accommodation cost, including travel time and any cost associated with the call-out. No payment for the "emergency breakdown repair visit" shall be done if the call-out coincides with any of the monthly visits as listed in SA 02.01.

The Contractor will only be remunerated for emergency breakdown repair visits upon instruction of the Engineer or his representative.

Typically examples of "emergency repair breakdown visits" would be:

- A breakdown of any standby power generator that prevents the standby power generator from operating at its capacity and meeting the demand.
- A breakdown of any water supply pump or any other component of the water supply or bulk water installation that affects the water supply to such an extent that it cannot meet the demand.
- A breakdown of the water reticulation network or sewer reticulation network that affects water supply or sewer removal to such an extent that the service is disrupted to any site.
- A breakdown of site electrical or building electrical that disrupts power supply to a building (including residential unit)
- A breakdown of a geyser that prevents it from supplying hot water as per specification
- Any other breakdown that can be regarded as having the potential to cause damage to equipment or property and is included in the scope of work to be maintained and serviced by the Contractor, as per specifications. *The Engineer or his representative will be responsible for categorising a breakdown as an emergency.*

SA 03 MAINTENANCE REQUIREMENTS

SA 03.01 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall maintain the complete installations for the 36-month Contract period.

Maintenance implies and shall include monthly preventative maintenance, corrective maintenance, as well as breakdown maintenance on all components of the specified installations.

The maintenance control plan (specified in Clause SA 03) will be developed by the Contractor, to schedule the frequency of routine inspections and format of reports. The Contractor shall carry out inspections on the equipment as detailed in the Technical and Particular Specifications and the maintenance control plan. Each inspection, test or breakdown shall be recorded in an approved format and listed in a quarterly report (part of the maintenance control plan).

As part of repair of each installation, the Contractor shall submit a set of Operating and Maintenance Manuals where applicable. The Contractor shall ensure through training that the operating and maintenance personnel are conversant with the instructions as presented in the Operating and Maintenance Manuals. Continued training shall be included in the scope of

maintenance work for the duration of the 36-month Contract, in accordance with Additional Specification SD: General Training.

The Operating and Maintenance Manuals, as approved by the Engineer, shall be used as a basis of preventative maintenance. The Contractor shall perform all preventative and corrective maintenance as described in the Operating and Maintenance Manuals. This shall be in accordance with the Technical and Particular Specifications.

The Contractor shall, as part of his maintenance responsibilities repair or replace faulty equipment upon logging of a breakdown, within the down-time as defined in Clause SA 05.02 at the Contractor's cost, except in the event of replacement being labelled as exceeding liability as specified in Clause 63 of the Project Specific Conditions of Contract, in which case the Department of Public Works will bear part of the costs.

The Contractor shall rectify any faulty condition of which he becomes aware, even if it has not been logged. Such rectification shall also be logged and listed in the quarterly report.

SA 03.02 CONDITIONS FOR EXCEEDING THE CONTRACTOR'S LIABILITY DUE TO OPERATIONAL DAMAGE BREAKDOWNS

Irrespective the definition of operational damage given in the Oxford dictionary, it shall be defined for the purpose of this clause as being any damage caused on purpose or through negligence by the User Client's employees, suppliers, subcontractors, etc for any reason whatsoever. For the purpose of this clause, operational damage and vandalism shall have the same meaning. Where repair work is necessitated as a result of operational damage caused by User Clients or their associates, the Contractor will be requested to:

(a) perform work, using tendered rates for the supply, delivery and installation of material forming part of the repair work schedule, within the maximum down-time allowed for operational damage, where the Engineer rules that the damage has been caused by incorrect operation;

(b) submit one (1) quotation for repair and/or replacement of the damaged unit, where tendered rates are not available and where the Engineer rules that the damage has been caused by incorrect operation;

(c) perform the work on receipt of an order from the Engineer, within the time offered as part of the quotation, and

(d) notify the Engineer well in advance of completion of the repair work in order to enable inspection.

The responsibility of determining whether damage to the installation was caused by people other than employees or associates of the Contractor shall rest with the Engineer.

Damage caused by the employees, suppliers, subcontractors, etc of the Contractor, shall be repaired by the Contractor at his own cost.

SA 03.03 **CONDITIONS FOR EXCEEDING THE CONTRACTOR'S LIABILITY ABOVE MARGINAL BREAKDOWN COST**

In the event where the cost for the repair or replacement of any single component/subassembly where a breakdown has occurred due to a single failure, or where the cost for replacing a single item of equipment completely, exceeds the value of R15 000,00 (transport, accommodation and travelling cost excluded), the liability of the Contractor is limited to the value of R15 000,00. The additional cost above the value of R15 000,00 will be paid for by the Employer provided that conditions 1, 2 and 3 below have been met.

1. The defective part/component/subassembly or machine must be identifiable as a single subassembly or component and not the total of a number of small defects or breakdowns on subassemblies/components on any one or more machines.

   Examples of subassemblies/components are the following:

   (a) Should the wiring or bearings on an electric motor fail, the complete motor must be removed for repairs and the cost for the repairs on the complete motor will be regarded as repairs on a single subassembly/component.

   (b) A starter motor, for example, is a subassembly, which can be removed from the machine for repairs. The repairs on the starter motor together with the repairs on the main bearings will not be regarded as a repair on a single subassembly/component. If the complete diesel engine is replaced with its associated subassemblies the replacement of the complete unit will be regarded as a single component.

   (c) A pump as a whole is regarded as a single component. The pump and driving machine on long coupled pumps are regarded as separate subassemblies. Pumps and motors on close-coupled equipment are regarded as a single component. The pump and motor of a sump pump are therefore regarded as a single component.

   (d) Control equipment for the control of a single item, with the sensing device, the controller itself and the final controlled variable are regarded as a single component of the system. The repairs on any one item on a controller have an influence on the rest of the control equipment and must after the replacement be commissioned again as a unit.

2. The Contractor shall submit a written report to the Engineer for approval. This report shall contain the following information:

   (a) The make and model number of the machine serviced/inspected/ repaired/replaced;

   (b) The identification number of the machine;

   (c) A description or name and part number of the defective part/component or subassembly;

   (d) A statement on whether the component could be repaired, together with a cost estimate;

   (e) A quotation valid for a minimum period of 60 days if the component/part/subassembly has to be replaced or repaired by an outside firm. If the subassembly/machine is to be repaired or replaced by an outside company, the Contractor shall supply one (1) quotation for such parts/repairs or a quotation from any sole supplier. Only an original quotation will be accepted. The mark-up on such

work shall be a percentage as tendered and shall be applicable to the total cost (VAT excluded) of repair work by outside companies;

(f) The expected urgency for the replacement or repairs, and

(g) The delivery time of a new component/subassembly/machine or delivery times on spares required to repair the defective component/ subassembly.

3. A written approval to proceed with the work must be issued by the Department. Copies of the original VAT invoices from outside companies for all repairs or spare parts supplied must be attached to the Contractor's invoice.

SA 03.04 **EMERGENCY BREAKDOWN REPAIR VISIT**

Whenever an emergency breakdown is logged at a site where no access has been given the Contractor, an "emergency breakdown repair visit" shall be carried out by the Contractor to attend to the repair of the emergency breakdown within 24 hours after it was logged with the Contractor.

Remuneration for the material and labour required to attend to repair of the emergency breakdown shall be deemed included in the payment item for maintenance of an installation based on a point system and measured monthly. Payment for the "emergency breakdown repair visit" will be measured separately in the schedule of quantities to cover the cost of the call-out, in terms of travel and accommodation cost, including travel time and any other cost associated with the call-out.

The Contractor will not be remunerated for emergency breakdown repair visits once the specific installation or site has been completed (Completion Certified). The contractor will be remunerated for maintenance and attending to emergency breakdowns as per his payment item for maintenance of a completed installation based on a point system as measured monthly.

Typical examples of "emergency repair breakdown visits" would be:

- A Breakdown of any standby power generator that prevents the standby power generator from operating at its capacity and meeting the demand.
- A Breakdown of any water supply pump or any other component of the water supply or bulk water installation that affects the water supply to such an extent that it cannot meet the demand.
- A Breakdown of the water reticulation network or sewer reticulation network that affects water supply or sewer removal to such an extent that the service is disrupted to any building.
- A Breakdown of site electrical or building electrical that disrupts power supply to a building (including residential unit).
- A Breakdown of a geyser that prevents it from supplying hot water as per specification.
- Any other Breakdown that can be regarded as life threatening or having the potential to cause damage to equipment or property and is included in the scope of work to be maintained by the Contractor, as per the technical and particular specifications. The Engineer will be responsible for categorising a breakdown as an emergency.

SA 03.05 COMPONENTS INCLUDED IN MAINTENANCE SCOPE

The following main sections of a facility with their subsections are as set out in the Technical Specifications and Particular Specifications where applicable and in the Schedule of Quantities and will each be deemed "an installation". Maintenance, as specified, will be applicable to all of these installations.

INSTALLATIONS: KOSI BAY PORT OF ENTRY

- Installation C1: Kosi Bay - Structural and Building Works
- Installation C2: Kosi Bay - Plumbing, Drainage and Wet Services
- Installation C3: Kosi Bay - Wastewater and Sewer Networks
- Installation C4: Kosi Bay - Fencing, Cleaning and Site Keeping
- Installation C5: Kosi Bay - Bulk Water & External Water Reticulation
- Installation C6: Kosi Bay - Roads and Storm water Drainage
- Installation E1: Kosi Bay – Building electrical and Site Electrical
- Installation E2: Kosi Bay – External Lighting
- Installation E3: Kosi Bay - Standby Power
- Installation M1: Kosi Bay - Heating, Ventilation and Air-Conditioning Systems
- Installation M2: Kosi Bay - Conventional Fire-Fighting Equipment

Building Structural and Building related installations are excluded from the maintenance portion of the contract. The Contractor will however be instructed during the maintenance phase to repair certain damaged structural items. The Contractor will be remunerated for the structural items repaired as per his tendered rates in the schedule of quantities No additional fixed or time related P&G may be claimed for the repair work to damaged structural items.

SA 03.06 COMMENCEMENT OF MAINTENANCE PERIOD

Maintenance responsibilities for an installation prior to practical completion of repair work shall include maintenance of all individual units, equipment or components thereof, for which no repair work is required (as per the contract document) or for which the repair work has not yet started, and shall commence with access to the installation.

Where access to an installation with a view to commence repair work is delayed, then the maintenance responsibilities which in such cases will consist of keeping the installation in the condition it is in, shall commence immediately at the start of the Contract.

Such maintenance before access is obtained, shall consist for example of fixing leaks without replacing pipework or opening a blocked pipeline without further altering or inspecting such pipes.

The Contractor shall accept full maintenance responsibilities for each completed installation upon issue of a Certificate of Practical Completion for repair work of that installation.

The preliminary construction programme differentiates between commencement of maintenance on various installations.

SA 03.07 **PREVENTATIVE MAINTENANCE: DEFINITION**

This entails the rendering of services and servicing of equipment according to a predetermined maintenance control plan to:

(a) replace and service components of equipment, units or parts thereof for each installation at prescheduled moments regardless of condition;

(b) readjust, reset, clean, corrosion protect all components of equipment, units or parts thereof for each installation, and

(c) carry out all implied actions to maintain installations in their present functional condition.

Preventative maintenance shall be aimed at minimisation of breakdowns.

SA 03.08 **CORRECTIVE MAINTENANCE: DEFINITION**

This entails regular observation of the equipment, identifying pending breakdowns, maladjustment or anomalies of equipment, units or parts of installations and subsequent action to restore installations to the functional condition as before the breakdown.

SA 03.09 **BREAKDOWN MAINTENANCE: DEFINITION**

This entails repair and/or replacement of defective equipment, units or parts of installations following a breakdown that leaves the installation inoperable or unsafe, and subsequent action to restore installations to their normal functional condition, within the maximum down-time allowed.

SA 03.10 **OPERATIONAL DAMAGE BREAKDOWN MAINTENANCE: DEFINITION**

This entails repair and/or replacement of defective or damaged equipment, units or parts of installations following a breakdown that leaves the installation inoperable or unsafe, and subsequent action to restore installations to their normal functional condition, within the maximum down-time allowed.

Typical examples of "operational damage breakdown visits" would be:

- A Breakdown of any structural items such as locks, window handles and stays, windows, doors and any other structural related items.
- A Breakdown of any plumbing, drainage or sanitary ware related items.
- A Breakdown of any electrical related items.
- Any other damaged items not caused by normal wear and tear.

SA 03.11 **SITE MAINTENANCE RECORD KEEPING**

The Contractor shall provide and maintain hard-cover A4 maintenance files for each installation for the duration of the Contract. All schedules, checklists, breakdown reports, preventative maintenance records, component replacement records and quarterly reports shall be filed, together with information regarding repairs exceeding the Contractor's liability, as set out in SA 03.02 and SA 03.03.

Site maintenance records shall be submitted at each monthly meeting.

SA 03.11 OPERATIONAL DAMAGE BREAKDOWN DEFINITION

SA 32.12.01 Labour

Competent personnel that have been trained by the Contractor, in accordance with Additional Specification SD: General Training shall execute all maintenance work.

SA 03.12.02 Equipment

All tools and equipment required for maintenance work shall be supplied by the Contractor at his cost (except where otherwise provided).

SA 03.12.03 Material

All material, spare parts, components, equipment and appurtenances necessary for the complete maintenance of each installation shall be supplied and installed by the Contractor at his cost, to a maximum value per part/subassembly as specified in the Special Conditions of Contract for exceeding Contractor's Liability.

Materials as provided for in the Schedule of Quantities, shall be supplied and delivered by the Contractor at the tendered rates upon order of the Engineer only, and shall be free-issued to the User Client for own use. The Contractor shall inform the Engineer of all scheduled deliveries to arrange official hand-over with the User Client.

SA 03.13 IDENTIFICATION OF EQUIPMENT

A unique identification number will be allocated only to each mechanical equipment item forming part of the installation. This identification number will be allocated and administered in collaboration with the User Client and must be described in the maintenance control plan.

Reference shall be made to identification numbers in the maintenance control plan, operating and maintenance manuals and during all maintenance activities, including the logging of breakdowns and other correspondence. Identification numbers shall also be indicated on as-built drawings.

SA 04 MAINTENANCE CONTROL

SA 04.01 SCOPE

Maintenance quality control shall be the responsibility of the Contractor. The Contractor shall introduce a maintenance control plan to assist him in ensuring that preventative, corrective and breakdown maintenance are performed as described in the operating and maintenance manuals and Technical and Particular Specifications.

SA 04.02 PRELIMINARY MAINTENANCE CONTROL PLAN

A preliminary version of the maintenance control plan shall be submitted with the programme and the framework of the preliminary version shall be as close as possible to that of the final maintenance control plan as specified in SA 03.03 below. Detail contained in this preliminary maintenance control plan shall include:

(a) Actual time that a representative of the Contractor will be present on Site for the duration of the maintenance period;

(b) the scope and frequency of routine inspections

(c) repair methodology

(d) details of training plan to be implemented in accordance with Additional Specification SD

SA 04.03 MAINTENANCE CONTROL PLAN

(a) The maintenance control plan shall be based on the Contractor's preliminary maintenance control plan, and shall be bound in a neat, A4-sized, ring-bound document with a cover page and back cover. The contents of the document shall be indexed.

In drawing up the document, the Contractor may reproduce relevant paragraphs and clauses from any of the specifications forming past of the Contract documents, but should there be any discrepancies between such clauses and paragraphs in the maintenance control plan and those in the Contract documents, those in the Contract documents shall be regarded as being correct and shall apply.

(b) To ensure that the Engineer is satisfied that the Contractor understands the purpose and advantage of carrying out maintenance work according to a maintenance control plan he shall, as an introduction to the control plan document, set out his views as to what he believes the implementation of a maintenance control plan will achieve.

(c) The maintenance control plan shall also contain the following:

(i) A summary of the repair and maintenance work to be carried out under the Contract giving details of the conditions of the various installations at the facility(ies) affected by the activities under the Contract. The Contractor shall bear in mind that maintenance work may have to be carried out before the repair phase of the installation has been entirely completed and the summary mentioned above shall therefore differentiate between maintenance work before and after the repair phase has been completed.

(ii) Details of how the Contractor intends to carry out the various types of maintenance work especially breakdown maintenance should breakdowns occur.

(iii) Details of how the call centre works, as specified in clause SA 04 as well as all statistics of breakdowns, leakages, blockages, etc. available from the call centre for the installation and the age of the installation that has been taken into account in compiling the contents of the maintenance control plan.

(iv) A list of organisations and persons directly involved with the Contract or whose requirements have to be taken into account during the entire Contract Period such as the Department of Public Works, the User Client, the Consulting Engineer, the Contractor, the Local Authority, etc. Each person's position within his organisation as well as the applicable phone numbers shall be given.

(v) Details of monthly meetings to be hold with the Department of Public Works, the User Client, Contractor and Engineer;

(vi) Reports to be submitted after every routine inspection (all reports, checklists, breakdown records, score card results, etc. for each system of an installation shall be kept on the site in a hard cover file);

(vii) Procedures to address complaints and logged breakdowns;

(viii) Details of quarterly reports, summarising all inspections, together with inspection data such as nature of test, names of persons carrying out tests and inspection results. Detail of repairs and replacements, together with testing of repaired equipment shall also be reflected in this report, and

(ix) Assistance to be given by the Engineer with decisions regarding material, equipment and other recommendations.

(d) The codes of practice as set out in ISO 10006 and ISO 9004 for quality systems and management shall be used as a guideline for compiling a maintenance control plan. ISO accreditation is not a requirement in terms of this Contract.

(e) The maintenance control plan shall be upgraded when its contents are no longer representative of actual conditions.

(f) The Contractor shall check the contents of existing Operating and Maintenance Manuals (if available) and shall update or modify and then incorporate applicable data into his own manuals. Where no manuals exist, the Contractor shall draw up his own Operating and Maintenance Manuals.

Pertinent data contained in the Operating and Maintenance Manual may be transferred to the Maintenance control plan to make it a document which can be used as an independent handbook for maintenance work.

The Contractor is referred to the contents of paragraph (a) above regarding the reproduction of data, as this shall also be applicable to data reproduced from Operating and Maintenance Manuals.

SA 05 COMMUNICATION

The maintenance control plan (Clause SA 03) will provide, after agreement between the Contractor and the Engineer, for the following communication and complaint logging procedure:

(a) The Contractor shall establish a telephone and fax line and a cellular telephone connection to ensure that he can be reached at any time.

(b) The Contractor shall primarily be responsible for determining the items requiring preventative, corrective and breakdown maintenance, and shall communicate this information directly to his maintenance workforce.

(c) Should the Engineer or operating personnel of the User Client determine or suspect that preventative, corrective or breakdown maintenance is required, a call shall be logged through the call centre to reach the Contractor as soon as possible.

(d) Reaction times will be as described in Clause SA 05.02.

(e) All complaints of the User Client shall be reported to the Engineer via the call centre, as set out in the maintenance control plan, and the Engineer shall issue instructions to the Contractor. After the Contractor has attended to the complaint, the Engineer will provide feedback to the call centre both telephonically and via fax.

The call centre logs the details of the Engineer's call and provides feedback to the complainant.

SA 06 PERFORMANCE MEASUREMENT

The Contractor's performance shall be measured against the following parameters:

SA 06.01 SPECIAL TESTING OF AN INSTALLATION

The Engineer may at any time inspect any part of the entire installation. During Maintenance work, the Engineer shall at his discretion order special tests to be carried out on complete installations at intervals of not less than four months, to verify the satisfactory functional condition of the installation.

The Engineer reserves the right to select at random component equipment and trade practices to be tested by independent authorities for compliance with specifications as specified in this Contract document.

The Contractor shall provide all equipment, tools and instruments required for testing.

SA 06.02 MAXIMUM MAINTENANCE DOWN-TIME

After a complaint has been logged and forwarded to the Contractor, the Contractor shall be expected to minimise the maintenance down-time until the system component is fully operational to the satisfaction of the Engineer. Should the Contractor not respond within the maximum down-time, the Engineer may arrange, at the cost of the Contractor, for the necessary repair work to be done by others.

Should the actual down-time exceed the maximum down-time the Contractor shall be liable to a payment reduction for the difference between actual down-time and maximum down-time. This is reflected in the table below:

No.	REQUIRED MAINTENANCE	MAXIMUM DOWN-TIME ALLOWED	PAYMENT REDUCTION IF EXCEEDED
1.	Fatal Breakdown	1 hour	R1 000/hour
2.	Emergency Breakdown	12 hours	R2 000/day
3.	Ordinary Breakdown	7 days	R500/day
4.	Operational damage repair	7 days	R500/day

"Maximum down-time" shall mean the period of time allowed to repair a breakdown, and "actual down-time" shall mean the measured period from the instant when the breakdown was logged with the Contractor until the installation has been repaired to its functional specification.

"Immediate response repairs" shall imply breakdown maintenance repair work where no breakdowns are allowed at any time in terms of the Technical Specification.

"Emergency maintenance repairs" shall imply any breakdown maintenance repair work required to rectify a component or unit of the installation that disables the installation from functioning at its designed maximum requirement in terms of the Technical Specification.

"Ordinary maintenance repairs" shall imply all breakdown maintenance repair work required other than immediate response or emergency maintenance repairs.

"Operational damage repairs" shall imply all operational damage breakdown repair work required on any other damaged items not caused by normal wear and tear and shall also include and structural related breakdowns.

SA 06.03 PERFORMANCE-BASED PAYMENT

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly maintenance payments for the various installations.

SA 06.03.01 Score-card

The Engineer shall inspect each installation monthly after Practical Completion of the repair phase of the installation. The Engineer shall use a score-card to measure the quality of preventative and corrective maintenance rendered by the Contractor during the preceding month, on all components that form part of the installation, in accordance with the maintenance specifications. The Engineer will record his inspection directly onto the score-card. The score-card shall serve to evaluate ten performance indicators each month.

SA 06.03.02 Performance indicators

Performance indicators shall be selected to measure the Contractor's service level of preventative and corrective maintenance.

The Engineer shall have the opportunity to select ten (10) performance indicators each month, which shall focus on the measurement of maintenance quality against the relevant specifications for the ensuing month. All ten (10) performance indicators are known to both the Engineer and the Contractor.

The Contractor shall aim to perform satisfactorily on all ten performance indicators. All indicators shall be selected from the scope of his normal preventative and corrective maintenance work and shall be based on the maintenance control plan and operating and maintenance manuals. The work shall either be satisfactory, or unsatisfactory, and the Contractor shall score one (1) or zero (0) respectively per indicator.

Performance indicators shall be used to focus on certain key aspects of the work and shall in no way limit the Contractor's responsibility to do all the required work.

SA 06.03.03 Satisfactory performance

The Engineer shall inspect the site on an arbitrary day to measure the quality of maintenance against the ten selected performance indicators. Should the Contractor score the maximum points (10) he shall receive his full maintenance payment for the installation. Should the quality of preventative maintenance, or components requiring persistent corrective maintenance be unsatisfactory according to the score-card, the Contractor may fail to achieve full payment due to a reduced service level. Each monthly payment for maintenance shall be subject to evaluation based on the score-card.

A copy of the score-card including a guideline for the use thereof is included in this Specification.

SA 07 PREVENTATIVE MAINTENANCE ACTIONS

The preventative maintenance actions for the various installations for preventative maintenance are described in this section. Remuneration for maintenance of the infrastructure shall be deemed included in the tendered monthly payment for the respective installations

The said maintenance and servicing work shall be executed in accordance with the relevant codes of the practise, standards, regulations, municipal laws and by-laws and the manufacturer's specifications and codes of practise.

The maintenance schedules and frequency shall be developed under the maintenance control plan to be instituted by the Contractor.

The maintenance and servicing work to be performed and executed shall include but not be limited to the items listed below. These actions and findings shall be logged and reported on the relevant approved schedules and reports forming part of the Maintenance Control Plan.

The Ports of Entry consists of various facilities, are listed in additional specification **SS: Site Specific Inventory**. The preventative actions required are divided into maintenance installations and grouped as follows:

1. Plumbing and Drainage

- SA 07.01 – Plumbing and Drainage Installations

2. Electrical Installations

- SA 07.02 – Electrical Installations

3. Fencing, Refuge Removal and Pest Control

- SA 07.03 – Fencing
  SA 07.04 – Refuge Removal and Pest Control

4. Cleaning and Site Keeping

- SA 07.05 – Cleaning and Site Keeping

5. External Water and Sewer Networks

- SA 07.06 – Water Distribution Networks
- SA 07.07 – Water Reservoirs and Storage Tanks
- SA 07.08 – Borehole Pump Systems
- SA 07.09 – Water Pump Systems
- SA 07.10 – Sewerage Networks

6. Roads and Stormwater Drainage

- SA 07.11 – Roads
- SA 07.12 – Stormwater Drainage

7. External Lighting and Standby Power

- SA 07.13 – External Lighting
- SA 07.14 – Low Voltage Distribution Networks
- SA 07.15 – Standby Power Systems

8. Heating, Ventilation and Air-Conditioning Systems

- SA 07.16 – Heating, Ventilation and Air-Conditioning Systems

9 Fire Fighting Equipment

- SA 07.17 – Fire Fighting Equipment

SA 07.01 PLUMBING AND DRAINAGE INSTALLATIONS

RAINWATER DISPOSAL SYSTEM

NO	PREVENTATIVE MAINTENANCE ITEM DESCRITPTION	MAINTENANCE FREQUENCY
1	Clean out and clear all rainwater gutters and full bores	Bi-monthly
2	Clean out and clear all catch pits, channel drains and floor outlets	Bi-monthly
3	Clean and unblock all pipes	Bi-monthly
4	Check alignments of gutters	Six-monthly
5	Check and inspect all rainwater outlet gratings and replace if necessary	Six-monthly
6	Check gutter and pipe bracketing systems	Four-monthly
7	Check and inspect manhole covers and frames for damage or missing	Monthly

SOIL AND WASTEWATER DRAINAGE SYSTEM

NO	PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Check, inspect and clean out all gullies	Monthly
2	Replace broken or missing gully gratings	Monthly
3	Check, inspect, repair or replace all manhole covers and frames	Bi-monthly
4	Check, inspect and repair manhole benching	Four-monthly
5	Check, inspect, repair or replace all inspection eyes, end caps and cleaning eye covers	Monthly
6	Check, inspect, repair or replace all bracketing systems	Four-monthly
7	Check, inspect, report and unblock any blockage that occurs	Monthly
8	Check, inspect, service, repair/replace all vacuum and two-way vents	Four-monthly

DOMESTIC WATER DISTRIBUTION AND RETICULATION SYSTEMS

NO	PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Check, inspect, report and repair all leaks	Monthly
2	Replace all valve gaskets, gland packings and seals	Annually
3	Check, inspect, repair and readjust all pressure-reducing valves	Annually
4	Check, inspect and test operation of all valves on site	Four-monthly
5	Clean out all strainers	Monthly
6	Check, inspect, service test and repair/replace all safety and expansion release valves	Six-monthly
7	Check, inspect, repair or replace all bracketing systems	Four-monthly
8	Check, inspect, service, repair/replace all air release valves and vacuum breakers	Four-monthly
9	Check, service, repair or replace all ball float valves	Four-monthly
10	Check, inspect, test, service and repair all geyser installations	Four-monthly
11	Check, inspect, test, service and repair all non-return valves	Four-monthly

SANITARY AND BRASSWARE EQUIPMENT

NO	PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Inspect, repair/replace WC seats and covers	Monthly
2	Replace all tap washers	Annually
3	Replace all tap gland packings	Annually
4	Check, inspect, repair, fix and where necessary replace sanitary ware mountings and brackets	Four-monthly
5	Check, inspect, service, repair/replace all cistern flushing mechanisms	Monthly
6	Check, inspect, service, repair/replace all brassware	Four-monthly
7	Check, inspect, service, repair/replace all sanitary ware	Four-monthly
8	Check, inspect, service, repair, readjust all flushing valves	Four-monthly
9	Repair all flushing valve internal parts with replacement kits	As occur
10	Stained equipment to be cleaned with approved manufacturer's cleaning agent	Six-monthly
11	Check, inspect, report and repair all leaks	Monthly
12	Check, inspect, repair/replace all shower gratings	Four-monthly
13	Check, inspect, repair, service, replace all missing valves	Six-monthly
14	Replace missing tap handles	As occur
15	Replace missing bath, basin, sink, plug, etc	As occur

SA 07.02 ELECTRICAL INSTALLATIONS

SA 07.02.01 Monthly maintenance

Check operative protective and monitoring devices.

Verify operation of switching elements and meters

Check lamp operation

Measure phase voltages and currents in distribution board and record values in Record book

Inspect and repair the following:

- any visible damage to the installations
- setting of protective and monitoring devices

Ensure upkeep of the labelling of the distribution board, equipment, cabling and wiring

Ensure presence of labelling on face plates or bodies of light switches, socket, outlets and isolators.

SA 07.02.02 Annual maintenance

Service all luminaries, distribution boards, socket outlets, isolators, light switches, etc.

Witnessed testing of all earth leakage protection units on all socket outlet units.

Visually inspect the following and repair if required:

- Connection of cables and conductors including earthing and bonding.
- Presence of appropriate devices for isolation and switching.
- Correct connection of socket outlets, light switches, isolators, lamp holders, etc.

SA 07.03 FENCING

Maintenance shall include replacing of components, fixing defects, tightening, redressing or any other actions or rectifying measures necessary for complete operation of the fencing installation. This shall include keeping the installation free of litter or any other element interfering with the function or integrity of the system, 0,5 wide on each of the fence.

SA 07.03.01 Monthly maintenance

- Clearing the fence route.
- Inspect and repair ant visible damages to installation.
- Corrosion protection on fencing, gates and tubular posts.
- Inspect fence for tightness to straining wire redress of repair or repair of necessary.
- Inspect tension of straining wires and repair if necessary.

SA 07.04 REFUGE REMOVAL AND PEST CONTROL

The whole of the site within the perimeter fences of the Kosi Bay Port of Entry shall be kept free of litter, rubble and solid waste. Litter and rubble (solid waste) shall be collected, stored by the Contractor and removed from site as frequently as necessary

Removal of household solid waste to the municipal dump site will be carried out by the Contractor. The cleanliness of the site will be the sole responsibility of the Contractor.

Garden refuse may be amongst the litter rubble to be collected and disposed off by the Contractor.

The tendered monthly payment for maintenance for site keeping shall be deemed to include to *continuously* collecting litter and rubble across the entire site, placing it in a central solid waste container (skip) and removing it off-site to a formal waste facility.

NO	ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Cleaning out all waste bins in public areas	Daily
2	Cleaning out all waste bins at residential units	Weekly

3	Collect litter, rubble and other waste across the entire site within the perimeter fences of the Kosi Bay Port of Entry and place in central solid waste container (skip)	Continuously
4	Re-fill all rodent bait stations	Monthly
5	Internal pest, termite and rodent control	Monthly
6	External pest, termite and rodent control	monthly

SA 07.05 CLEANING AND SITE KEEPING

The Contractor shall further be responsible for supplying and maintaining the grass cutting equipment in a perfect working condition.

SA 07.05.01 Site keeping

Site keeping activities will include providing all equipment and consumables necessary for site keeping, such as lawn mowers, brush-cutters, rakes, fuel, shovels, etc, and shall be deemed included in the monthly maintenance cost for Site keeping and Cleaning.

NO	ACTION	FREQUENCY
1	Cleaning out of *and supply* of black waste bin bags to all waste bins in public areas	Daily
2	Cleaning out of all waste bins in residential areas	Weekly
3	Emptying the solid waste skip and removal of waste off-site to approved dumping site	At least monthly (when required)
4	Watering of plants, shrubs, grass and trees (*only* if water is readily available and instructed for by Engineer)	daily
5	Removal of weeds	Weekly
6	Clearing of weeds and grass along the edges of paved areas	Weekly
7	Cutting of grass. Lawns: No grass to exceed the length of 40mm. Open areas: No grass shall exceed the length of 100mm.	At least weekly (when required)
8	Trimming of dense shrubs	2 Monthly
9	Removal of undesirable shrubs	Quarterly
10	Trimming of trees where branches cause obstruction	Quarterly
11	Collecting of litter and foreign objects	Continuous Daily

SA 07.05.02 Cleaning tasks for Offices, Ablutions and Support Facilities

The Contractor shall be responsible for cleaning ablution facilities as frequently as necessary to maintain them in a clean and healthy condition. The actions outlined below serve only as a benchmark for the cleaning and maintaining of the facilities.

Cleaning activities will include providing all cleaning agents and equipment necessary for cleaning. Consumables such as toilet paper, sanitizers, bin liners of she-bins, paper towels and hand wash soap will be replaced by the Contractor as and when necessary and shall be deemed include in the monthly maintenance cost for Site Keeping and Cleaning. It can be assumed that toilet paper will be consumed at 3 rolls per toilet (public ablution) per day (single ply), and hand washing soap at 2 litres per soap dispenser per month.

CLEANING TASKS FOR OFFICE AND SUPPORT FACILITIES

NO	ACTION	FREQUENCY
1	Disinfect and cleaning of floors in public passage areas and open plan offices	Daily (before the opening of the port of entry)
2	Disinfect and cleaning of counter tops and under counter shelves	Daily (before the opening of the port of entry)
3	Emptying of waste baskets in offices and service buildings	Daily
4	Disinfect and cleaning of office floors / Vacuum of carpets	Weekly
5	Washing of windows and dusting of window sills and ledges	Weekly
6	Clean and polish all fittings	Weekly
7	Washing of walls	Weekly
8	Dusting of interior of the building to remove dust and spider webs	Weekly

CLEANING TASKS FOR ABLUTION FACILITIES

NO	ACTION	FREQUENCY
1	Disinfecting, cleaning and ensuring that the ablution facilities are in a pristine sanitary condition at all times	Continuous 7 days a week
2	Disinfect, washing and cleaning of floors	Continuous 7 days a week
3	Empty and clean all waste receptacles	Continuous Daily
4	Clean and sanitise all bowls, basins and urinals	Continuous Daily

5	Clean, sanitise and polish all fittings and mirrors	Continuous Daily
6	Sanitising and cleaning out of she-bins	Continuous Daily
7	Washing of windows and dusting of window sills, ledges, pipes and fittings	Weekly
8	Disinfecting and washing of walls	Monthly
9	Dusting of interior of the building to remove dust and spider webs	weekly

SA 07.06 **WATER DISTRIBUTION NETWORKS**

NO	ROUTINE PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Water Audit	Monthly
2	Clean out all strainers	Monthly
3	Check, inspect, repair or replace all bracketing systems	Four-monthly
4	Pant repairs to piping, fittings and equipment	Annually

CLEANING OF EXISTING PIPELINES

NO	ROUTINE PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Remove silt, debris and loose lime deposits from within pipeline where required by scouring	Annually
2	Do general cleaning in areas where leakage has occurred	Six-monthly

FITTINGS AND STRUCTURES

NO	ROUTINE PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Replace all valves gaskets, gland packings and seals	Annually
2	Check, inspect, service, repair and readjust all pressure reducing valves	Annually
3	Check, inspect and test operation of all valves on site	Four-monthly
4	Check, inspect, service, test and repair/replace all safety and expansion release valves	Six-monthly
5	Check, inspect, service, test and repair/replace all air release valves and vacuum breakers	Four-monthly
6	Check, service, repair or replace all ball float valves	Six-monthly
7	Clean out structures of debris	Four-monthly

8	Check, inspect, test, service and repair/replace all non-return valves	Four-monthly

SA 07.07 **WATER RESERVOIRS AND STORAGE TANKS**

NO	ROUTINE PREVENTATIVE MAINTENANCE OF PRESSED STEEL TANKS AND ANCILLARIES	MAINTENANCE FREQUENCY
1	Check for and repair all leaks. Repair leaks.	Monthly
2	Corrosion protection.	Annually
3	Clean and sterilise pressed steel tanks.	annually

SA 07.08 **BOREHOLE PUMP SYSTEMS**

The borehole pumping equipment and systems shall be serviced and maintained to keep it in perfect functional condition.

NO	ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Service submersible pumps	Annually
2	Clean filters/ strainers	Three-monthly
3	Check V-belts (Lister Engine)	Monthly
4	Measure rest water-level	Three-monthly
5	Check and clean MCC panel	Three-monthly
6	Check electric motors	Monthly
7	Monitor supply to storage tanks from borehole	Daily

SA 07.09 **WATER PUMP SYSTEMS**

Maintenance shall include all repairs, replacing of components or materials, routine setting or any other actions necessary to ensure a perfect functional condition

NO	ROUTINE PREVENTATIVE MAINTENANCE OF CLEAR-WATER PUMP SYSTEMS	MAINTENANCE FREQUENCY
1	Check, service, repair and clean all pumps	Annually
2	Corrosion protect pumps, motors and surface piping	As required
3	Check, inspect, report and repair all leaks	Monthly
4	Check and lubricate moving parts	Four-monthly

5	Operation and supply of diesel for water pump at Kosi Bay Port of Entry	Daily

SA 07.10 SEWAGE NETWORKS

SA 07.10.01 Sewage Network Systems

NO	ROUTINE PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MANTENANCE FREQUENCY
1	Check, inspect, repair or replace all manhole covers and frames and builder's work to manholes	Four-monthly
2	Check, inspect and repair manhole benching	Four-monthly
3	Check, inspect, repair or replace all inspection eye, end caps and cleaning eye covers	Four monthly
4	Check, inspect, report and unblock any blockages that occurs	Monthly
5	Systematically mechanical cleaning of all sewer manholes and unblocking of all sewer line	Monthly
6	Check, inspect, repair/replace sewer pipes where necessary to maintain good working condition at all times	Four-monthly

SA 07.11 ROADS

All components of a roadway infrastructure, which includes the road surface, underlying layer works, kerbing, road markings, road sins and sidewalks, shall be maintained during the Contract.

Maintenance shall all repair work, replacing of components, fixing of defects, or any other actions or rectifying measures necessary for complete and safe functioning of the road infrastructure.

Maintenance of the road infrastructure shall also include all other actions related to maintenance, such as temporary accommodation of traffic through and around work areas, and provision of temporary accesses to properties.

NO	ROUTINE PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Check, inspect, repair all surface failures	Two-monthly
2	Check, inspect, repair all pavement failures	Six-monthly
3	Inspect and repair gravel shoulders	Six-monthly
4	Check, inspect, repair, repaint, replace road markings	Six-monthly
5	Check, inspect, repair, repaint, replace road markings	Annually
6	Remove loose material from the surface of parking areas by means of mechanical brooming	monthly

SA 07.12 SRORMWATER DRAINAGE

All components of the stormwater drainage infrastructure, including surface as well as underground components, shall be maintained during the contract.

Maintenance shall include all repair work, replacing of components, fixing of defects, cleaning, or any other actions or rectifying measures necessary for complete and safe functioning of the stormwater drainage infrastructure.

Maintenance on the stormwater drainage infrastructure shall also include all other actions related to maintenance, such as temporary drainage features and temporary accommodation of traffic.

NO	ROUTINE PREVENTATIVE MAINTENANCE ITEM DESCRIPTION	MAINTENANCE FREQUENCY
1	Check, inspect, repair or replace all manhole or inlet covers, grids and frames and builder's work to manholes.	Four-monthly
2	Check, inspect and repair manhole and inlet benching.	Four-monthly
3	Check, inspect, report and unblock any blockage that occurs.	Monthly
4	Clean all vegetation and debris accumulated in inlets and around stormwater pipes / culverts.	monthly

SA 07.13 EXTERNAL LIGHTING SYSTEMS

Maintenance shall include all repairs, replacing of components or materials, routine setting or any other actions necessary to ensure a perfect functional condition. The following shall be used as guidelines to ensure effective maintenance:

SA 07.13.01 Area Lighting

Monthly Maintenance

- Verify operation of switching element.
- Check lamps.
- Check mast door for weatherproof seal.
- Check earth connection at footing, record value.

Annual Maintenance

- Service all luminaries
- Measure earth resistance of electrode.
- Measure earth resistance of trench earth.
- Record values in record book.

SA 07.13.02 Security lighting

Monthly Maintenance

- Verify operation of switching element.
- Check lamps.
- Check that all pole covers are secure.
- Visually check distribution kiosk.

Annual Maintenance

- Measure phase voltages and line currents in distribution kiosk or local distribution board.
- Do vermin protection.
- Service all luminaires.
- Paint timber poles with creosote.

SA 07.13.03 Street Lighting

Monthly Maintenance

- Verify operation of switching element.
- Check lamps.
- Check that all pole covers are secure.
- Visually check distribution kiosk

Annual Maintenance

- Measure phase voltages and line currents in distribution kiosk.
- Do vermin protection.
- Service all luminaires and distribution kiosks.
- Paint timber poles with creosote.

SA 07.14 LOW VOLTAGE RETICULATION

SA 07.14.01 Monthly maintenance

- Verify operation of volt and ammeters.
- Check that access covers are secure.
- Visually check distribution board.
- Check all connections.
- Check operation of switching timers.
- Inspect and secure access doors and covers.
- Inspect distribution kiosks.
- Inspect overhead conductors, insulators and poles.
- Monthly electricity meter readings.

Annual maintenance

- Service all low voltage boards.
- Measure phase voltages and line currents in low voltage distribution board.
- Record values in record book and Maintenance Control Plan.
- Service all distribution and metering kiosks.
- Service overhead distribution system.

SA 07.15 STANBY POWER SYSTEMS

SA 07.15.01 Weekly maintenance

1. Simulate a power failure **EVERY FRIDAY** at **11:00** to ensure generator is fully operational. Test run shall be undertaken, if possible on load, and running hours, diesel levels, volt, ampere and frequency readings recorded.

SA 07.15.02 Monthly maintenance

1. The following activities shall be executed during the monthly generator inspections:

   - Check oil level and top up as required.
   - Check oil viscosity for dilution by water or fuel.
   - Check starter battery terminals and apply contact grease.
   - Check battery cables for damage and secure termination.
   - Check battery electrolyte.
   - Check battery voltage and record.
   - Check battery voltage drop during engine cranking and record.
   - Check battery charger operation after cranking test.
   - Check starter motor for abnormal noise.
   - Check diesel engine while running for noise, vibration or loose components.
   - Check all flexible hoses for leaks, corrosion and ageing.
   - Check all engine V-belts.
   - Monitor engine / alternator coupling for noise.

2. Verify that the alarm functions are operational by simulation:

   - Low oil pressure.
   - High engine temperature.
   - Low engine coolant level.
   - Abnormal speed.
   - Synchronising failure (if applicable).
   - Cooling water pump failure.
   - Cooling tower fan failure (if applicable).
   - Low battery voltage.
   - Fuel pump failure.
   - Low fuel bulk tank (if applicable).

3. Test that following alarms trigger correctly by creating the alarm condition:

   - Unit not in auto : turn selector switch to manual or test
   - Battery charger failure : switch off AC supply to battery charger
   - Auxiliary supply failure : switch off auxiliary power supply

4. Alternator shall be checked for accumulation of dust on the regular and for any loose components.

5. Test run shall be undertaken, if possible on load, and volt, ampere and frequency readings recorded.

6. Alternator shall be cleaned and switched back into 'auto' mode

7. Complete standby Generator monthly log sheets

8. Record running hours, diesel consumption etc in the following prescribed format (example):

	Previous Measurement	This Measurement	Consumption	Average Per day
Date:	01-Apr-2016	03-May-2016	Total	32 days
			(litres)	(ltrs/day)
Diesel Tank Meter Reading (litres)	26542.2	30546.2	4004.0	125.1
Running Hours:			(hours)	(hrs/day)
Generator 1 (hrs)	1245.6	1604.2	358.6	11.2
Generator 2 (hrs)	2535.6	2927.6	392.0	12.3
Total Generator hours (hrs)			750.6	
Average Diesel consumption			5.3	ltrs/hr

SA 07.15.03 Annual maintenance

The following activities shall be executed in addition to the monthly maintenance work after every twelve months.

1. Drain an oil sample and submit for analysis to establish need for an oil change. Fix test report in Record book
2. Record output parameters while on load.
3. Record running hours
4. Replace oil and fuel filters if not replaced during 1 year as part of 200hrs service).
5. The cooling system shall be drained, flushed and refilled with water and prescribed water conditioner.

SA 07.16 HEATING, VENTILATION AND AIR-CONDITIONING SYSTEMS

SA 07.16.01 Monthly maintenance

REFERENCE NUMBER	ACTION
S-1	Clean filters, replace if required
S-2	Inspect air intake and discharge for blockages
S-3	Check all refrigerant, drainage pipes for damage and leaks
S-4	Check sight glass: clear or flash gas
S-5	Carry out visual inspection of condenser coil for blockages and correct operation of fans
S-6	Carry out visual inspection of evaporator coil for blockages and correct operation of supply fan
S-7	Check enclosure for damages
S-8	Check electric motor running temperature
S-9	Check electric connections for tightness
S-10	Test thermostat and control operation
S-11	Clean condensate tray and test drainage for proper operation
S-12	Check cooling and heating cycle

SA 07.16.02 Bi-Annual maintenance (6-months)

REFERENCE NUMBER	ACTION
S-1	Clean filters, replace if required
S-2	Inspect air intake and discharge for blockages
S-3	Check all refrigerant, drainage pipes for damages and leaks
S-4	Check sight-glass: clear or flash gas
S-5	Carry out visual inspection of evaporator coil for blockages and correct operation of fans
S-6	Carry out visual inspection of evaporator coil for blockages and correct operation of supply fans
S-7	Check enclosure for damages
S-8	Check electric motor running temperature
S-9	Check electric connections for tightness
S-10	Test thermostat and control operation
S-11	Clean condensate tray and test drainage for proper operation
S-12	Check filter/dryer
S-13	Check superheat and functioning of expansion valve
S-14	Check operation of HP and LP
S-15	Check operation of controliers
S-16	De-rust, neutralize and touch up paint work
S-17	Check cooling and heating cycle
S-18	Clean evaporator and condenser oil chemically
S-19	Clean all filter frames and seals
S-20	Check fan motor and compressor current
S-21	Check and test overload settings
S-22	Lubricate all bearings

SA 17.17 FIRE FIGHTING EQUIPMENT

The routine preventative maintenance work to be performed and executed shall include, but not be limited to the items listed below under the respective headings. These actions and findings shall be logged and reported on the relevant approved schedules and reports.

SA 17.17.01 Fire Extinguisher: Monthly Maintenance

- Check charge of the extinguisher.
- Check the condition of the discharge.
- Check the mechanism condition of the discharge hose.
- Update the log entry on the extinguisher.
- Log maintenance schedule
- DCP extinguishers: Check charge and replace powder at prescribed intervals.
- CO_2 extinguisher: Check charge.

SA O8 MANDATORY PERIODIC SERVICE

The following mandatory periodical services shall be measured for payment separately and does not form part of the remuneration for monthly preventative maintenance items

SA 08.01 Log all water meter readings and calculate losses on a monthly basis and report in the following format (example):

	Previous Measurement	This Measurement	Consumption	Average per day (kl)
Date:	01-Apr-2016	03-May-2016	Total	32 days
WATER SUPPLY: (kl) Main Supply (input)	 278540.6	 279235.5	(kl) 694.9	(kl/day) 21.716
Admin Cell Block House A1 House A2 House B1 House B2 House B3 Ablution A Ablution B Building A Building B	15642.0 15674.0 18569.5 32598.0 13349.4 89562.5 98685.3 85684.0 53265.5 25689.2 26858.8	15690.0 15721.5 18610.8 32650.5 13396.0 89620.7 98721.1 85723.2 53397.6 25790.2 269521.1	48.0 47.5 41.3 52.5 36.6 58.2 35.8 39.2 132.1 101.0 93.3	1.500 1.484 1.291 1.641 1.144 1.819 1.119 1.225 4.128 3.156 2.916
Total consumption Output)			685.5	21.422
Loss (Input – Output)			9.4	0.294
PORTABLE WATER SUPPLY: Water supply within standards Water test report attached	 Yes/No Yes/No	 Yes/No Yes/No		

SA 08.02 Sample potable water supply and chemical analyses to be provided by an authorised company on a monthly basis. The water report should be provided monthly in the following format, **in accordance with SANS241:**

SANS 241:2006	Unit	Class 1 (recommended values)
Chemical report		
pH		5.5 tot 9.5
Electrical conductivity	mS/m	150
Calcium as Ca	mg/L	150
Magnesium as Mg	mg/L	70
Sodium as Na	mg/L	200
Potassium as K	mg/L	50
P-Alkalinity	mg/L	
M-Alkalinity	mg/L	
Fluoride as F	mg/L	1
Chlorine as Cl	mg/L	200
Bromide as Br	mg/L	**3
Nitrate as N	mg/L	10
Phosphate as PO_4	mg/L	
Sulphate as SO_4	mg/L	400
Calcium Hardness	mg/L	375
Magnesium hardness	mg/L	287
Total hardness as $CaCO_3$	mg/L	662
Aluminium as Al	mg/L	0.300
Arsenic as As	mg/L	0.010
Chromium as Cr	mg/L	0.100
Copper as Cu	mg/L	1.000
Iron as Fe	mg/L	0.200
Manganese as Mn	mg/L	0.100
Lead as Pb	mg/L	0.020

Zinc as Zn	mg/L	5000
Bacteria report		
Heterotrophic plate count	cfu/ml	100
Total coliform	cfu/100ml	0
e. coli	cfu/100ml	0

SA 08.03 Log all electricity meter readings on a monthly basis in the following format:

	Previous Measurement	This Measurement	Consumption	Average per day (kl)
Date:	01-Apr-2016	03-May-2016	Total	32 days
ELECTRICITY: (kWh)			(kWh)	(kWh/day)
Main Supply	124899.0	145865.9	20966.9	655.2
Admin	135899.0	1523.3	167.3	5.2
Cell Block	3596.5	3658.2	61.7	1.9
House A1	8976.0	9256.3	280.3	8.8
House A2	9686.0	9785.2	99.2	3.1
House B1	9565.0	10152.2	587.3	18.4
House B2	3594.0	4512.3	918.3	28.7
House B3	3594.0	4689.2	1095.2	34.2
Ablution A	3598.0	4154.3	556.8	17.4
Ablution B	5975.0	8785.3	2779.3	86.9
Building A	5698.0	8520.0	2822.0	88.2
Building B	5689.0	8654.2	2965.2	92.7

SA 08.04 Cleaning and sterilization of water storage reservoir/tank to be performed annually.

SA 08.05 Remove and empty waste from skip to external waste disposal site on a weekly basis.

SA 08.06 De-sludge and cleaning of septic tanks as and when required and instructed for by the Engineer.

SA 08.07 Service submersible pumps for borehole installations annually.

SA 08.08 Statutory annual servicing of fire extinguishers.

SA 08.09 Annual Pest control (internal and external).

SA 09 FREQUENT SERVICING OF INSTALLATIONS

SA 09.01 Wastewater Treatment

General frequent servicing of the wastewater treatment works shall be done in accordance with this specification.

SA 09.01.01 General

The general frequent servicing work to be performed and executed shall include, but shall not be limited to the items listed in the table below:

Item	Description	Frequency
01	General housekeeping: keeping site in neat and acceptable condition.	Daily
02	Control access to the site.	Daily
03	Maintain safety conditions on site.	Daily
04	Log and report spills, pollution events, power failures, extraordinary process phenomena, etc. check auto-reset of power to mechanical equipment	Event
05	Develop a feel for effective treatment by means of visual indicators of good/bad plant performance: colour, odour, foam, algae growth, aerator spray patterns, effluent clarity, bubbles, floating material, solids accumulation, flow patterns, turbulence, touch.	Daily
06	Record operating hours and kW-hours of all mechanical equipment	Daily
07	Check operation of all valves and sluices	monthly

SA 09.01.02 Specific Processes and Units

The specific frequent servicing work to be performed and executed shall include, but shall not be limited to the items listed in the table below:

Item		Operation of Specific Processes and Units	Frequency
01		Septic tanks and French drains	
	01	Check and log scum, water and sludge depths in tank	6 Months
	02	Empty tank as specified frequencies (max. 3years) or when full	3 Years
	03	Inspect French drain for accumulation of water or for seepage to surface. If positive, repair again	3 Months
	04	Clean connecting pipes and accessories and remove tree and grass roots from pipes	3 Months

02		Inlet works	
	01	Hand-raked screens: remove screenings rags, plastics, etc), ensuring that only degradable material is passed on to subsequent process units. (Last removal after evening peak flow	2 hours during day
	02	Wash screenings and grit, and return degradable material to treatment train	Hourly
	03	Dispose of screenings and grit by on-site burial	Daily
03		Oxidation/maturation ponds	
	01	Remove floating material from trap at an inlet pond and dispose of by off-site removal.	Daily
	02	Remove tree and grass roots from verges of ponds.	Monthly
	03	Check leak detection facilities (if provided) for signs of leakages	Monthly
	04	Ensure that surface growths are not accumulated in ponds.	monthly
04		Settling tanks	
	01	Scour settling tank and check for clumps of floating sludge.	Daily
	02	Remove scum and clean overflow weirs.	Daily
	03	Clean submerged portion of settling tank walls by pushing settled sludge on inclined surfaces down to the apex of the cone.	Monthly
05		Sludge drying beds	
	01	Apply sludge to drying beds in depths to suit climatic conditions, and remove when adequately dried.	Daily
	02	Keep sludge beds free of weed growth.	Daily
	03	Replenish filter media when required.	Event
06		Sludge disposal facilities.	
	01	Remove tree grass roots from verges of sludge lagoon.	Monthly
	02	Check leak detection facilities (if provided) for signs of leakage from lagoon.	Monthly
	03	Maintain hygienic conditions at sludge handling facilities.	Daily
07		Pump stations	
	01	Check operation and correct switching of pumps.	Daily
	02	Clean pump sumps.	Weekly
08		Bio filters	
	01	Check operation of dosing siphons and snifter pipes.	Daily
	02	Check operation of flow distribution pipes.	Daily
	03	Flush flow distribution pipes.	Weekly
	04	Check spread of flow and clean distribution nozzles/holes	Weekly
	05	Evaluate, by means of measurement and calculation, flushing rates, frequency and duration.	6 Monthly
	06	Inspect health of biological growth on filter media.	Weekly
	07	Check occurrence of blockages, ponding and nuisance conditions on filter media.	Monthly
	08	Check operation of dosing and re-circulation pumps.	Daily
09		Chemical phosphate removal	
	01	Check operation of dosing equipment.	Daily
	02	Select chemicals and dosing rates by means of beaker tests. Ensure correct calculation of dosage concentration and dosing rates.	6 Months
	03	Check, by means of measurement and calculation, the accuracy of dosing rates and their control proportion to flow rate.	Daily
	04	Manage provision, storage and control of chemicals.	Daily
	05	Ensure continuous dosing – avoid pulsing of dosing stream.	Daily
10		Disinfection	
	01	Check operation of dosing facilities.	Daily
	02	Clean chlorine contact tank.	4 Months
	03	Ensure chlorine-dosing proportional to flow rate.	Weekly

11		Effluent disposal facilities	
	01	Oxidation ponds: manage irrigation of effluent as means of disposal.	Daily
	02	Ensure erosion free discharge to receiving water body.	Monthly

SA 09.01.03 Monitoring and Reporting

The contractor shall keep a written record of all measurements taken and analyses done for process control and reporting to relevant authorities in terms of legal or project requirements.

A logbook shall be kept for daily recording of failures, malfunctions, spills, pollution events, power failure and detail of measures taken.

SA 10 MEASUREMENT AND PAYMENT

SA.01 MAINTENANCE OF A COMPLETE INSTALLATION ..... Unit: point

The unit of measurement shall be a point. Each month shall represent a maximum of ten points and a minimum of zero points, depending on the performance and quality of maintenance. Ten points per month, determined by using the tendered rate per point, shall include full compensation for all liabilities and obligations described or implied in the Contract document and deemed by the Contractor to be applicable to the maintenance phase of the Contract, for the complete monthly maintenance of an entire installation, and all appurtenant works deemed to form part thereof, as defined in the relevant Technical or Particular Specifications.

tendered Contract Price) shall also include full compensation for complete preventative, corrective and breakdown maintenance (as defined in this General Maintenance Specification), including full compensation for all costs related to resetting, repair, procurement, supply, delivery, replacement, protecting, furnishing, installing, testing and commissioning of all items and material required to maintain the complete installation in a perfect functional condition. The only items not to be included in the rate for monthly maintenance points are:

1. Supply, delivery, installation and testing of special equipment/materials that will be measured elsewhere, and

2. Special testing of an installation.

Different installations shall be listed in the Schedule of Quantities, in accordance with the definition of each installation.

Although ten points per month shall include full compensation for preventative, corrective and breakdown maintenance, the Contractor might fail to achieve all points applicable in the event of unsatisfactory performance, in which case he shall still perform all maintenance requirements according to specification, but at his own cost where a reduction in points awarded is insufficient to cover his cost.

SA.02 ADDITIONAL TESTS:

SA.02.01 Where ordered by the Engineer..... Unit: rand (R)

SA.02.02 Charge required by the Contractor on subitem SA.03.01 above ..... Unit: %

An amount has been allowed in the Schedule of Quantities to cover the cost of additional tests required by the Engineer. The Engineer will have the sole authority to spend the amount or part thereof under subitem SA.03.01.

The tendered percentage under subitem SA.03.02 will be paid to the Contractor on the value of each payment made to the approved testing authority.

SA.03 **PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING EMERGENCY BREAKDOWN**.....Unit: days

The unit of measurement shall be the number of days, in excess of 36 hours, during which a component of an installation was in a disfunctional condition that required emergency repairs.

The negative fixed rate shall include full compensation for the User Client's loss in productivity and, multiplied by the number of days measured, shall be deducted from the certified amount due to the Contractor.

SA.04 **PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING ORDINARY BREAKDOWN**.....Unit: days

The unit of measurement shall be the number of days, in excess of 7 days, during which a component of an installation was in a disfunctional condition that required ordinary repairs.

The negative fixed rate shall include full compensation for the User Client's loss in productivity and, multiplied by the number of days measured, shall be deducted from the certified amount due to the Contractor.

SA.05 **PAYMENT REDUCTION DUE TO EXCEEDING OF MAXIMUM ALLOWABLE DOWN-TIME DURING OPERATIONAL DAMAGE BREAKDOWN**.....Unit: days

The unit of measurement shall be the number of days, in excess of 7 days, during which a component of an installation was in a disfunctional condition that required ordinary repairs.

The negative fixed rate shall include full compensation for the Client's loss in productivity and, multiplied by the number of days measured, shall be deducted from the certified amount due to the Contractor.

SA.06 **CALL-OUT FOR REPAIR OF EMERGENCY BREAKDOWN (24 Hours)**.....Unit: No

The Unit of measurement shall be number. The Contractor will be remunerated for the number of call-out trips to the site, in order attend to the repair of an emergency breakdown logged (Before Access to a Site) with him by the Engineer. The tendered rate shall provide full compensation for all travel, accommodation and travel-time cost to and from the site. Remuneration for material and labour cost is deemed to be included under the "maintenance of a completed installation" payment item in the schedule of quantities, based on the points system and measured monthly.

DEPARTMENT OF PUBLIC WORKS

MAINTENACE SCORE-CARD

CONTRACT NUMBER: WCS _____

CONTRACT: _____

CONTRACTOR: _____

ENGINEER: _____

INSTALLATION: _____ **MONTH:** ____ OF **36**

The following components of the installation were selected by the contractor at the Monthly Operation Meeting nr. ____ as performance indicators to be tested according to specification:

1. ENGINEER'S SELECTION	0	1
1.1		
1.2		
1.3		
1.4		
1.5		
1.6		
1.7		
1.8		
1.9		
1.10		

TOTAL SCORE: ____

D	D	/	M	M	/	Y	Y

Engineer's Representative **Signature** **Date**

GUIDELINE FOR THE USE OF THE MAINTENANCE SCORE-CARD

The score-card and performance indicators must be used as a maintenance management tool. The aim with each score-card is to ensure that:

(a) the project focuses on key aspects of maintenance per month;
(b) the Contractor receives payment for his work, and
(c) the Employer receives value for money and a sustained high level of service.

Performance indicators must be selected to measure the Contractor's service level of preventative and corrective maintenance that will be based on the Maintenance Control Plan and the Operating and Maintenance Manuals (containing information specified in the Contract documentation).

For each specific installation, different performance indicators must be defined each month based on the content of the maintenance in relation to the scope of maintenance work per installation and must be based on the Contractor's service level record on preventative and corrective maintenance.

Breakdowns must be dealt with if and when necessary by logging of the breakdown and monitoring the downtime.

The Contractor and the Engineer must agree on all performance indicators at an occasion prior to the month during which the Contractor's performance (service level of maintenance) will be measured.

ADDITIONAL SPECIFICATION

SB OPERATING AND MAINTENANCE MANUALS

CONTENTS

SB 01 SCOPE
SB 02 PROCEDURE FOR SUBMISSION OF MANUALS
SB 03 FORMAT OF OPERATING AND MAINTENANCE MANUALS
SB 04 CONTENTS
SB 05 MEASUREMENT AND PAYMENT

SB 01 SCOPE

The Contractor shall be responsible for the compilation of complete sets of Operating and Maintenance Manuals. A separate Operating and Maintenance Manual shall be supplied for each installation where required and as defined in the Additional Specification SA: General Maintenance.

SB 02 PROCEDURE FOR SUBMISSION OF MANUALS

SB 02.01 SUBMISSION OF DRAFT MANUALS

A draft copy of each Operating and Maintenance Manual shall be submitted to the Engineer prior to safety inspection of the installation. Approval of the draft Operating and Maintenance Manuals shall be a prerequisite for commencement of the safety inspection in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)

The manuals will be reviewed and checked by the Engineer and returned to the Contractor with comments, where necessary. The Contractor shall make the necessary changes and amendments to the manuals to incorporate the Engineer's comments.

SB 02.02 DEVELOPMENT OF FINAL MANUALS

A final draft copy of each Operating and Maintenance Manual shall be submitted to the Engineer at least one week prior to commencement of Day 1 tests on commissioning. This set of manuals will not be accepted without the Contractor's verification of the information contained in the manuals and the professional language editing thereof. The Engineer shall return the manuals to the Contractor, who shall make the final corrections. The Engineer will, however, not be responsible for the quality control on manuals. Approval of final Operating and Maintenance Manuals shall be a prerequisite for issuing of a Certificate of Practical Completion for repair of the installation.

After the Engineer has approved the final Operating and Maintenance Manuals, the Contractor shall provide the Engineer with seven (7) sets of the manuals. Approval of the final Operating and Maintenance Manuals shall be a prerequisite for issuing of a Certificate of Completion.

SB 03 FORMAT OF OPERATING AND MAINTENANCE MANUALS

(a) Manuals shall be bound in hardcover lever-arch files with plastic coatings. The files shall be clearly labelled on the front cover, as well as on the back band, with the following information:

(i) The title "Operating and Maintenance Manuals"

(ii) Name of the installation (as defined in Additional Specification SA: General Maintenance)

(iii) Name of the contract and contract number

(iv) The Contractor's name, address and contact telephone number and fax (logo optional)

(v) Month and year in which the manuals are finally handed over to the Employer

(vi) Name of the User Client.

(b) Pamphlets and bound leaflets/booklets from suppliers or manufacturers shall be placed in plastic pockets.

(c) Drawings and diagrams larger than A3 shall be folded and placed in plastic pockets to be easily removed or stored.

(d) The sections of the manuals specified below shall be clearly partitioned.

(e) Cross-referencing between drawings/diagrams and text shall be in a clear and consequent format.

(f) The Operating and Maintenance Manuals shall be supplied in English.

SB 04 CONTENTS

SB 04.01 TABLE OF CONTENTS

The table of contents shall appear on the second page and shall consist of the headings of the various sections in the manual and the relevant page numbers.

The table of contents shall essentially contain at least the following:

1. Introduction
   - 1.1 Scope of the manual
   - 1.2 General arrangement of the manual
   - 1.3 Description of installation
   - 1.4 Specifications
2. List of drawings and diagrams
3. Parts and components
4. Operating procedures

5. Maintenance

   5.1 Purpose of maintenance
   5.2 Preventative maintenance
   5.3 Trouble-shooting

6. Breakdown maintenance and repair

7. List of Appendices.

SB 04.02 INTRODUCTION

The introduction shall contain at least the following:

SB 04.02.01 Scope of the manual

A summary shall explain the scope of the contents.

SB 04.02.02 General arrangement of the manual

A brief description shall explain the way in which the manual is arranged.

SB 04.02.03 Description of installation

This section shall give a functional description of the complete installation covered by the manual, including all systems and/or functional units deemed to form part thereof, as defined in Additional Specification SA: General Maintenance.

SB 04.02.04 Specifications

A summary shall be given of the specifications applicable to the particular part of the Contract.

SB 04.03 DRAWINGS AND DIAGRAMS

SB 04.03.01 Mechanical flow diagrams (MFDs) and single line diagrams

Mechanical flow diagrams (for mechanical systems) or single line diagrams (for electrical systems) of the system and/or functional unit shall be included in the Operating and Maintenance Manuals for easy reference by the operators of the installation. Diagrams shall be drawn not only for parts of an installation that have been repaired, but also for the complete installation, including all the components.

SB 04.04 PARTS AND COMPONENTS

SB 04.04.01 Equipment data sheets

A data sheet shall be drawn up for each piece of equipment and/or machine forming part of the installation and shall contain the following information:

(a) Equipment tag number
(b) Equipment description
(c) Model/make/manufacturer
(d) Supplier/Reconditioning details
(e) Ordering details
(f) Details of fixed components

(g) Details of lubrication
(h) Maintenance references (refer to supplier/reconditioning technical manual).

SB 04.04.02 **Technical equipment manuals**

For each piece of equipment and/or machine forming part of the installation the following information shall be included in this section of the Operating and Maintenance Manuals:

(a) the supplier or reconditioning manual and/or standards of operating and maintenance instructions;

(b) illustrated parts breakdown and/or group assembly drawings as agreed with the Engineer;

(c) parts lists and data sheets, including all characteristic curves for machines indicating operation point, efficiency, power consumption, etc;

(d) calibration charts, and

(e) test certificates for hydraulic pressure tests, flame-proof grading, materials, non-destructive examinations, coating and lining details, etc.

Each detailed description shall be accompanied by a set of engineering drawings. From the drawings the functionality of each part or component used, as well as the special characteristics associated with the part or component shall be very clear.

SB 04.04.03 **Parts and components list**

A detailed description shall specify all the parts and components used for the duration of the Contract. This description shall include new parts and components, as well as existing parts and components that have either been reconditioned or used as specified in the Contract.

The description shall state at least the part or component number, part or component name, the size of the part or component, an explanatory description, the quantity used, the material of which the part or component is made, the coating (if any), date of purchase, as well as any relevant remarks as to the application thereof.

Details of the manufacturer of the part or component shall also be listed. This shall at least state the name, address, telephone number, fax number and name of a contact person.

The supplier of the part or component shall also be stated and shall include at least the name, address, telephone number, fax number, name of a contact person and an alternative supplier (if available).

SB 04.04.04 **Drawings**

Drawings shall contain a descriptive heading, an explanatory key and relevant comments. Drawings shall be done on a computer-aided design package approved by the Engineer.

A compound drawing for all subassemblies shall clearly indicate how and where the various parts fit in the subassembly. The compound drawing shall be linked to the equipment data sheets and parts and components list and shall clearly specify the parts or components used, their model numbers, their sizes and the quantities used. The compound drawings shall also be accompanied by a short description explaining the workings of the subassembly, as well as the assembly of the parts or components to complete the subassembly.

SB 04.05 OPERATING PROCEDURES

The operating instructions shall be a step by step description of the manual start-up and shut-down procedure for every piece of equipment and/or process reconditioned, repaired or supplied with references to the MFDs. For automatic operation the operators shall be referred to the automatic control manual (if applicable).

The functioning of the installation shall be clearly described, using a flow diagram depicting the interrelationships among the various subassemblies. The subassemblies shall be described by descriptive drawings.

Each mechanical or process flow diagram shall contain at least a heading, relevant comments and a key.

Every subassembly shall also have its own flow diagram explaining the operation of the subassembly, as well as the application of each part and component. The application of the subassembly shall also be very clear. The flow diagram shall consist of at least a heading, relevant comments and an explanatory key.

A detailed description shall be given of all operational systems forming part of the installation, explaining the operation and functioning of the system and the number of operations personnel required for performing the operation successfully.

The preparations, which are required before the system can be operational, shall be clearly stated and explained.

The operation tasks shall be clearly explained with reference to dangerous situations that might occur. Hazardous operations shall be explained in great detail and cover all the applicable safety precautions.

SB 04.06 MAINTENANCE

SB 04.06.01 Purpose of maintenance

The maintenance process shall be explained and the main responsibilities described.

SB 04.06.02 Preventative maintenance

A preventative maintenance and lubrication schedule shall be included in this section. This schedule shall be in table format and shall include a summary of all the maintenance actions required for each different system and/or functional unit covered by this manual, in order to give a single summary of all routine preventative maintenance actions required for the complete installation.

The schedule shall indicate daily, weekly, fortnightly, monthly and yearly maintenance actions. A lubrication schedule summary shall also be included under this section.

The frequency of routine preventative maintenance actions shall be indicated very clearly.

The Contractor shall provide the maintenance requirements as prescribed by the manufacturer. The type of maintenance shall be clearly indicated. The description of the maintenance to be performed shall include at least the part name, location of the part in either the assembly or subassembly, the model number, the quantity of the particular part or component to be maintained, the type of maintenance, and notes on the maintenance procedure.

A brief description shall accompany the maintenance schedule, indicating special tools to be used, maintenance and test equipment required for the test procedures. Any special tools necessary for maintenance shall be specified in terms of name, model, size, manufacturer, supplier (name, telephone number, fax number, contact person), coating (if any) and notes on the use of the equipment.

Remarks on the system readiness checks of each subassembly shall be explained in detail. Routine inspection and maintenance processes shall be described. It shall be very clear what needs to be done, how to perform the necessary task and any dangers that are present.

SB 04.06.03 **Trouble-shooting**

An explanation shall be given to assist the maintenance personnel in analysing and resolving malfunctions that might occur. Various scenarios with possible causes and rectification procedures shall be explained.

The scenarios shall be accompanied by drawings indicating the position of the part that is faulty. Each of these drawings shall have a heading, comments and an explanatory key.

SB 04.07 **BREAKDOWN MAINTENANCE AND REPAIR**

The Contractor shall describe the complete procedure to be followed in the event of a breakdown. It shall be very clear what the operating personnel should look for, how to eliminate any dangers due to the breakdown (eg electricity must be shut off in the event of problems with the wiring) and who should be contacted. The Contractor shall supply the names and telephone numbers of at least two contact persons who may be contacted in the event of a breakdown.

The Contractor shall refer to Additional Specification SA: General Maintenance, to determine the reaction time for the repair to the breakdown.

Repair instructions shall provide the maintenance personnel with detailed instructions for the removal and/or replacement of any item requiring replacement due to malfunctioning. Contact numbers shall also be given to assist maintenance personnel, should a breakdown occur.

The Contractor shall specify the actions expected of maintenance personnel in the event of a breakdown.

The Contractor shall also specify the testing procedures to be followed before the system can be put into operation again. Every procedure shall be described clearly and all the potential dangers pointed out, as well as the precautions that have to be taken.

The testing procedures shall be accompanied by drawings illustrating the process to be performed. Every drawing shall have a heading, comments and an explanatory key.

SB 05 MEASUREMENT AND PAYMENT

SB.01 **Compile and supply a complete set of Operating and Maintenance Manuals** ..... Unit : sum

The unit of measurement shall be a sum for each complete set (seven copies) of Operating and Maintenance Manuals. Operating and Maintenance Manuals for different installations shall be measured separately in the Schedule of Quantities.

The tendered sum shall include full compensation for all technical research, gathering of information, compilation of manufacturer's instructions, compilation of drawings and diagrams, and for writing of all the descriptions, instructions and functional procedures, as well as language editing, in order to provide a clear and correct set of Operating and Maintenance Manuals.

The tendered sum shall also include full compensation for all expenses such as paper, copy work, binding and printing necessary for the completion of the manuals.

The tendered sum shall also include full compensation for the compilation of draft sets of operating and maintenance manuals in accordance with the specification, and for incorporation of all comments and corrective requirements.

SB.02 **Compile and supply a complete site plan** ..... Unit : sum

The unit of measurement shall be a sum for the complete set (three A1-size copies for each plan) and electronic format of the site plan(s).

The tendered sum shall include full compensation for all expenses such as paper, copy work and printing required for the completion of the site plan.

The site plan shall include and comply with the following:

SB.02. 01 **SCOPE**

This specification provides minimum requirements for the preparation of a Site Layout Plan and is based on the specifications of the Department of Public Works.

SB.02. 02 **SPECIFICATIONS**

The Specification is based on the following specifications:

1. Civil Engineering Manual PW347/2012, Annexure A1
2. Specification of Materials and Methods to be Used PW371
3. Additional Specification SB: Operating and Maintenance Manuals.

Compile and supply a complete Site Layout Plan:

(a) Detail Ground Survey

All services must be shown on a complete Site Layout Plan as required by the Engineer, including roads, fences, paving, transmission and telephone lines, etc. For sewerage reticulation and storm water drainage systems the pipe sizes, as well as invert heights must be provided. An effort must be made to trace the routes of these services.

(b) Survey of Buildings

The "footprint" of all the buildings and structures must be surveyed.

(c) General

All survey data shall be captured in electronic format.

SB.02. 03 TITLE BLOCK

The standard drawing sheet layout and title block of the Department of Public Works must be used.

Complete all the relevant fields in the title block with reference to the name of the Port of Entry in the appropriate block. The words SITE LAYOUT PLAN should form part of the drawing title.

SB.01 **Drawing Number**

The drawing number should consist of a four-part identifier:

- Port of entry designator: WCS .....
- Group: 1
- Drawing number: Numbering will start at 1
- Revision number:Will start at 01

Typical example: WCS ...../1/1 Rev 01

SB.02 **Overlay Sheets/Layering Scheme (if required)**

The overlay sheet designator identifies the type of drawing (example: overlay for water reticulation) and can be added to the drawing number:

- C: Existing structures, facilities, roads, paving, fencing, etc
- CR: Storm water drainage system
- CE: Electrical power and equipment
- CF: Fire fighting equipment
- CS: Sewer network
- CT: Telephone lines
- CW: Water reticulation system

Typical example for the numbering of an overlay sheet: WCS ...../1/**CW**/1 Rev 01

SB.02. 04 DRAFTING CONVENTIONS

The Site Layout Plan should be created following engineering conventions and standards in order to represent a clear drawing simplifying the huge amount of visual information.

SB.01 **Paper Prints**

Preference is given to size A1 plans, but for reporting size A3 will be used and the information should still be legible in this format.

SB.02 **Scale**

The Site Layout Plan must be drawn according to scale and the following scales can be used:

- 1:200 or
- 1:500 or
- 1:1000

SB.03 **Plan Orientation**

The Port of Entry should be rotated on the plan so that the north point arrow are pointing in the direction of either the upper left or upper right quadrants of the plan. The north point arrow to be placed in the top right hand corner of the drawing space.

SB.04 **Contours**

Contours do not form part of the Site Layout Plan.

SB.05 **Line Weight**

Line weight/width is extremely important and features such as the services should be drawn with lines that are more prominent. The following line weights (mm) can be used:

1. 0.10
2. 0.15
3. 0.25
4. 0.30
5. 0.35
6. 0.50
7. 0.70
8. 1.00

SB.06 **Line Type/Style**

The following typical standard line types that can be used:

TYPICAL LINE TYPES

LINE DESCRIPTION	LINE APPEARANCE
1. Centre Line	
2. Solid/Continuous line	
3. Short broken line	
4. Long broken line	
5. Break line	
6. Hatch lines 45°	

SB.07 **Hatching**

Hatching are angled line patterns to indicate the position of permanent structures. The spacing between lines should be consistent at 45° to the structure. Park Homes must be shown on the plan, but without hatching.

SB.08 **Surfaced Areas**

Surfaced roads should be indicated by two solid lines as well as paved areas.

Two long broken lines should be used to indicate gravel roads.

SB.09 **Non Standard Line Types**

The following lines could be used for the various services, but must be identified in the Legend as a non standard line type:

LEGEND

		Colour Code	Line Weight (mm)
W	Water pipe line	Cyan	0.50
S	Sewer pipe line	Black	0.50
EL	Electrical overhead line	Magenta	0.50
EC	Electrical cable	Magenta	0.50
T	Telephone line	Green	0.50
G	Gas pipe line	Brown	0.50
x	Fence line	Black	0.30
	Surfaced Road	Black	0.30
	Gravel Road	Black	0.30
	Railway Line	Black	0.25

SB.10 **Lettering and Font Styles**

Use the standard font style and font size for engineering drawings and do not use stylized fonts.

Create all text in upper case letters, except for certain unit designations such as km, m, mm, kVA, etc.

SB.11 **Site Layout Plan**

When the Port of Entry is too large for one sheet, divide the plan into logical sections. Add a key layout in the title block showing how the various sheets should be joined together to obtain a layout of the entire site. This key layout should form part of each sheet.

SB.12 **Facilities**

The name of the facility should be written adjacent to the facility. If the space is limited, a reference number of the facility, which refers to a description of the facility, is inserted in a table format in or close to the title block as a legend.

SB.13 **Fences and gates**

Show the position of the security fence and all other fences as well as gates. Include the height of all fences.

SB.14 **Destinations**

The destination to the nearest town with a pointing arrow should appear on all incoming and outgoing roads.

SB.02. 05 **SERVICES**

The position of the services is extremely important and should be indicated by lines that are more prominent/thicker. The description of the line types for the various services must be given in the Legend. See DIR04.09.

The following services, where applicable, must be shown on the Site Layout Pan for future reference:

SB.01 **Water Reticulation System**

Show the position of the water reticulation system and include the following:

- Pipe lines, pipe sizes, type of pipes, valves, meters, boreholes and tanks (include capacities). Show the direction of flow.

SB..02 **Sewerage Network**

Show the layout of the sewerage network and include the following:

- Pipe lines, pipe sizes, type of pipes, manholes, rodding eyes, septic tanks (include capacities), french drains (include volumes). Show the invert levels of all manholes as well as the position and level of the bench mark.

SB.03 **Electrical Power**

Indicate the position of electrical power lines, cables, substations, kiosks, flood lights along the perimeter as well as street lights and area lighting.

Air-conditioning units should be numbered and listed in table format including the type and size.

Give the source(s) of electrical power.

SB.04 **Telephone Lines**

Show the position of overhead telephone lines.

SB.05 **Storm water System**

Show the layout of the storm water system, culverts and sizes as well as inlet and outlet structures. Give the invert levels of all structures as well as the position and level of the bench mark.

SB.06 **Fire Fighting Equipment**

Include the pump installation, tank and capacity, fire hydrants, valves, meters, fire extinguishers and fire hose reels.

Fire extinguishers should be numbered and listed in table format including the type and size.

SB.02. 06 **ELECTRONIC FORMAT**

A complete set of electronic files shall be placed on CD(s) in a Data Exchange Format (DXF) or DWG format.

Affix a stick-on label to the CD with the following information:

- Department of Public Works and logo
- Name of Port of Entry
- WCS number
- Description: SITE LAYOUT PLAN
- Drawing number(s)
- Date issued
- Electronic format: DXF or DWG

SB.02. 07 **SUBMISSION**

The Consultant must submit A1 and A3 paper prints as well as a CD(s) of the Site Layout Plan(s) to the Project Manager before the Final Approval Certificate is signed.

The CD(s) must include the entire overlays/layering scheme and a compound drawing which includes all the services and information on one Site Layout Plan in DXF/DWG format.

During the Repair and Maintenance phase, the Project Manager will forward a request from time-to-time to the Consultants to prepare an A3 print(s) of the Site Layout Plan, which will be submitted as part of a report to Department of Public Works.

ADDITIONAL SPECIFICATION

SC GENERAL DECOMMISSIONING, TESTING AND COMMISSIONING PROCEDURES

CONTENTS

SC 01	SCOPE
SC 02	PHASED REPAIRS AND UPGRADING OF THE INSTALLATION
SC 03	DETAILED COMMISSIONING PROGRAMME
SC 04	COMMISSIONING COMMUNICATION CHANNELS
SC 05	COMMISSIONING RISK CONTROL AND PENALTIES
SC 06	DELAYS TO SCHEDULED SHUTDOWNS
SC 07	MATERIAL AND EQUIPMENT PROCUREMENT AND PROTECTION
SC 08	TESTING OF EQUIPMENT PRIOR TO RECOMMISSIONING
SC 09	TESTING OF MATERIAL AND EQUIPMENT SPECIFICATIONS AND WORKMANSHIP
SC 10	DECOMMISSIONING
SC 11	RECOMMISSIONING, COMMISSIONING AND COMPLETION OF INSTALLATIONS
SC 12	MEASUREMENT AND PAYMENT

SC 01 SCOPE

This specification encompasses all aspects of the repairs of systems and services that form part of an installation, including the factory and on-site testing, decommissioning, installation and commissioning of all equipment, instrumentation and materials reconditioned, supplied and installed as part of an installation as defined in Additional Specification SA: General Maintenance.

The specified procedures are the minimum requirements to be supplemented by various technical and particular specifications in this document. These requirements shall apply to all commissioning work scheduled as part of the initial repair work on installations, as well as commissioning work that is part of the routine preventive and corrective maintenance.

SC 02 PHASED REPAIRS AND UPGRADING OF THE INSTALLATION

When an installation consists of parallel systems or components, the complete installation and all its components shall be repaired without taking the complete installation out of commission at any time, unless otherwise specified in the Technical Specifications.

In order to schedule the repairs of an installation, all work shall be done in phases as specified in the Technical Specifications and illustrated in detail on the drawings. Repairs of each part shall terminate with the successful reconditioning of that part.

Each part of the system shall be decommissioned and recommissioned in the sequence specified in the Technical Specifications and on the drawings.

The Contractor shall install all the necessary temporary specials, spool pieces, supporting frames and brackets to provide a functional link between each repaired and upgraded part of the system and the part of the installation that has not yet been repaired and upgraded during recommissioning. Electrical and instrumentation Contractors and subcontractors shall ensure

that the system remains operational as specified, using either existing or newly installed instruments, cables and controls.

Payment is based on the successful recommissioning of a specific part of the installation.

SC 03 DETAILED COMMISSIONING PROGRAMME

No work of any kind on any part of the existing installation shall take place prior to the Engineer's approval of a detailed commissioning programme. This programme shall be submitted in addition to the general programme for planning and monitoring contract progress, at least two weeks prior to any programmed shutdown. The programme shall be the coordinated product of the Engineer and the User Department. Commissioning programmes shall take all process requirements into account. The detailed commissioning programme shall indicate all actions necessary for:

(a) Decommissioning
(b) Recommissioning of parts of the installation
(c) Commissioning of the installation as a whole.

All work deemed necessary for practical completion of the installation shall be indicated on the commissioning programme.

The programme shall indicate the milestones to be achieved before shutdown and decommissioning as activities of zero duration, all of which shall be prerequisites linked to the "start" of decommissioning.

The following specific actions shall be included in the programme, clearly indicating the time allowed for:

(a) Communication, including the time for confirmation of the official shutdown;

(b) Draining parts of the installation to sumps, where available, or to other storage facilities provided by the Contractor;

(c) Installation of temporary blanked flanges or other means of isolation where necessary;

(d) Partial decommissioning and removal of existing material and equipment to perform work, including protection of pipework against hot work, cutting into pipework, loosening bolts, flanges and all other work necessary for recommissioning;

(e) Installation of temporary functional links (pipe specials) between any two parts of the installation;

(f) Each individual field weld, subject to the Engineer's approval;

(g) Non-destructive testing of materials, for manufacturing/construction quality and for producing test results;

(h) Installation of all instruments and their connection to SCADA systems;

(i) Installation and connection of all power cables;

(j) De-aeration of all pipe sections;

(k) Communication between the Contractor, the Engineer, the Employer and the User Client;

(l) Start-up of the complete system, indicating start-up procedures.

Inspection of the prefabricated installation, testing of all equipment prior to final commissioning, pressure testing and non-destructive testing shall be clearly scheduled in the project progress programme.

Day 30 tests and instruction/training sessions with the User Department shall be scheduled in the project progress programme.

SC 04 COMMISSIONING COMMUNICATION CHANNELS

The Contractor shall communicate with the User Department's operating and maintenance managers via the Engineer to finalise start-up after decommissioning in accordance with the specified procedures.

The following key parties shall be involved before and during shutdown and decommissioning of any part of the system:

Contractor: Site Agent

Engineer: Resident Engineer

Employer: Representative of Area Manager

User Department: Operating and Maintenance Manager.

SC 05 COMMISSIONING RISK CONTROL AND PENALTIES

(a) The safety instructions stipulated by the Occupational Health and Safety Act, 1993 (Act 85 of 1993) shall be adhered to at all times.

(b) The Contractor shall not be allowed to work on any part of the installation without obtaining a commissioning check permit on the day of shutdown. A typical example of a commissioning check permit is included in this document, referring to the minimum required milestones to be achieved prior to decommissioning.

(c) Payment reductions for exceeding the maximum permissible down-time during maintenance shall apply as stipulated in the General and special Conditions of Contract. This stipulation does not include shutdowns during programmed routine preventive maintenance work.

SC 06 DELAYS OF SCHEDULED SHUTDOWNS

Specific dates on which an installation shall be shut down for decommissioning shall be finalised during coordination meetings of all the parties involved, including the Engineer, the Employer, the User Department and the Contractor.

Although a date for each shutdown will be scheduled at the coordination meetings, the actual date of the shutdown shall be determined by the process requirements and user demands, allowing for a window of seven (7) calendar days from the date of the planned shutdown.

Prospective tenderers shall make allowances in their tendered rates for the shutdown to occur at any time during this seven-day period. No additional payment shall be due if the shutdown occurs within this seven-day period.

If the Contractor fails to commence with the shutdown and decommissioning of the installation

within the scheduled period, all additional costs arising from the shutdown at a later stage shall be for the Contractor's account.

SC 07 MATERIAL AND EQUIPMENT PROCUREMENT AND PROTECTION

It is the responsibility of the Contractor to ensure the functionality of all units of new equipment prior to decommissioning, before installation of any specific part of the system. If the equipment, whether free-issued or not, does not conform to the functionality specifications during pre-installation testing, the Contractor shall notify the Engineer in writing without delay.

SC 08 TESTING OF EQUIPMENT PRIOR TO RECOMMISSIONING

The equipment shall be tested for functionality after pre-installation of equipment in parts of the installation.

(a) The Contractor shall inform the Engineer well in advance of his intention to perform the first tests and start-up of equipment in order to allow a representative of the Engineer to witness the tests. The extent of all precommissioning tests and checks shall be agreed with the Engineer prior to commencement.

(b) The Contractor shall first conduct his own tests of the equipment. When he is satisfied that the equipment complies with the specifications, he shall notify the Engineer that he is ready for the official tests on completion. The Contractor shall not conduct an official test without the Engineer's presence or approval. All equipment shall conform to the specified requirements.

(c) Before starting up any part of the installation or filling the tanks and sumps with liquid, the Contractor shall clean out the tanks, pipes, fittings, equipment or structures and, if necessary, make arrangements with other Contractors to remove their building rubble form the structures, check that all safety devices and alarms have been set and activated, all nuts have been tightened correctly, that all the equipment is complete and ready for start-up, that the plant has been installed correctly, and that copies of the operating manuals have been handed to the Engineer.

(d) The Contractor shall start up each section of equipment after ensuring that oil fillings, lubrication, vibration monitoring, cable termination and so on have been correctly completed. He is also responsible for the first refilling of all lubricating oils and for adjusting the plant to operate according to the specifications. Before any equipment is started or energised, the Contractor shall ensure that it is safe in terms of the personnel and equipment on the site to do so. The Contractor's tendered rates and sums shall allow for these costs.

All equipment shall be tested according to the relevant specifications that form part of this document.

No shutdown or decommissioning of any part of the system shall take place unless all the equipment to be installed have been tested by the Contractor and approved by the Engineer.

SC 09 TESTING OF MATERIAL AND EQUIPMENT SPECIFICATIONS AND WORKMANSHIP

All results of the required non-destructive, pre-commissioning and manufacturing testing shall be submitted to the Engineer well in advance of testing the equipment on recommissioning. All such test results shall be submitted before Day 1 commissioning tests and no certificate of practical completion shall be issued prior to receipt of the required test results.

SC 10 DECOMMISSIONING

The decommissioning period shall commence on the instant of the entire system shutdown. The recommissioning period shall start in parallel with decommissioning.

Shutdown and decommissioning shall not proceed without compliance with all the milestones in the detailed commissioning programme. The list of milestones in this document is not complete but indicates the minimum requirements. Milestones to be achieved prior to shutdown and decommissioning may be added to the programme at the Engineer's discretion.

The Contractor is responsible for the safe decommissioning of all material, equipment, components and instrumentation to avoid damage to parts or components of the installation.

SC 11 RECOMMISSIONING, COMMISSIONING AND COMPLETION OF INSTALLATIONS

SC 11.01 RE-COMMISSIONING

Re-commissioning means the commissioning of all sections or systems that form part of the installation to meet the required functional specifications for the individual section or system prior to commissioning of the repaired and upgraded installation.

The Contractor is responsible for the recommissioning of all parts of the system and he shall perform the tasks listed below.

(a) Prior notice shall be given to and proper arrangements shall be made for recommissioning with the Employer, the Engineer, the User Client and the suppliers of equipment that is affected by recommissioning and testing.

(b) If plant and equipment supplied by others are to be commissioned, the supplier's specific permission together with all requirements related to commissioning shall be obtained prior to recommissioning without in any way altering the Special Conditions of Contract with reference to the Contractor's liability in terms of defects.

(c) The new and reconditioned parts of the installation shall be thoroughly inspected by a responsible representative of the Contractor to ensure that manufacture/construction and installation work have been completed according to the specifications.

SC 11.02 COMMISSIONING AND COMPLETION OF REPAIRS AND UPGRADING WORK

Commissioning means commissioning of the repaired and upgraded installation as a whole to perform in perfect working order.

(a) The commissioning period for each installation as a whole:

(i) Commences with the Day 1 tests of the complete repaired and upgraded installation;

(ii) Includes commissioning of all sections and systems that have been recommissioned prior to the Day 1 tests;

(iii) Includes training of the User Department's operating personnel and the maintenance teams;

(iv) Terminates with a Day 30 test in compliance with the commissioning report.

(b) The purpose of the Day 1 tests is to ensure that:

(i) The electronic, electrical and mechanical equipment and materials are functional and in perfect working order with respect to each other and the installation as a whole;

(ii) The commissioning period, including training, commences on successful completion of the Day 1 tests;

(iii) The Contractor is entitled to a certificate of practical completion for the repairs and upgrading of the installation on successful completion of the Day 1 tests;

(iv) The Contractor becomes responsible for maintenance of the installation and is entitled to performance-based payments in compliance with the Special Conditions of Contract and Additional Specification SA: General Maintenance.

(c) Commissioning shall be undertaken over a trouble-free period up to Day 30. During this period the Contractor shall train the User Department's operators and his maintenance team for operating and maintaining the installation. This training shall allow for all possible operational conditions, including emergency conditions, the correct servicing of every part, the type of oil or grease to be used, and similar tasks. The training shall take place by means of demonstrations, and the operating and maintenance manuals shall be referred to for this purpose.

(d) Day 30 commissioning tests shall be performed thirty calendar days after the successful completion of the Day 1 tests. The commissioning period of the installation terminates upon the successful completion of the Day 30 tests.

(e) The Contractor shall conduct all the tests required to satisfy the Engineer that the installation is performing according to specification, and shall make allowance for these tests in his tendered rates and prices. These tests shall be conducted to certify that the installation, as repaired, upgraded and installed, is in perfect working order in terms of the specified functional requirements. The Contractor shall note that all equipment is to be tested as part of an installation, where appropriate, and will not be passed if all protection devices, interlocking with other equipment, etc, are not fully functional.

(f) The Engineer shall provide commissioning sheets to the Contractor at least three weeks before the commissioning period commences, for all the equipment supplied, reconditioned and installed by the Contractor. The Contractor shall complete the commissioning sheets during the commissioning period and all items listed shall be entered. No completion certificate will be issued for an installation of which the equipment has incomplete commissioning reports. Information that is not available or applicable, or instances where certain tests have not been carried out, are subject to the Engineer's decision.

(g) Commissioning of the plant (which includes the thirty days between the Day 1 and Day 30 tests) includes operating under conditions that adequately prove that all the specifications have been met. All safety devices, standby plant, automatic controls and protection devices shall be adequately tested for reliability and correct functioning. The Contractor may be called upon to repeat testing during the maintenance period if the performance of the equipment is suspected to be substandard. Costs related to such tests shall be for the Contractor's account and shall comply with the specified requirements. Copies of updated commissioning reports shall be provided to the Engineer within two days after a test has been performed.

(h) The Contractor is responsible for providing all labour and materials (including testing equipment) during the commissioning period and shall carry out all the servicing and adjustments to ensure that the installation operates as specified. Valid calibration

certificates shall be available for all testing equipment on the site during the commissioning period.

(i) Programmes for the Day 1 tests, Day 30 tests and instruction/training sessions with the User Department's operators and maintenance team shall be prepared by the Contractor and submitted to the Engineer at least two weeks before the commissioning period commences. The Contractor shall provide weekly updates of these schedules for the duration of the commissioning period.

(j) The Contractor shall note that if any equipment fails during the commissioning period, the equipment shall be repaired or replaced by the Contractor, and testing and commissioning shall commence from scratch.

(k) Successful commissioning of an installation entitles the Contractor to a certificate of completion for the installation.

SC 12 MEASUREMENT AND PAYMENT

SC.01 **Decommissioning and removing parts of the installation**.....Unit: sum

The unit of measurement shall be a sum.

The tendered sum shall include full compensation for all actions and labour required for shutdown and decommissioning of the entire installation as specified to enable decommissioning and removal of parts of the installation as listed in the Schedule of Quantities.

The tendered sum shall include full compensation for the decommissioning and removal of the parts and components of an installation as listed individually in the Schedule of Quantities, including actions and/or costs resulting from such work, to enable the recommissioning of parts of the repaired and/or upgraded installation.

The tendered sum shall include full compensation for final dismantling of decommissioned materials and equipment and the removal of all such items to stores on site, as directed by the Engineer.

SC.02 **Commissioning and testing of parts of the installation**.....Unit: sum

The unit of measurement shall be a sum.

The tendered sum shall include full compensation for commissioning and testing parts of the installation to be operational while still incomplete in relation to the entire repaired and/or upgraded system or installation.

Separate payment items shall be scheduled for separate parts of the system.

SC.03 **Commissioning and testing of the installation**.....Unit: sum

The unit of measurement shall be a sum.

The tendered sum shall include full compensation for commissioning the upgraded installation as a whole and for all costs and expenses related to labour, removal, repair, reinstallation and testing of material and equipment during the commissioning period for each part of the installation. The tendered sum shall include full compensation for the final commissioning and

testing, including Day 1 and Day 30 tests, of all parts and components of the installation to the specified functional condition.

Payment shall be based on successful completion of the Day 30 tests.

SC.04 **Provision for safety and hot work requirements during shutdown** ..... Unit: number

The unit of measurement shall be the number of shutdowns during which all the required safety and hot work requirements are provided.

The tendered rates shall include full compensation for all the required safety and hot work requirements and arrangements in accordance with the specifications during a shutdown period, including all labour, personnel, equipment, materials and consumables required.

ADDITIONAL SPECIFICATION

SD GENERAL TRAINING

CONTENTS

SD 01 SCOPE
SD 02 BASIC METHOD REQUIREMENT
SD 03 TRAINING OF USER CLIENT PERSONNEL
SD 04 TRAINING OF MAINTENANCE PERSONNEL

SD 01 SCOPE

The Contractor shall be responsible for providing diverse training to various groups, including operating and maintenance personnel. The Contractor shall develop and facilitate initial training sessions for all parties, as well as training sessions at specified intervals to revive and supplement the initial training. An accredited trainer shall present all training sessions.

This specification includes all requirements for methods to be employed, the syllabus required by the User Client, the syllabus required for maintenance managers and workers and the method of measurement and payment.

SD 02 BASIC METHOD REQUIREMENT

The Contractor shall be responsible for conducting a complete investigation of the groups that have to be trained in order to compile a proper training plan.

The investigation shall cover at least the following aspects:

(a) Assess likelihood of conformance to task-specific requirements *(status quo)* of capabilities.

(b) Identify minimum pre-qualification criteria in terms of existing knowledge and skill levels in relation to reaching target requirements.

(c) Evaluate personnel in terms of pre-qualification criteria and tasks to be performed (skills profile).

(d) Identify training needs.

(e) Develop appropriate and accredited training courses and material in terms of task-specific activities and identified training needs, and compile the training syllabus per installation.

The Contractor shall identify an accredited trainer to assist in the above investigation and finalise the compilation of a training plan and syllabus. Approval of the syllabus shall be a condition for issue of a Certificate of Practical Completion for repair of an installation. Once the training plan and syllabus have been approved the Contractor shall liaise with the Engineer to establish a date and appropriate training venue that would be conductive to learning to perform training.

The training shall be revived within one month after initial training to determine its effectiveness. Further regular training sessions shall be scheduled according to the effectiveness of initial training.

The Engineer will be responsible for recording all training sessions and shall keep an attendance register. The Engineer will also examine the trainees officially with each training session and issue certificates of trainees' acquired skills on satisfactory completion of the training.

SD 03 TRAINING OF USER CLIENT PERSONNEL

The Contractor's training shall include training of the User Client's operators on biannual basis to acquaint them with operating of installations (especially electrical and mechanical systems). The training sessions shall comprise lectures and on-site (hands-on) demonstrations, and shall be conducted over two-day periods. The Contractor shall liaise with the Engineer to prepare for the correct number of trainee operators.

The content of training courses for operators shall include the essential features of operating the installation, as also described in the Operating and Maintenance Manuals.

Completion of an installation shall, in terms of the Special Conditions of Contract, be subject to successful completion of training. The training course shall also be based on the Operating and Maintenance Manuals. No training shall commence without the Engineer's approval of the final draft Operating and Maintenance Manual for the particular installation.

SD 04 TRAINING OF MAINTENANCE PERSONNEL

The Contractor shall train either his own employees, or local labourers, with regard to maintenance of the installation.

The training of maintenance managers shall include the following aspects:

(a) Awareness of safety, health and personal hygiene in terms of the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993);

(b) functioning of the installation, including all its systems, services, parts of buildings and infrastructure;

(c) all specific tasks related to routine preventative maintenance;

(d) interpretation and understanding of Operating and Maintenance Manuals with specific reference to requirements in cases of corrective and breakdown maintenance, and

(e) repair/reconditioning and installation/construction of equipment and materials forming part of an installation.

SD 05 MEASUREMENT AND PAYMENT

SD.01 **Development of a syllabus for training of operators** ..... Unit: sum

The unit of measurement shall be the lump sum for the compilation of a training syllabus for each installation that shall be measured separately in the Schedule of Quantities.

The tendered sum shall include full compensation for identification of pre-qualification criteria and training needs, staff assessment and evaluation prior to training, all technical research, development and compilation of an accredited training course and course material, and all other actions necessary for commencement of official training sessions in accordance with the specification.

The tendered sum shall also include full compensation for the compilation of a draft syllabus and for incorporation of all the Engineer's comments and corrective requirements.

SD.02 **Presenting a training course for operators** ..... Unit: number

The unit of measurement shall be the number of training courses presented based on the approved syllabus.

The tendered rate shall include full compensation for presenting a two-day training course, including lectures, demonstrations, on-site training and hands-on development and improvement of operators' skills to enable the operators to operate installations safely and efficiently.

The tendered rate shall include full compensation for the Contractor's time, appointment of the accredited trainer for the course, and for all material expenses such as paper hand-outs and slides for the whole group of trainees, the number of which shall be determined during development of the training course.

SD.03 **Presenting a training course for maintenance personnel** ..... Unit: number

The unit of measurement shall be the number of training courses presented.

The tendered rate shall include full compensation for presenting a two-day training course, including lectures, demonstrations, on-site training and hands-on development, and improvement of maintenance personnel's skills to enable them to maintain and repair installations safely and efficiently at the satisfactory functional condition specified.

The tendered rate shall include full compensation for the Contractor's time, appointment of the accredited trainer for the course, and for all material expenses such as paper hand-outs and slides for the whole group of trainees, the number of which shall be determined during development of the training course.

ADDITIONAL SPECIFICATION

SF GENERAL OPERATION

CONTENTS

SF 01 SCOPE
SF 02 OPERATION REQUIREMENTS
SF 03 OPERATION CONTROL
SF 04 COMMUNICATION
SF 05 PERFORMANCE MEASUREMENT
SF 06 MEASUREMENT AND PAYMENT

SF 01 SCOPE

Operation of the specified systems, services or equipment shall all be referred to as "Operation of an Installation". Operation of an installation shall ensure effective functioning and optimum operational condition thereof. Monthly operation responsibilities for each installation including all units and components as specified shall commence with access to the installation.

Operation of an installation shall be performed in accordance with the Technical and Particular Specifications and the Operating and Maintenance Manuals.

Remuneration for operating "installations" (systems, services and equipment) is provided for in the Bills of Quantities by means of monthly payment items, depending on the score achieved by the operators.

This Additional Specification covers operation requirements, site operation administration, communication operation performance measurement, as well as the items for measurement of the Contractor's service level and resulting payment.

SF 02 OPERATION REQUIREMENTS

SF 02.01 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall operate the complete installation for the 36-month Contract period.

Operation implies and shall include hourly operation, daily operation (night and day), weekly as well as monthly operation on all components of the specified installations, *including* public holidays and non-working days.

The Contractor shall operate the equipment as detailed in the Technical and Particular Specifications and the operation and maintenance manuals. Each operational function, task, test or action shall be recorded in an approved format and listed in a quarterly report by the Contractor.

As part of the repair of each installation, the Contractor shall submit a set of Operating and Maintenance Manuals where applicable. The Contractor shall ensure through training that the operating and maintenance personnel are conversant with the instructions as presented in the Operating and Maintenance Manuals. Continued training shall be

included in the scope of operation work for the duration of the 36-month Contract, in accordance with Additional Specification SD: General Training.

The Operating and Maintenance Manuals, as approved by the Engineer, shall be used as a basis of hourly, daily, weekly and monthly operations. The Contractor shall perform all operational tasks as described in the Operating and Maintenance Manuals.

SF 02.04 **COMPONENTS INCLUDED IN OPERATION SCOPE**

The main sections of a facility with their subsections are as set out in the Technical Specifications and Particular Specifications where applicable and in the Bill of Quantities and will each be deemed "an installation". Operation, as specified, will be applicable to all of the installations listed in the Bill of Quantities under the "OPERATION" section

SF 02.05 **COMMENCEMENT OF OPERATION PERIOD**

Operation responsibilities for an installation shall include operation of all individual units, equipment or components thereof, and shall commence with access to the installation.

SF 02.09 **SITE OPERATION RECORD KEEPING**

The Contractor shall provide and maintain hard-cover A4 Operation files for each installation that needs to be operated for the duration of the Contract. All schedules, checklists, actions, tasks, reports, hourly, daily and monthly operational records and quarterly reports shall be filed.

Site operation records shall be submitted to the Engineer at each monthly meeting.

These files will become the property of the Department of Public Works after the completion of the 36 months contract.

SF 02.10 **SUPPLY OF LABOUR, EQUIPMENT AND MATERIAL**

SF 02.10.01 **Labour (qualified where necessary)**

Competent personnel (qualified where necessary) that have been trained by the Contractor or external training authority, in accordance with Additional Specification SD: General Training shall execute all operational work.

SF 02.10.02 **Equipment**

All tools and equipment required for operation work shall be supplied by the Contractor at his cost (except where otherwise provided).

SF 02.10.03 **Material**

All material, equipment, testing equipment, protective clothing and appurtenances necessary for the complete operation of each installation shall be supplied and installed by the Contractor at his cost. Remuneration for *maintenance* actions and material shall be measured elsewhere in this document.

The technical specification of each specific installation to be operated, shall indicate whether the Contractor should supply other consumables (such as chemicals or coal) as part of his operation requirements.

SF 03 OPERATION CONTROL

Operation quality control shall be the responsibility of the Contractor. The Contractor shall introduce his own quality assurance system to assist him in ensuring that hourly, daily and monthly operational tasks are performed as described in the operating and maintenance manuals and Technical and Particular Specifications.

SF 04 COMMUNCATION

The Contractor shall communicate in writing to the Engineer the following operational results on a monthly basis:

(a) The quantity of ground water or surface water extracted and the total recorded as at the last day of each month.

(b) The quality of waste water irrigated or discharged into the environment and the total recorded weekly (compiled monthly).

(c) The quantity of the waste water by grab sampling, at the point at which the waste water enters the effluent disposal system.

(d) Record keeping of activities as specified shall be up to date on a daily basis and available to the Engineer on inspection.

(e) The quality of domestic waste water discharged into the environment.

(f) Details of failures and malfunctions and details of measures taken to avoid environmental pollution.

SF 05 PERFORMANCE MEASUREMENT

The Contractor's performance shall be measured against the following parameters:

SF 05.03 PERFORMANCE-BASED PAYMENT

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly operation payments for the various installations.

SF 05.03.01 Score-card

The Engineer shall inspect each installation monthly after access to the installation has been granted. The Engineer shall use a score-card to measure the quality of operational tasks rendered by the Contractor during the preceding month, on all components that form part of the installation, in accordance with the Operation specifications. The Engineer will record his inspection directly onto the score-card. The score-card shall serve to evaluate ten performance indicators each month in the manner set out below.

The Contractor shall always have the opportunity to score the maximum points, provided that his operation work complies with the Specifications. The Employer shall be protected against a reduced or unsatisfactory operational level and may refuse payment on such points.

SF 05.03.02 **Performance indicators**

Performance indicators shall be selected to measure the Contractor's service level of operation.

The Engineer shall select ten (10) performance indicators each month, which shall focus on the measurement of operation quality against the relevant specifications for the ensuing month. All ten (10) performance indicators are known to both the Engineer and the Contractor.

The Contractor shall aim to perform satisfactorily on all ten performance indicators. All indicators shall be selected from the scope of his normal hourly, daily and monthly operation work and shall be based on the operation control plan and operating and maintenance manuals. The work shall either be satisfactory, or unsatisfactory, and the Contractor shall score one (1) or zero (0) respectively per indicator.

Performance indicators shall be used to focus on certain key aspects of the work and shall in no way limit the Contractor's responsibility to do all the required work.

SF 05.03.03 **Satisfactory performance**

The Engineer shall inspect the site on an arbitrary day to measure the quality of operation against the ten selected performance indicators. Should the Contractor score the maximum points (10) he shall receive his full operation payment for the installation. Should the quality of operation be unsatisfactory according to the score-card, the Contractor may fail to achieve full payment due to a reduced service level. Each monthly payment for operation shall be subject to evaluation based on the score-card.

A copy of the score-card including a guideline for the use thereof is included in this Specification.

SF 06 MEASUREMENT AND PAYMENT

SF.01 **OPERATION OF AN INSTALLATION** ..... Unit: point

The unit of measurement shall be a point. Each month shall represent a maximum of ten points and a minimum of zero points, depending on the performance and quality of operation. Ten points per month, determined by using the tendered rate per point, shall include full compensation for all liabilities and obligations described or implied in the Contract documents and deemed by the Contractor to be applicable to the operation of an entire installation, and all appurtenant works deemed to form part thereof, as defined in the relevant Technical or Particular Specifications.

The combined bid rate for ten points shall also include full compensation for complete hourly, daily, weekly and monthly operation.

Although ten points per month shall include full compensation for hourly, daily and monthly operation, the Contractor might fail to achieve all points applicable in the event of unsatisfactory performance, in which case he shall still perform all operation requirements according to specification, but at his own cost where a reduction in points awarded is insufficient to cover his cost.

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly operation payments for the various installations.

SF.02 **APPOINT MANDATORY CLASS I AND CLASS II PROCESS CONTROLLERS** ..... Unit: point

The unit of measurement shall be each month the stipulated number of process controllers has performed the duties as prescribed in the Contract and Technical Specifications. Each month shall represent 16 hours per day for 7 days per week. The rate tendered for the process controllers shall include all duties as required by the process controllers in terms of the Contract and Technical Specifications.

The item shall not limit the Contractor to the amount of personnel required to operate the works but shall be deemed the minimum requirement for the operation of the works as required in the Contract and Technical Specifications.

Any additional labour or process controllers required to perform any preventative or breakdown operation work shall be included in the Contractor's rate tendered for the ten operation scoring points per month.

The item shall be deemed mandatory and the Contractor shall be liable in terms of the ten operation scoring points per month to ensure that the required process controllers are appointed.

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly operation payments for the various installations.

SF.03 **APPOINT MANDATORY CLASS III AND CLASS IV PROCESS CONTROLLERS** ..... Unit: point

The unit of measurement shall be each month the stipulated number of process controllers has performed the duties as prescribed in the Contract and Technical Specifications. Each month shall represent 8 hours per day for 5 days per week. The rate tendered for the process controllers shall include all duties as required by the process controllers in terms of the Contract and Technical Specifications.

The item shall not limit the Contractor to the amount of personnel required to operate the works but shall be deemed the minimum requirement for the operation of the works as required in the Contract and Technical Specifications.

Any additional labour or process controllers required to perform any preventative or breakdown operation work shall be included in the Contractor's rate tendered for the ten operation scoring points per month.

The item shall be deemed mandatory and the Contractor shall be liable in terms of the ten operation scoring points per month to ensure that the required process controllers are appointed.

Remuneration for all value-related as well as all time-related preliminary and general charges shall be deemed included in the monthly operation payments for the various installations.

DEPARTMENT OF PUBLIC WORKS

MAINTENACE SCORE-CARD

CONTRACT NUMBER: WCS _____

CONTRACT: _____

CONTRACTOR: _____

ENGINEER: _____

INSTALLATION: _____ **MONTH:** ☐☐ OF **36**

The following components of the installation were selected by the contractor at the Monthly Operation Meeting nr. ☐☐ as performance indicators to be tested according to specification:

1. ENGINEER'S SELECTION	**0**	**1**
1.1 _____		
1.2 _____		
1.3 _____		
1.4 _____		
1.5 _____		
1.6 _____		
1.7 _____		
1.8 _____		
1.9 _____		
1.10 _____		

TOTAL SCORE: ☐☐

_____ **Engineer's Representative**

_____ **Signature**

D D / M M / Y Y **Date**

GUIDELINE FOR THE USE OF THE OPERATION SCORE-CARD

The score-card and performance indicators must be used as an Operation management tool. The aim with each score-card is to ensure that:

(a) the project focuses on key aspects of Operation per month;
(b) the Contractor receives payment for his work, and
(c) the Employer receives value for money and a sustained high level of service.

Performance indicators must be selected to measure the Contractor's service level of operation that will be based on the Operating and Maintenance Manuals (containing information specified in the Contract documentation).

For each specific installation, different performance indicators must be defined each month based on the content of the Operation in relation to the scope of Operation work per installation and must be based on the Contractor's service level record on operation.

The Contractor and the Engineer must agree on all performance indicators at an occasion prior to the month during which the Contractor's performance (service level of Operation) will be measured.

ADDITIONAL SPECIFICATION

SH HIV/AIDS REQUIREMENTS

CONTENTS

SH 01 SCOPE
SH 02 MAINTENANCE REQUIREMENTS
SH 03 MAINTENANCE CONTROL
SH 04 COMMUNICATION
SH 05 PERFORMANCE MEASUREMENT
SH 06 MEASUREMENT AND PAYMENT

SH 01 SCOPE

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

Service Provider: The natural or juristic person recognised and approved by the Department of Public Works as a specialist in conducting HIV/AIDS awareness programmes.

Service Provider Workshop Plan: A plan outlining the content, process and schedule of the training and education workshops, presented by a Service Provider which has been approved by the Representative/Agent.

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 BASIC METHOD REQUIREMENT

The Contractor shall, through a Service Provider, conduct onsite workshops with the Workers.

The Service Provider shall develop and compile a Service Provider Workshop Plan to be presented at the workshops and which will be best suited for this project to achieve the specified objectives with regard to HIV/AIDS awareness.

The Service Provider Workshop Plan shall be based on the following information provided by the Contractor:

- Number of Workers and Sub-contractors on site
- When new Workers or Sub-contractors will join the construction project
- Duration of Workers and Sub-contractors on site
- How the maximum number of Workers can be targeted with workshops
- How the Contractor prefers workshops to be scheduled, *e.g.* three hourly sessions per Worker, or one 2.5 hour workshop per Worker
- Profile of Workers, including educational level, age and gender (if available)
- Preferred time of day or month to conduct workshops
- A Gantt chart reflecting the construction programme, for scheduling of workshops
- Suitable venues for workshops.

The Contractor shall submit the Service Provider Workshop Plan for approval within 21 days after the tender acceptance date. After approval by the Representative/Agent, the Contractor shall make available a suitable venue that will be conducive to education and training.

The Service Provider Workshop Plan shall address, but will not be limited to the following:

- The nature of the disease;
- How it is transmitted;
- Safe sexual behaviour;
- Post exposure services such as voluntary counselling and testing (VCT) and nutritional plans for people living with HIV/AIDS;
- Attitudes towards other people with HIV/AIDS;
- Rights of the Worker in the workplace;
- How the Awareness Champion will be equipped prior to commencement of the HIV/AIDS awareness programme with basic HIV/AIDS information and the necessary skills to handle questions regarding the HIV/AIDS awareness programme on site sensitively and confidentially;
- How the Service Provider will support the Awareness Champion;

- Location and contact numbers of the closest clinics, VCT facilities, counselling services and referral systems;
- How the workshops will be presented, including frequency and duration;
- How the workshops will fit in with the construction programme;
- How the Service Provider will assess the knowledge and attitude levels of attendees to structure workshops accordingly;
- How the video will be used;
- How the Service Provider will elicit maximum participation from the Workers;
- A questions and answers slot (interactive session)
- The Service Provider Workshop Plan shall encompass the Specific Learning Outcomes (SLO) as stipulated.

SH 04 HIV/ AIDS AWARENESS EDUCATION AND TRAINING

SH 04.01 WORKSHOPS

The Contractor shall ensure that all Workers attend the workshops.

The workshops shall adequately deal with all the aspects contained in the Service Provider Workshop Plan. A video of HIV/AIDS in the construction industry, which can be obtained from all Regional Offices of the Department of Public Works, is to be screened to Workers at workshops. In order to enhance the learning experience, groups of not exceeding 25 people shall attend the interactive sessions of the workshops.

SH 04.02 RECOMMENDED PRACTICE

SH 04.02.01 WORKSHOP SCHEDULE

Presenting information contained in the Service Provider Workshop Plan can be divided in as many workshop sessions as deemed practicable by the Contractor, provided that all Workers are exposed to all aspects of the workshops as outlined in the Service Provider Workshop Plan.

Breaking down the content of information to be presented to Workers into more than one workshop session however, has the added advantage that messages are reinforced over time while providing opportunity between workshop sessions for Workers to reflect and test information. Workers will also have an opportunity to ask questions at a following session.

SH 04.02.02 SERVICE PROVIDERS

A database of recommended Service Providers is available from all Regional Offices of the Department of Public Works.

SH 04.02.03 HIV/AIDS SPECIFIC LEARNING OUTCOMES AND ASSESSMENT CRITERIA

Workers shall be exposed to workshops for a minimum duration of two-and-a-half hours. In order to set a minimum standard requirement, the following specific learning outcomes and assessment criteria shall be met.

04.02.03.01 UNIT 1: THE NATURE OF HIV/AIDS

After studying and understanding this unit, the Worker will be able to differentiate between HIV and AIDS and comprehend whether or not it is curable. The Worker will also be able to explain how the HI virus operates once a person is infected and identify the symptoms associated with the progression of HIV/AIDS.

Assessment Criteria:
1. Define and describe HIV and AIDS.
2. List and describe the progression of HIV/AIDS.

04.02.03.02 UNIT 2: TRANSMISSION OF THE HI VIRUS

After studying and understanding this unit, the Worker will be able to identify bodily fluids that carry the HI virus. The Worker will be able to recognise how HIV/AIDS is transmitted and how it is not transmitted.

Assessment Criteria:
1. Record in what bodily fluids the HI virus can be found.
2. Describe how HIV/AIDS can be transmitted.
3. Demonstrate the ability to distinguish between how HIV/AIDS is transmitted and misconceptions around transmittance of HIV/AIDS.

04.02.03.03 UNIT 3: HIV/AIDS PREVENTATIVE MEASURES

After studying and understanding this unit, the Worker will comprehend how to act in a way that would minimise the risk of HIV/AIDS infection and to use measures to prevent the HI virus from entering the bloodstream.

Assessment Criteria:
1. Report on how to minimise the risk of HIV/AIDS infection.
2. Report on precautions that can be taken to prevent HIV/AIDS infection.
3. Explain or demonstrate how to use a male and female condom.
4. List the factors that could jeopardize the safety of condoms provided against HIV/AIDS transmission.

04.02.03.04 UNIT 4: VOLUNTARY HIV/AIDS COUNSELLING AND TESTING

After studying and understanding this unit, the Worker will be able to recognise methods of testing for HIV/AIDS infection. The Worker will be able to understand the purpose of voluntary HIV/AIDS testing and pre- and post-test counselling.

Assessment Criteria:
1. Describe methods of testing for HIV/AIDS infection.
2. Report on why voluntary testing is important.
3. Report on why pre- and post-test counselling is important.

04.02.03.05 UNIT 5: LIVING WITH HIV/AIDS

After studying and understanding this unit, the Worker will be able to recognise the importance of caring for people living with HIV/AIDS and be able to manage HIV/AIDS.

Assessment Criteria

1. List and describe ways to manage HIV/AIDS.
2. Describe nutritional needs of people living with HIV/AIDS.
3. Describe ways to embrace a healthy lifestyle as a person living with HIV/AIDS.
4. Explain the need for counselling and support to people living with HIV/AIDS.

04.02.03.06 UNIT 6: TREATMENT OPTIONS FOR PEOPLE WITH HIV/AIDS

After studying and understanding this unit, the Worker will be familiar with the various treatments available to HIV/AIDS infected or potentially HIV/AIDS infected people.

Assessment Criteria

1. Discuss anti-retroviral therapy.
2. List methods of treatment to prevent HIV/AIDS transmission from mother-to-child.
3. Describe the need for treatment of opportunistic diseases for people living with HIV/AIDS.
4. Describe post exposure prophylactics.

04.02.03.07 UNIT 7: THE RIGHTS AND RESPONSIBILITIES OF WORKERS IN THE WORKPLACE WITH REGARD TO HIV/AIDS

After studying and understanding this unit, the Worker will be able to identify the rights and responsibilities of the Worker living with HIV/AIDS in the workplace. The Worker will recognise the importance of accepting colleagues living with HIV/AIDS and treating them in a non-discriminative way.

Assessment Criteria:

1. Discuss the rights of a person living with HIV/AIDS in the workplace.
2. Discuss the responsibilities of a person living with HIV/AIDS in the workplace.
3. Report on why acceptance and non-discrimination of colleagues living with HIV/AIDS is important.

SH 04.03 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 05 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 SANS 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.

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

SH 06 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 07 APPOINTMENT OF AN HIV/AIDS AWARENESS CHAMPION

Within 14 days of site handover the Contractor shall appoint an Awareness Champion from amongst the Workers, who speaks, reads and writes English, who speaks and understands all the local languages spoken by the Workers and who shall be on site during all stages of the construction period. The Contractor shall ensure that the Awareness Champion has been trained by the Service Provider on basic HIV/AIDS information, the support services available and the necessary skills to handle questions regarding the HIV/AIDS programme in a sensitive and confidential manner.

The Awareness Champion shall be responsible for:

7.1 Liasing with the Service Provider on organising awareness workshops;
7.2 Filling condom dispensers and monitoring condom distribution;
7.3 Handing out information booklets;
7.4 Placing and maintaining posters

SH 08 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.

The attached SERVICE PROVIDER REPORT (SCHEDULE B) shall be completed and submitted on a monthly basis to the Department's Project Manager, through the Representative/Agent.

The attached CONTRACTOR HIV/AIDS PROGRAMME REPORT (SCHEDULE C), a close out programme report, shall be completed by the Contractor at the end of the contract.

SCHEDULE A

HIV/AIDS PROGRAMME: SITE CHECKLIST

When did construction commence _____

Name of Departmental Project Manager _____

Please refer to HIV/AIDS Programme activities during the reporting period

Tick the block if Contractor satisfactorily complied with specifications																												
	PI				**PI**				**PI**				**PI**				**PI**				**PI**				**PI**			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Programme implemented within 14 days of site handover																												
Awareness champion on site																												
HIV/AIDS awareness service provider report																												
Male condom dispenser																												
Sufficient male condoms available																												
Male condom dispenser in a highly trafficked area																												
Female condom dispenser																												
Sufficient female condoms available																												
Female condom dispenser in a highly trafficked area																												
All four types of posters displayed																												
Posters in a good condition																												
Posters in a highly trafficked area																												
Posters displayed on local support services: clinic & VCT centre																												

Tick the block if Contractor satisfactorily complied with specifications																								
	PI				**PI**				**PI**				**PI**				**PI**				**PI**				**PI**			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Support service poster/s in highly trafficked area																												
Support service poster/s in a good condition																												
Please indicate the applicable number for the reporting period																												
Workers on payroll (at PI)																												
Sub-Contractors who will be on site for longer than 30 days (at PI)																												
Workshop attendees																												
Number of workshops held																												
Scheduled workshops according to approved workshop plan																												
Booklets distributed																												
Male condoms distributed																												
Female condoms distributed																												

SCHEDULE A

Date of progress inspection (dd/mm/yy) _____

Reporting period: (dd/mm/yy)_____ to (dd/mm/yy) _____

Deviations from HIV/AIDS awareness programme plan:

Corrective actions

_____ _____

Representative/Agent Departmental Project Manager

_____ _____

Date Date

SCHEDULE B

HIV/AIDS AWARENESS PROGRAMME: SERVICE PROVIDER REPORT

Reporting period: (dd/mm/yy)_____ to (dd/mm/yy) _____

Number of workshops conducted in reporting period _____

Number of scheduled workshops according to approved workshop plan _____

Deviations from workshop plan:

State reasons for deviating from workshop plan:

Corrective actions:

_____ _____

Service Provider Contractor

_____ _____

Date Date

SCHEDULE B

HIV/AIDS AWARENESS PROGRAMME: WORKSHOP CONTENT ADDRESSED

Fill in the applicable information with regard to each workshop conducted																												
	W/S				**W/S**				**W/S**				**W/S**				**W/S**				**W/S**				**W/S**			
	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
Content of workshop: *(Mark the content included)*																												
SLO1																												
SLO2																												
SLO3																												
SLO4																												
SLO5																												
SLO6																												
SLO7																												
HIV/AIDS in construction video																												
Indicate the duration of the workshop in hours																												
Total number of Workers																												
Indicate workshop venue																												

SCHEDULE B

HIV/AIDS AWARENESS PROGRAMME: ATTENDANCE REGISTER

Fill in your name and indicate attendance by ticking the appropriate date

		W/S				W/S				W/S				W/S				W/S				W/S				W/S			
		D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M	D	D	M	M
No	**NAMES**																												

SCHEDULE C

CONTRACTOR HIV/AIDS PROGRAMME REPORT

Project name _____

Project Location _____

Contract value of project (R) _____

Department of Public Works Project Manager _____

HIV/AIDS Programme duration: (dd/mm/yy) _____ to (dd/mm/yy) _____

AWARENESS MATERIAL

Describe location of posters displayed during the programme _____

_____

Comments on posters _____

_____

Indicate total number of booklets distributed _____

Comments on booklets _____

_____

CONDOMS

Indicate total number of male condoms distributed _____

Indicate total number of female condoms distributed _____

Describe where male condom dispenser was placed _____

Describe where female condom dispenser was placed _____

HIV/AIDS WORKSHOPS

Indicate the total number of HIV/AIDS workshops conducted _____

Indicate the duration of workshops _____

Indicate the total number of Workers that participated in the HIV/AIDS workshops _____

Indicate the total number of Workers that were exposed to the video on HIV/AIDS in the Construction Industry

_____

Comments on HIV/AIDS workshops on site _____

_____

GENERAL

Briefly describe programme activities and satisfaction with outcome _____

_____

_____

Additional comments, suggestions or needs with regard to the HIV/AIDS awareness programmes on site

_____

_____

_____

Please indicate if your company has a formal HIV/AIDS policy focussing on HIV/AIDS awareness raising and care and support of HIV/AIDS Workers	Yes	No	Currently developing one

Please indicate if, to your knowledge, you have lost any workers during the duration of the project to HIV/AIDS related sicknesses. One or more of the following might indicate an HIV/AIDS related death:

Excessive weight loss	Coughing or chest pain	Vomiting
Reactive TB	Pain when swallowing	Meningitis
Hair loss	Persistent fever	Memory loss
Severe tiredness	Diarrhoea	Pneumonia

Number of HIV/AIDS-related deaths _____

_____ _____

Contractor **Date**

_____ _____

Departmental Project Manager **Date**

ADDITIONAL SPECIFICATION

SI OCCUPATIONAL HEALTH AND SAFETY

CONTENTS

SI 01	APPLICABLE LEGISLATION AND REGULATIONS
SI 02	SCOPE OF WORK
SI 03	THE PRINCIPLE CONTRACTOR'S DUTIES
SI 04	THE PRINCIPLE CONTRACTOR'S SPECIFIC DUTIES
SI 05	THE PRINCIPLE CONTRACTOR'S SPECIFIC DUTIES WITH REGARD TO HAZARDOUS WORK OR ACTIVITIES

SI 01 APPLICABLE LEGISLATION AND REGULATIONS

This document was prepared to guide the Agent in the compilation of a Health and Safety Specification in terms of Sub-regulation 4(1)a of the Construction Regulation as published under Government Notice R. 85 of 07 February 2014. The content of this document or the fact it was made available for the use of the Agent will not relieve the Agent of any of his obligations in terms of the act.

The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) together with its applicable Regulations ("the Act") forms part of this Health and Safety Specification. Any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned to it unless the context otherwise indicates.

SI 02 SCOPE OF WORK

All work forming part of this Contract is divided into installations.

Schedule 2: Corrective Maintenance Related Work

- Structural And Building
- Plumbing And Drainage
- Building And Site Electrical
- Fencing, Cleaning And Site Keeping
- Bulk Water Supply Systems And External Water Networks
- Wastewater Treatment Works And Sewer Networks
- Roads And Storm Water
- Heating, Ventilation And Air Conditioning
- Conventional Fire Fighting Equipment
- Incinerator

Structural and Building Works

- General structural repair due to operation damage, wear and tear work such as paintwork, replacement of damaged items, e.g. doors, locks, windows, etc. on all buildings
- Apply varnish to all exterior timber doors

- Painting of roof timbers and facia boards
- Repair work to two face brick houses

Plumbing and Drainage

- Replacement of missing or damaged toilette seats
- Replacement of damaged toilette pans
- Service of Cisterns and flush masters
- Servicing of all taps, valves, etc.
- Servicing and cleaning of geysers due to hardness salt precipitation
- Replacement of geyser due to hardness salt precipitation
- Repair work to two face brick houses

Building and Site Electrical

- Supply and install a cable to the chlorinator
- Power supply to the borehole pump
- Power supply to the pumps and equipment at the WWTW
- Service the HV Switchgear and transformers
- Replace the distribution kiosks at the park homes
- Lamp replacements
- Service distribution boards
- Replacement of faulty/damaged lights, light switches and socket outlets

Fencing, Cleaning and Site Keeping

- Installation of ablution block equipment
- Damage repair to fences
- Cleaning of fire break areas at perimeter fences

Bulk Water & External Water Reticulation

- Pressure cleaning the three existing boreholes that were drilled during the construction Contract.
- Test 4 boreholes.
- Connect one borehole for additional water supply and allow for repair of borehole pumps if required to ensure the recommend flow.
- Installation of a motor control centre for the army base borehole.
- Recondition existing motor control centres when required.
- Borehole pipe connections for four boreholes that will be utilised.
- Servicing of all type of valves.
- Replace all types of valves when required.
- Once off cleaning out of manholes in borehole pump line.
- Service manhole covers opening mechanisms on pumping main valve chambers.
- Supply, deliver and install new enclosure complete with roof and floor at the army base borehole as per drawing.
- Supply, deliver and install new enclosure complete with roof and floor at the reservoir as per drawing.
- Supply and Delivery of a Chlorination System.
- Compile operating and maintenance manuals to supply a complete set of operating and maintenance manuals.
- Repair of pipe lines when required, valves, sprinklers and manholes.

Wastewater Treatment Works and Sewer Networks

- Repair (When necessary) two sludge removal pumps in order to accommodate gravity sludge removal and to ensure a 100mm diameter solid passing through the pump
- Recondition existing motor control centres when required.
- Clean at raw sewer pump station
- Service motor control centre if required
- Servicing of existing flow measuring equipment
- Service existing pumps and motors when so required
- Cleaning out of rotating biological contactor
- Repair a leak in the biological contactor chamber.
- Service motor control centre if required
- Cleaning out of chlorination channel
- Service chlorinator
- Servicing of all types of valves if required
- Update existing operating and maintenance manual
- Commissioning and testing of the installation

Roads and Storm water Drainage

- Road marking and maintenance of road signs
- Replacement of damaged paving at residential area
- Repair exiting bitumen road surface at the residential area

Standby Power

- General servicing of the existing Standby Generators
- Provide diesel for the standby generators for the duration of the contract

External Lighting

- Servicing of the existing perimeter, street and area lights
- Bulk Lamp replacement

Heating, Ventilation and Air-Conditioning Systems

- Servicing of all the existing air conditioners in the various buildings and residential units
- Replacement of air conditioners that are at the end of their life cycle at the park homes

Conventional Fire-Fighting Equipment

- Servicing of all fire fighting equipment
- Compile fire plans for operational buildings

Incinerator

- Servicing of burners and equipment of Incinerator
- Provide diesel for the Incinerator for the duration of the contract

SI 03 DUTIES OF A PRINCIPAL CONTRACTOR

The Principal Contractor's duties in terms of this Health and Safety Specification are, but not limited to, the following:

(1) A principal contractor must-

(a) provide and demonstrate to the client a suitable, sufficiently documented and coherent site specific health and safety plan, based on the client's documented health and safety specifications contemplated in regulation 5(1)(b), which plan must be applied from the date of commencement of and for the duration of the construction work and which must be reviewed and updated by the principal contractor as work progresses;

(b) open and keep on site a health and safety file, which must indicate all documentation required in terms of the Act and the Regulations, which must be made available on request to an inspector, the client, the client's agent or a contractor; and

(c) on appointing any other contractor, in order to ensure compliance with the provisions Act-

(i) provide contractors who are tendering to perform construction work for the principal contractor, with the relevant sections of the health and safety specifications contemplated in regulation (5)(b) pertaining to the construction work which has to be performed;

(ii) ensure that potential contractors submitting tenders have made sufficient provision for the health and safety measures during the construction process;

(iii) ensure that no contractor is appointed to perform construction work unless the principal contractor is reasonably satisfied that the contractor he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely;

(iv) ensure prior to work commencing on the site that every contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational injuries and Disease Act, 1993;

(v) appoint each contractor in writing for the part of the project on the construction site;

(vi) take reasonable steps to ensure that each contractors health and safety plan contemplated in subregulation (2)(a) is implemented and maintained on the construction site;

(vii) ensure that the periodic site audits and document verification are conducted at intervals mutually agreed upon between the principal contractor and any contractor, but at least once every 30 days;

(viii) stop any contractor from executing construction work which is not in accordance with the clients health and safety specifications and the principal contractors health and safety plan for the site or which poses a threat to the health and safety of persons;

(ix) where changes are brought about to the design and construction, make available sufficient health and safety information and appropriate resources to the contractor to execute work safely; and

(x) discuss and negotiate with the contents of the health and safety plan contemplated in subregulation (2)(a), and must thereafter finally approve that plan for implementation;

(d) ensure that a copy of his or her health and safety plan contemplated in paragraph (a), as well as the contractors health and safety plan contemplated in subregulation (2)(a), is available on request to an employee, an inspector, a contractor, the client or the client's agent;

(e) hand over a consolidated health and safety file to the client upon completion of the construction work and must, in addition to the documentation referred to in subregulation (2)(b), include a record of all drawings, designs, materials used and other similar information concerning the completed structure;

(f) in addition to the documentation required in the health and safety file in terms of paragraph (c)(v) and subregulation (2)(b), include and make available a comprehensive and updated list of all the contractors on site accountable to the principal contractor, the agreements between the parties and the type of work being done; and

(g) ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of annexure 3.

SI 04 THE PRINCIPAL CONTRACTOR'S SPECIFIC DUTIES

The Principal Contractor's specific duties in terms of this Health and Safety Specification are specified in the Construction Regulation as published under Government Notice R. 85 of 07 February 2014. (Hereinafter referred to as "Construction Regulation, 2014").

The Principal Contractor is specifically referred to the following sub-regulations of the Construction Regulation, 2014:

Subject	Applicable sub-regulation of the Construction Regulation, 2014.
Definitions	1
Scope of application	2
Application of construction work permit	3
Notification of construction work	4
Duties of principal contractor and contractor	7
Management and supervision of construction work	8
Risk assessment for construction work	9
Approved inspection authorities	32
Offences and penalties	33
Withdrawal of regulations	34
Short life	35

The Principal Contractor will acquaint himself with these duties and will make provision in his Contract price for the implementation and supervision of these duties.

SI 05 THE PRINCIPAL CONTRACTOR'S SPECIFIC DUTIES WITH REGARD TO HAZARDOUS WORK OR ACTIVITIES

The following hazardous work or activities were identified in terms of the Construction Regulation, 2014, and it is the duty of the Principal Contractor to ensure that the said work and activities are performed or carried out in terms of the relevant sub regulations of the Construction Regulation, 2014 and other applicable Regulations.

SI 06 PERFORMANCE MEASUREMENT

The Contractors compliance to the Occupational Health and Safety Act shall be measured against pre-set parameters relating to compliance to the Act.

SI 06.01 INSPECTIONS BY THE APPOINTED OHSA OFFICER

The OHSA Officer shall inspect the construction site at any time during the construction and repair work period. The Officer shall complete a score card consisting of the following parameters to ensure that the Principal Contractor provide and maintain as far as reasonable a working environment that is safe and without risk to the health of his employees and other persons:

- Safety Management
- Appointments
- Registers
- Facilities
- Incident Management
- Signs
- Contractors (Sub-Contractors)
- Activity / Conditions
- Personal Protective Equipment
- Electrical
- Housekeeping
- Site Establishment
- Records

SI 06.02 EVALUATION SCORE CARD

The OHSA Officer shall inspect each of the above indicated compliance criteria relating to construction and repair work for each type of installation.

The Officer will use a score card to measure compliance under the 13 Sections culminating in a total of 82 possible inspection items, depending on construction activities being executed.

The Officer will record his inspection findings directly onto the Score Card. Items that are not applicable to the site or construction work will not be relevant on the score card and each will have a maximum score of 100%. The Contractor shall always have to comply 100% to each section in order to receive payment for the point associated with that particular section.

SI 06.03 PERFORMANCE SCORE CARD

The thirteen performance indicators shall be recorded on the Performance Score Card and will be used to measure the Contractors remuneration for compliance to the Occupational Health and Safety Act.

The Contractor shall aim to perform satisfactory on all 13 indicators. Compliance shall either be satisfactory (full compliance) or unsatisfactory(less than 100% per indicator) and the Contractor shall score one (1) or zero (0) respectively per indicator.

A copy of the OHSA Evaluation Score Card and Performance Score Card is included in this specification.

SI 07 MEASUREMENT AND PAYMENT

SI. 01 **COMPLIANCE TO OHSA REQUIREMENTS AND CONSTRUCTION REGULATIONS 2014** .....Points

The unit of measurement shall be a point. Each month shall represent a maximum of thirteen points and a minimum of zero points depending on the compliance to the OHSA.

Thirteen points per month shall mean full compensation for OHSA compliance for work.

DEPARTMENT OF PUBLIC WORKS **OHSA**
PERFORMANCE SCORE CARD

CONTRACT NUMBER: WCS _____

CONTRACT:
CONTRACTOR:
ENGINEER:

INSTALLATION: **MONTH:** 0 0 **OF 36**

OHSA Performance Indicators

1. ITEMS	0	1
1.1 SAFETY MANAGEMENT		
1.2 APPOINTMENTS		
1.3 REGISTERS		
1.4 FACILITIES		
1.5 INCIDENT MANAGEMENT		
1.6 SIGNS		
1.7 CONTRACTORS (SUB CONTRACTORS)		
1.8 ACTIVITY / CONDITIONS		
1.9 PERSONAL PROTECTIVE EQUIPMENT		
1.10 ELECTRICAL		
1.11 HOUSEKEEPING		
1.12 SITE ESTABLISHMENT		
1.13 RECORDS		
TOTAL:		

Engineer's Representative **Signature** **Date**

Construction, Repair and Maintenance							
ADDITIONAL SPECIFICATION. SI OCCUPATIONAL HEALTH SAFETY EVALUATION SCORE CARD							
ITEM NO	**DESCRIPTION ITEM**	**POSSIBLE POINTS**	**POINTS AWARDED**	**NO**	**ITEM**	**ACTION POSSIBLE POINTS**	**POINTS AWARDED**
1	**SAFETY MANAGEMENT**			**7**	**CONTRACTORS (SUB CONTRACTORS)**		
1.1	Client SHE (SI) Specifications available on site?	1		7.1	Updated list of Sub Contractors available?	1	
1.2	Principal Contractors SHE Plan available?	1		7.2	Mandatory Agreements with all Sub Contractors on file?	1	
1.3	Adequate Risk Assessments available?	1		7.3	Safety File complete (appointments, risk assessments, safe work procedures, registers)?	1	
1.4	Safe Work Procedures available?	1		7.4	Sub Contractor's First Aider on site or alternatively	1	
1.5	Safe Work Procedures approved by Engineer?	1			First Aid Agreement in place with Contractor?		
1.6	Fall Protection Plan available?	1					
1.7	Notification of Construction Work available?	1					
2	**APPOINTMENTS**						
2.1	Contractor to confirm if there are any new appointments to be minuted	1		**8**	**ACTIVITY / CONDITIONS**		
2.2	Are all the appointments recorded and available in the Health and Safety File ?	1		8.1	Correct use of Scaffolding?	1	
3	**REGISTERS**			8.2	Correct use of Support Work?	1	
3.1	Fire Extinguisher (stores, site office etc.)	1		8.3	Workers working safely at Elevated Positions?	1	
3.2	Ladders	1		8.4	Safe Operations?	1	
3.3	Scaffolding	1		8.5	Barricading?	1	
3.4	Excavations	1		8.6	Roof work: Harnesses & Lifelines?	1	
3.5	Form / Support Work	1		8.7	Excavation: Shoring & Batter?	1	
3.6	Portable Electrical Tools	1		8.8	Manholes: Demarcated?	1	
3.7	Hand tool Inspection	1		8.9	Ladders Conditions?	1	
3.8	Personal Protective Equipment & Clothing (PPE & C)	1		8.10	Construction Vehicle Condition?	1	
3.9	Explosive Powered Tools	1		8.11	Haz. Chem. Substances Applications?	1	
3.10	Crane	1		8.12	Hand tools properly used and in good condition?	1	
3.11	Lifting Machines	1		**9**	**PERSONAL PROTECTIVE EQUIPMENT**		
3.12	Lifting Tackle	1		9.1	Correctly issued (documented in file)?	1	
3.13	Construction Vehicles	1		9.2	Used correctly?	1	
3.14	Material/ Man Hoist	1		**10**	**ELECTRICAL**		
3.15	Hazardous Chemical Register	1		10.1	DB's & COC's?	1	
4	**FACILITIES**			10.2	Good Plugs / Earth Wire?	1	
4.1	Hygiene Inspection performed?	1		10.3	Electrical Leads / Condition?	1	

4.2	Toilets adequate and clean for workers?	1	
4.3	Change Area available?	1	
4.4	Eating Area available for workers?	1	
4.5	Washing Area available for workers?	1	
5	**INCIDENT MANAGEMENT**		
5.1	First Aid Box adequate and available?	1	
5.2	First Aider on site & valid First Aid Certificate in place?	1	
5.3	Any incidents to report; (Annexure 1 report; recur/investigation; record to FEM)?	1	
6	**SIGNS**		
6.1	"No Unauthorized Entry" Signs?	1	
6.2	"Danger Construction Work" signs?	1	
6.3	"Danger Lifting Operations' sign?	1	
6.4	"Hard Hats" sign?	1	
6.5	"Dust Mask" sign?	1	
6.6	"Ear Protection" sign?	1	
6.7	"Eye Protection" sign?	1	
6.8	"Safety Harness' sign?	1	
6.9	"No Smoking" sign?	1	
6.10	Scaffold use: "Safe" or "Unsafe" signs?	1	
6.11	"Emergency Assembly Point" sign?	1	
The Principal Contractor's Score Achieved is:		**0.00%**	.

10.4	Portable Electrical Tools?	1	
11	**HOUSEKEEPING**		
11.1	Good Stacking & storage?	1	
11.2	Cement spillage control?	1	
11.3	Dust control?	1	
11.4	Placing of Sand / Stone / Bricks/ materials?	1	
12	**SITE ESTABLISHMENT**		
12.1	Office	1	
12.2	Stores	1	
12.3	Fencing / Hoarding	1	
12.4	Access Control	1	
13	**RECORDS**		
13.1	OHS Act; OHS spec; Construction Regulations	1	
13.2	SANS 10085 (Scaffolding)	1	
13.3	Safety Rep. Inspections	1	
13.4	Safety Meetings (Toolbox Talks and/ or Safety Committee)	1	
13.5	Employees Induction	1	
13.6	Visitors Inductions	1	
13.7	Job Assessments	1	
13.8	Medical Certificates	1	
13.9	Training Certificates (*Crane, Lifting Machines,* Vehicles, Scaffold, Safety Rep., TLB, Water Cart, Grader, Excavator, Roller, Front Loader, Mobile Crane, Bob-Cat, Bomag, Wacker and Tipper Trucks)	1	
	TOTAL POINTS TO BE AWARDED	**82**	
	TOTAL POINTS AWARDED	**0**	
	PERCENTAGE (%)	**0.00%**	

Compliance with Construction Regulations 2003 is SATISFACTORY / UNSATISFACTORY (delete which is N/A)

ADDITIONAL SPECIFICATION

SJ COVID-19 GUIDELINES FOR MANAGEMENT OF RISK ON CONSTRUCTION SITES

CONTENTS

SJ 01 SCOPE

SJ 02 SPECIFICATIONS, ACTS AND REGULATIONS

SJ 03 GENERAL REQUIREMENTS

SJ 04 DEGREE OF RISK PER SITE TYPE

SJ 05 RISK MITIGATION PLAN

SJ 06 MEASUREMENT AND PAYMENT

SJ 01 SCOPE

This specification covers guidelines and requirements to reduce the risk of a COVID-19 outbreak in the workplace and the possible impact on workers and the public.

SJ 02 SPECIFICATIONS, ACTS AND REGULATIONS

SJ 02.01 GENERAL STANDARD SPECIFICATIONS

The latest edition, including all amendments up to the date of tender, of the following specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof:

CODE	DESCRIPTION
SH	HIV/AIDS Requirements
SI	OHS Act: Health and Safety
SANS 1200	Standard Specifications. A. General.

SJ 02.02 ACTS AND REGULATIONS

All regulations and statutory requirements as laid down in the latest edition of the following Acts and Regulations shall be adhered to:

ACT	DESCRIPTION
Act No. 85 of 1993	Occupational Health and Safety Act
	Construction Regulations, 2014
	Hazardous Biological Agents Regulation, 2000
Act No. 57 of 2002	Disaster Management Act
	COVID-19 Occupational Health and Safety Measures in Workplaces Covid-19 (C19 OHS), 2020
	Section 27(2) Regulations, 29 April 2020

SJ 02.03 MANUFACTURERS' SPECIFICATIONS, CODES OF PRACTICE AND INSTALLATION INSTRUCTIONS

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

SJ 02.04 MUNICIPAL REGULATIONS, LAWS AND BY-LAWS

All municipal regulations, laws, by-laws and special requirements of the Local Authority shall be adhered to unless otherwise specified.

SJ 03 GENERAL REQUIREMENTS

SJ 03.01 IMPLEMENTING WORKPLACE CONTROLS

The legislation governing workplaces in relation to COVID-19 is the Occupational Health and Safety Act (Act 85 of 1993) as amended, in conjunction with the Hazardous Biological Agents Regulation.

A COVID-19 specific risk assessment together with a written policy concerning the health and safety of all employees, clients, suppliers and sub-contractors who are associated with the Contractor, shall be drawn up and communicated to all the relevant parties, along with mitigation measures which need to be monitored and adjusted should the need arise.

SJ 03.01.01 WORKPLACE CONTROLS

- All offices (including site offices) will be sanitised before opening for business each day.
- Place posters that encourage staying home when sick, cough and sneeze-etiquette, and hand hygiene at the entrances of offices and sites.
- On-site induction with special emphasis on COVID-19 will be done with all employees upon return to work.
- Provide tissues and waste bins lined with a plastic bag so that they can be emptied without contact with the contents.
- Instruct employees to clean their hands frequently using soap and water, for at least 20 seconds or with an alcohol-based hand sanitiser that contains at least 70% alcohol.
- Continue routine environmental cleaning, which includes tools and equipment.
- Increase ventilation in offices by natural or mechanical means.
- Provide soap and water and/or alcohol-based hand sanitiser (at least 70%) in the workplace in multiple locations and in common areas to encourage hand hygiene.
- Practice social distancing (2m) as far as possible (no handshakes, hugs, kissing, horseplay or touching each other). Keep distance from each other while working on site. Supervisors will monitor this throughout the day.
- While queuing at the gate to enter the site, employees must stand in a line, with at least 2m between them.

- Desks for employees working in the office (site office) will be spaced at least 1.5m apart or where this is not possible, protective barriers will be erected between desks.
- It is compulsory to wear face masks at all times. Each employee will be issued with two cloth face masks to wear at work and while commuting, with appropriate training on the use of these masks. Arrangements will be made for the washing, drying and ironing of cloth masks.
- Temperature testing will be done on all employees every morning upon arrival to site, and also randomly during the day. All readings will be recorded, monitored and sent to the SHEQ department. The testing will be conducted by the site safety officer. On sites where a full-time safety officer is not available, the responsibility will fall onto the supervisor.
- During the temperature screening, employees will be screened for any additional symptoms such as body aches, loss of smell or taste, nausea, vomiting, diarrhoea, fatigue, weakness or tiredness. The results will be recorded in the Social Distancing Control Sheet and send to the SHEQ department. If an employee displays any of the symptoms, he will not be permitted to enter the site/offices.
- In addition to posters, brief employees and sub-contractors that anyone with a mild cough or low-grade fever (37.3 or more) needs to stay at home and take sick leave.
- Any employee who develops flu-like symptoms (i.e. cough, shortness of breath, fever) or any of the additional symptoms should inform his supervisor immediately.
- Where practical, the minimum number of employees will be allowed on site, and rotation, staggered working hours and shift work may be implemented. Promote working from home for employees who are able to do so.
- All visitors to site will undergo induction and temperature screening and must be in possession of the appropriate PPE (i.e. face mask) prior to being allowed access to site. No access will be granted to visitors not complying.
- All visitors will be required to sanitize their hands before entering the site as well as when they leave.
- Sub-contractors shall ensure that all of their employees are issued with face masks and any other necessary PPE, and that hand sanitiser and soap is available for their employees.
- Temperature testing will be done by the sub-contractor and records kept. Failure to do so will result in the sub-contractor's employee/s being put off-site until compliant.
- A copy of the Essential Service Permit must be available on site at all times. All sub-contractors to provide a copy of their Permit prior to being granted permission to work.
- All employees are obliged to comply with measures introduced in the workplace.

SJ 03.01.02 **<u>WHAT TO DO WHEN AN EMPLOYEE ON SITE BECOMES ILL WITH COVID-19</u>**

If someone becomes ill in the workplace and there is reason to suspect they may have contracted or come into contact with someone who has contracted the COVID-19 virus, the person must be isolated immediately, provided with a **FFP1 surgical mask**, and transport arranged for the employee to go home to be self-isolated or for medical examination. Ensure testing is done at an identified testing site.

The Department of Health and Department of Labour will be informed of any employees testing positive for COVID-19, whereafter an investigation will be conducted to establish the cause, including any control failures. The risk assessment will be reviewed to ensure necessary controls and PPE is in place.The risk of transmission will be assessed, the employees working area disinfected.

If an employee is confirmed to have COVID-19, his/her fellow employees will be informed of their possible exposure to COVID-19 in the workplace and referred for screening, but confidentiality must be maintained at all times, and no discrimination must be shown toward an employee who tested positive for COVID-19.

If evidence exist that the employee contracted COVID-19 as a result of Occupation Exposure, a Claim for Compensation will be lodged in terms of the Compensation of Occupational Injuries and Diseases Act 1993 (Act No. 130 of 1993) in accordance with Notice 193 published on 3 March 2020.

Once an employee was positively diagnosed with COVID-19 and isolated in accordance with the Department of Health Guidelines, the employee may only return to work after he has undergone a medical evaluation confirming the employee has tested negative for COVID-19. The employee will be required to wear a face mask, maintain social distancing and adhere to cough and sneeze-etiquette. The employee will also be monitored for symptoms upon his/her return to work.

SJ 03.01.03 TRANSPORT

- Where transport is provided, occupancy of the vehicle should be reduced in line with social distancing practice.
- All passengers must wear face masks or respirators.
- All passengers to sanitise their hands before getting into the transport, as well as when disembarking.
- Transport vehicles should be sanitised before and after each trip.
- Employees making use of public transport to ensure they wear face masks and sanitise their hands regularly (before getting into the transport and when disembarking) and attempt not to touch any surfaces unless absolutely necessary.

SJ 03.01.04 MEETINGS

Wherever possible, meetings are to be held via tele or video conference in order to maintain social distancing and prevent the possible spread of COVID-19.

Toolbox talk meetings, inductions and briefing sessions should be done in open areas with social distancing in place.

Progress meetings and technical meetings will be held in the site meeting building specified as 14 meter x 5 meter = 70m² to accommodate 12 persons. The conference table will accommodate 12 attendees, 2 meters apart. The room shall be well ventilated at a maximum temperature of 22°C.

SJ 03.01.05 TRACKING RECORD LOG

Example:

Tracking Record log (Employees/Visitors)								
DATE	NAME	ID NUMBER	AGE	TEMPERATURE IN	SIGNATURE	TEMPERATURE OUT	SIGNATURE	SECURITY CONTROL SIGNATURE

SJ 03.01.05 TRAINING ATTENDANCE REGISTER

Example:

Training Attendance Register			
		Session No	
Date of training			
Time training started		Time training ended	
Duration of training			
Instructor name and signature			
Training provided (Tick applicable box)			
Read only	Class Room	Practical Demonstration	Communicated Changes

Employee number	Employee name	Employee signature *(Signature indicates acknowledgement that training was understood)*	Type of training received

SJ 04 DEGREE OF RISK PER SITE TYPE

BUILDING AND PROJECT TYPE	SITE SET-UP AND STAFF WELFARE	CONSTRUCTION STAGE
Lower Risk	For most, but not all project construction stage risk may be as follows:	For most but not all sites, set-up risk may be as follows:
Industrial, Logistical, Roads and Bridge Construction	**Lower Risk**	**Lower Risk**
Medium Risk	• Excavation and groundworks • Foundations and Piling	• Large Sites
Residential Accommodation	**Medium Risk**	**Medium Risk**
High Risk		• Site and management offices
		High Risk
	High Risk	
	• Cladding and Glazing • M+E and Lifts • Interior First Fix • Interior Second Fix	
		GUIDLINE **For each construction site there will be different levels of risk and it will be critical to evaluate the specific risk of each individual project.**

SJ 05 RISK MITIGATION PLAN

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Demographics of Labour: • Inadequate procedures in place to identify potential infected employees and workers • Manage the exposure to COVID-19 on the project, including visitors and suppliers		**CONTRACTOR**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Origin of labour and transportation Need to minimize the risk of exposure to virus whilst in transport	• **On site transportation**: Where on site transportation is done, a policy needs to be available for how such transportation will be made safe and limit any opportunity for cross infection. If possible, the Principal Contractor should provide their own transportation of work force. (Where not possible, use of public transport can be considered to comply to transport limitations) • **Parking areas**: Private and public vehicles are required to park outside of the construction site • Support staff for professional service providers are to work from office location or from home • **Education and information**: Information boards are required at entrance of sites and within Site Offices with information on the virus and precautions to be taken during working hours and traveling. • **Social Distancing**: o **On site**: As far as possible, work activities must be so arranged that social distance is kept to a minimum of 2 metre. o **Site office**: seating arrangements must be of such that social distancing for roll players is kept to a minimum of 1 metre, ie; '**ONE CHAIR, SKIP CHAIR, ONE CHAIR, SKIP CHAIR**'. o Roll players must be limited to Professional Team and principal contractor. o Facial Masks must be worn at all times by all roll players. o Contractor work force when on site and transportation to and from site, where hand gloves can be used, they should be worn at all times to minimize touching of possible contaminated surfaces and injury.	**CONTRACTOR AND PROFESSIONAL TEAM**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Public transportation across boarders/towns/cities Where a return to work will necessitate travel between Provinces and cities for employees and workers to return to the project, The Principal Contractor and Sub-Contractors are to have in place procedures for or provision of transport for the return of workers to minimize the risk of exposure to the virus whilst in transit.	**The contractor to source/recommend a transport service provider that complies with all travel restrictions and requirements as gazetted by the government, inter alia:** • Maximum occupancy of vehicles to allow for social distancing • Vehicles sanitized before passengers board • Passengers provided with Face Masks and hand sanitizers provided within vehicles for passengers sanitization before boarding and after returning from vehicles for comfort breaks • Regular testing of body temperature • Adequate number of vehicles to be provided to comply with the maximum occupancy • Principal Contractor to put in place procedures for sanitization of personal belongings and luggage of work force on arrival at final destination • Permits to be provided per vehicle and per passenger from Authorising Authority	**CONTRACTOR**
Social Distancing: Construction site and facilities not set up in such a way that it will be possible as far as is practicable to maintain the required social distancing of 2 metres between persons when at work **Risk:** Manual labour for physical tasks and tasks that will not allow for social distancing;	**<u>Tasks that require more than 1 person to complete</u>:** • Providing adequate supplies of suitable PPE such as face masks, task specific gloves, safety glasses, disposable/additional coveralls; • PPE used during multi-person activities to be exchanged immediately after the task is completed; • Sealed bins to be provided for disposable PPE such as masks, disposable coveralls, disposable gloves, etc.; • Sealable bags provided to each person for keeping PPE requiring laundering, such as gloves and coveralls, and • Sanitizing/washing facilities provided for immediate sanitizing of hard hats, safety glasses, shoes, safety harnesses etc, on completion of multi-person tasks	**CONTRACTOR**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Site access by non-employees/security access Inadequate access control measures in places	• Stop all non-essential visitors • All employees and non-employees to be screened with non-contact thermometers (Thermal Thermometers); • Body temperature checks with thermometer upon employee's arrival and departure; • Introduce staggered start and finish times to reduce congestion and contact at all times; • Take body temperatures of anybody stepping on or off site; • Monitor site access points to enable social distancing; • Number of access points to be reduced to enable controlled monitoring; • Ensure disinfectants are in place for disinfecting of shoes on entering/leaving the site; • Provide hand sanitizer for all entering the site to sanitize hands; • Allow social distancing of 2 metres in ques for all entering the site; • Regular cleaning of common contact surfaces areas, e.g.; desks, telephones handsets, site office door handles, chairs, etc.; • Drivers of suppliers of materials and goods and services must remain with their vehicles if load will allow it, if not, drivers are to wash hands before unloading goods and materials	**CONTRACTOR**
Alcohol and Drug Testing Lack of safe testing procedures in place for alcohol and drug testing	• Alcohol testing may only be done using single use test units, and must be disposed of in the appropriate contaminated waste bins provided on site; • Drug testing will only be done by an occupational health facility either using urine or blood sampling; • A protocol will be drawn up by the Principal Contractor to manage this with the occupational health service being used.	**CONTRACTOR**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Medical Surveillance No methodology in place as part of the normal requirements for pre-placement, periodic and exit medicals that includes factors related to COVID-19	• The normal requirements of pre-placement, periodic and exit medicals will remain, with the Occupational health service providing a methodology of how they will be including factors relating to Covid-19. No lung functions or peak flows will be done until deemed safe to do so by the South African Thoracic Society. • It is preferable that occupational health service providers use a cloud-based record keeping service to ensure easy tracking and tracing. Free apps such as Square 1 is such an example. • Any person who contracts the virus may need to be reported to the Compensation Commissioner as an occupational disease where their work is to monitor and in contact with others. Such details are provided in the Compensation for Injuries and Diseases Act (COIDA). • Isolation of workers who have a temperature or any symptoms, and removal to the closest facility for testing and treatment, through the numbers provided. The PC is to ensure their policy on this includes such information. • Workers will be required to complete COVID-19 questionnaires prior to returning to site. Any worker with any symptoms is not to return to work, or notify the PC of same.	**CONTRACTOR**
Ablution Facilities on Site Unhygienic ablution facilities leading to poor hygiene	• Restrict the number of people using toilet facilities at any one time. e.g. use a welfare attendant; • Hand washing facilities (soap and water, paper towel) to be available where possible, and if not, to provide hand sanitizer. Wash hands before and after using the facilities • Induction training to educate to ensure all users are hand washing correctly; • Enhance the cleaning regimes for toilet facilities particularly door handles, locks and the toilet flush handle. Flush toilets preferably 1:15 ratio unless increased cleaning regime present; • Portable toilets should be avoided wherever possible, but where in use these should be cleaned and emptied more frequently. Portable toilets to be provided at a 1:10 ratio; • Provide suitable and enough rubbish bins for hand towels with regular removal and disposal be cleaned and emptied more frequently; • Introduce staggered start and finish times to reduce congestion and contact at all times; • Consider increasing the number or size of facilities available on site if possible.	**CONTRACTOR AND EMPLOYEES**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Waste Management for Covid-19 Waste Outdated waste management arrangements in place that leads to an increased risk of the spread of Covid-19	Waste management arrangements to be updated to include provision for the disposal of additional waste generated due to preventative measures implemented. All waste to be managed as hazardous waste. **a. Disposal of any gloves, masks** The contractor shall dispose of all used gloves and masks as hazardous waste and provide sealable bags and containers for the safe disposal of this waste. **b. Paper towels** The contractor shall provide adequate supplies of paper towels on site. At points where these towels are provided lined waste bins to be placed in order to collect all used towels and then to be disposed of in hazardous waste. **c. Disinfectant solution** The contractor to provide adequate supplies of disinfectant on site where the use of water and soap for cleaning is not practical. If disinfectant dispensers are not refilled it should be disposed with other hazardous waste. **d. Wastewater** Wastewater at washing points, toilets, and bathrooms to be contained in a drainage system that prevent surface spills. If wastewater is contained in waste buckets it must be sealed when removed and disinfected after it is cleaned.	**CONTRACTOR**
Site Meetings Not limiting the number of employees at all activities to the minimum required to do the work in a safe manner.	Only necessary meeting participants should attend. • Attendees should be two metres apart from each other. • Rooms should be well ventilated / windows opened to allow fresh air circulation. • Consider holding meetings in open areas where possible. • Technological alternatives to be exploited for meeting • Attendance if possible (Zoom, Skype, MS Teams). • Training and awareness to address procedures and the importance of social distancing. • Toolbox talks to be conducted outdoors when possible in order for persons to maintain social distancing. Where inclement weather does not allow for this, toolbox talks to be conducted with smaller groupings of workers in a sheltered area large enough to maintain social distancing.	**CONTRACTOR**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Signage Conflicting messages/notices displayed on the site in contravention with current requirements to respond to Covid-19	The Principal Contractor is to review all current signs and notices displayed on site. The PC is to avoid conflicting messages/notices that have been in place prior to lockdown and review accordingly. **a. Access rules** The contractor shall install additional signage with site rules specific to the prevention of spreading the COVID-19 virus at the access control points of the site. **b. Notices/Posters with protocols** Notices and posters shall be placed and installed to raise awareness and regarding protocols to be followed on site. These notices and posters shall be placed conspicuously at various points on the site including the following places: • Entrance • Site notice board • Site Office • Eating areas • Next to toilets and bathrooms • Hand washing stations • Storerooms	**CONTRACTOR**
Emergency Planning Emergency plan not completed and undated in line with current Regulations of the National Disaster Management Act	An updated emergency plan is to be completed that is in line with the current Regulations of the National Disaster Management Act. **a. First aid** Extra gloves, and disinfectants are to be available, first aiders are to be issued with at least FFP2 masks should they be required to respond **b. Evacuation plans** Evacuation plans should consider social distancing. **c. Isolation of potentially infected workers** The emergency plan is to consider how anyone who arrives on site and displays any of the symptoms, or has a raised temperature.	**CONTRACTOR**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Welfare facilities Lack of procedures and arrangements for the provision of welfare facilities to prevent the spread of Covid-19 between employees on site	The Principal Contractor shall adapt arrangements regarding the provision of welfare facilities to be in line with Government guidelines and requirements. **a. Clean, storage for food and personal belongings** The Principal Contractor to provide lockable storage for all employees on site, which shall be disinfected daily. Training and awareness to address procedures and the importance of good hygiene practice. **b. No personal belongings to be kept on site** Apart from extra clean personal clothing no other personal belongings allowed on site accept if kept in locker provided by the Principal Contractor. **c. No communal drinking facilities (shared cups etc.)** The Principal Contractor to provide adequate supplies of bottled water to all employees on site. Empty bottles to be disposed of as normal waste. Training and awareness to address procedures and the importance of good hygiene practice. **d. Eating areas** The Principal Contractor is to limit the number of employees at all activities to the minimum. Stagger lunchbreaks and resting periods for work teams. Training and awareness to address procedures and the importance of good hygiene practice and social distancing. • Workers are required to stay on site once they have entered it and not use local shops. • Dedicated eating areas should be identified on site to reduce food waste and contamination. Where catering is provided on site, it should provide pre-prepared and wrapped food only; • Payments should be taken by contactless card wherever possible; • Crockery, eating utensils, cups etc. should be disposable if supplied; • Drinking water should be provided with enhanced cleaning measures of the tap mechanism introduced; • Tables should be cleaned and disinfected between each use; • All rubbish should be put straight in the bin and not left for someone else to clear up; • All areas used for eating must be thoroughly cleaned at the end of each break and shift, including chairs, door handles, vending machines and payment devices.	**CONTRACTOR AND EMPLOYEES**

RISK DESCRIPTION	MITIGATION PLAN/ACTION	RESPONSIBILITY
Consequence Management Inadequate processes and procedures in place for consequence management	• When non-compliance activities are noted, that activity will be stopped. Should the remedial actions not take place the site will be shut down till the corrective actions have been implemented. • Employees that do not work according to the SSHSS and SSHSP must be disciplined according to the company's disciplinary codes and practices. • Supervisory employees on site must ensure compliance, and when non conformances are noted disciplinary actions should also be followed. • Principal Contractor's should note that they could be fined and even according to the Disaster Management Act, arrested.	**CONTRACTOR**

SJ 06 MEASUREMENT AND PAYMENT

SJ 06.01 **APPOINTMENT OF A COVID-19 AWARENESS CHAMPION** .....Unit: Month

The unit of measurement shall be for the number of months the Awareness Champion is employed.

The tender rate shall include the training of the person on basic COVID-19 information and regulations and to ensure that the person has the necessary skills to handle questions and apply correct procedures regarding the COVID-19 regulations.

SJ 06.02 **ARRANGING AWARENESS WORKSHOP** ..... Unit: Number

The unit of measurement shall be for the number of events arranged.

The tender rate shall include the cost of the service provider, suitable venue and all tuition material and performing assessment procedures.

SJ 06.03 **PROVIDING PERSONAL PROTECTIVE EQUIPMENT (PPE)**..... Unit: Month

The unit of measurement shall be for the number of months the Contractor must provide PPE to all workers on site.

The tender rate shall include for face masks, gloves, tissues, towels etc. for all workers for the full construction period of 24 months.

SJ 06.04 **PROVIDING SANITIZING/WASHING FACILITIES**..... Unit: Month

The unit of measurement shall be for the number of months the Contractor must provide sanitizing and washing facilities on site for the total 24 month contract period.

The tender rate shall include for providing sanitizing and washing facilities for all construction workers at all the different construction sites for all PPE equipment as specified.

SJ 06.05 **ADDITIONAL ABLUTION FACILITIES**.....Unit: Number

The unit of measurement shall be for the number of facilities on the different construction sites.

The tender rate shall include for the construction of sanitizing and washing facilities consisting of a concrete floor area min 3 x 3 meter with 3 hand wash basins and IBR roof covering, including 5000ℓ water tank on stand, as well as soak away for grey water. The facilities to be maintained for the duration of construction at each site.

SJ 06.06 **SITE MEETING VENUE**.....Unit: Sum

The unit of measurement shall be for the additional cost relating to the site meeting venue building as specified in SANS 1200 and PS 5.4.

The additional rate shall include for the additional m² size of the building and furniture which will consist of a separate chair and an 800mm x 600mm table desk for each of the 12 places.

SJ 06.07 **PROVIDE NOTICES AND POSTERS**.....Unit: Month

The unit of measurement shall be for the posters and information notices and booklets to raise awareness and to share information about COVID-19.

The posters and notices must be maintained at places as indicated in Item 1.10.7 at all the different construction sites for the duration of construction.

SJ 06.08 **PROVIDE SCREENING FACILITY**.....Unit: Month

The unit of measurement shall be for the provision of a screening facility to accommodate workers daily at the start of every working day, including provision of infrared forehead thermometers and the maintenance of the equipment for the duration of the 24 month contract period.

ADDITIONAL SPECIFICATION

SN IMPLEMENTATION OF LABOUR-INTENSIVE INFRASTRUCTURE PROJECTS UNDER THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP)

CONTENTS

SN 01	SCOPE
SN 02	TERMINOLOGY AND DEFINITIONS
SN 03	APPLICABLE LABOUR LAWS
SN 04	EMPLOYMENT OF UNSKILLED AND SEMI-SKILLED WORKERS IN LABOUR INTENSIVE WORKS
SN 05	TRAINING OF EPWP WORKERS
SN 06	CONTRACTUAL OBLIGATIONS IN RELATION TO LABOUR
SN 07	SETTING OF RATE OF PAY
SN 08	GENERIC LABOUR INTENSIVE SPECIFICATION

SN 01 SCOPE

This project is part of the Expanded Public Works Programme and aims to alleviate and reduce unemployment. EPWP will achieve this aim through the provision of work opportunities as part of the project. EPWP workers will be recruited and trained in skills relevant to the work to be done on this project. These workers will be employed by the Contractor as part of this project so that they can gain work experience on these projects. The Contractor will be required to manage, supervise and report on the EPWP workers, monthly, for a period of 36 months. Furthermore the Contractor will be required to supervise these EPWP workers to ensure that the work they perform is of the required standard.

Labour-intensive infrastructure projects under the EPWP include:

- using labour intensive construction methods to provide employment opportunities to local unemployed people;
- providing training or skills development to those locally employed workers;
- building cost-effective and quality assets.

The employment of locally employed temporary workers on all EPWP labour-intensive infrastructure projects must be in accordance with the Code of Good Practice for Employment and Conditions for Expanded Public Works Programmes issued in terms of the Basic Conditions of Employment Act, 1997 (Act N°75 of 1997)..

SN 02 TERMINOLOGY AND DEFINITIONS

SN 02.01 TERMINOLOGY

a)	BY HAND	refers to the use of tools which are manually operated and powered.
b)	EPWP	Expanded Public Works Programme, a National Programme of the government of South Africa, approved by Cabinet.
c)	DOL	Department of Labour. Labour-intensive refers to methods of construction involving a mix of machines and labour, where labour,

utilising hand tools and light plant and equipment, is preferred to the use of heavy machines, where technically and economically feasible.(Note: The normal emphasis on the cost-effectiveness and quality of the asset must be retained.)

d) Public body — refers to a department, trading entity, constitutional institution, municipality, public entity or municipal entity

e) Scope of work — refers to a specification and description of the services or construction works which are to be provided and any other requirements and constraints relating to the manner in which the contract is to be performed

SN 02.02 DEFINITIONS

(a) "employer" — means the contractor or any party employing the worker under the EPWP Programme.

(b) "client" — means the Department of Public Works.

(c) "worker" — means any person working or training in an elementary occupation on an EPWP.

SN 03 APPLICABLE LABOUR LAWS

In line with the Expanded Public Works Programme (EPWP) policies, the Code of Good Practice for Employment and Conditions of Work for Expanded Public Works Programmes read in conjunction with a Ministerial Determination for Expanded Works Programmes issued by the Minister of Labour in terms of Section 50(1) of the Basic Conditions of Employment Act of 1997 of which extracts have been reproduced below in clauses SN 04, shall apply to works described in the scope of work and which are undertaken by unskilled or semi-skilled workers.

SN 04 EMPLOYMENT OF UNSKILLED AND SEMI-SKILLED WORKERS IN LABOUR INTENSIVE WORKS

SN 04.01 REQUIREMENTS FOR THE SOURCING AND ENGAGEMENT OF LABOUR

The beneficiaries of the programmes should be locally-based (as close to the project site as possible) individuals prepared to work on the specific EPWP.

In order to spread the benefits as broadly as possible in the community, a maximum of one person per household should be employed, taking local available labour into account.

Workers from other areas may be employed if they have skills that are required for a project and there are not enough persons in the local communities who have those skills or who could undergo appropriate skills training. However, workers from other communities should not exceed 20% of all persons working on a programme. A proper skills audit should be conducted, where possible, in an area where an EPWP is in operation.

Programmes should set participation targets for employment with respect to women, youth, and people with disabilities.

The proposed targets are:

- 55% women;
- 40% youth from 16 to 35 years of age; and
- 2% people with disabilities.

EPWPs should seek to achieve these targets in all occupational categories.
Persons under sixteen years of age may not be employed on EPWP.

SN 04.02 SPECIFIC PROVISIONS PERTAINING TO SANS 1914-5

Definitions

Targeted labour: Unemployed persons who are employed as local labour on the project.

Contract participation goals

- The specified contract participation goal for the contract is stated in the Scope of Works. The contract participation goal shall be measured in the performance of the contract to enable the employment provided to targeted labour to be quantified.

- The wages and allowances used to calculate the contract participation goal shall, with respect to both time-rated and task rated workers, comprise all wages paid and any training allowance paid in respect of agreed training programmes.

- Further to the provisions of clause 3.3.2 of SANS 1914-5, written contracts shall been entered into with targeted labour.

The definition for net amount shall be amended as follows:

- Financial value of the contract upon completion, exclusive of any value added tax or sales tax which the law requires the employer to pay the contractor.

SN 05 TRAINING OF EPWP WORKERS

The contractor shall provide all the necessary on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract in a manner that does not compromise worker health and safety.

Three types of training are applicable, namely

- Life skills;
- On the job training;
- First Aid training;
- Technical Skills training.

Training will be implemented by training instructors accredited by DOL and/or CETA:

- EPWP workers shall be employed on the projects for a minimum period of 12 months.

- EPWP workers shall be deployed on projects in the vicinity of their homes. The same arrangements as for other workers regarding accommodation, subsistence and travel shall be applicable to EPWP workers.

(a) The contractor shall provide all the necessary on-the-job training to targeted labour to enable such labour to master the basic work techniques required to undertake the work in accordance with the requirements of the contract in a manner that does not compromise worker health and safety.

(b) The cost of the formal training of targeted labour, will be funded by the provincial office of the Department of Labour. This training should take place as close to the project site as practically possible. The contractor, must access this training by informing the relevant provincial office of the Department of Labour in writing, within 14 days of being awarded the contract, of the likely number of persons that will undergo training and when such training is required. The employer must be furnished with a copy of this request.

(c) A copy of this training request made by the contractor to the DOL provincial office must also be faxed to the EPWP Training Director in the Department of Public Works

(d) The contractor shall be responsible for scheduling the training of workers and shall take all reasonable steps to ensure that each beneficiary is provided with a minimum of six (6) days of formal training if he/she is employed for 3 months or less and a minimum of ten (10) days if he/she is employed for 4 months or more.

(e) The contractor shall do nothing to dissuade targeted labour from participating in the above mentioned training programmes.

(f) An allowance equal to 100% of the task rate or daily rate shall be paid by the contractor to workers who attend formal training, in terms of (d) above.

(g) Proof of compliance with the requirements of (a) to (e) must be provided by the Contractor to the Employer prior to submission of the final payment certificate.

SN 06 CONTRACTUAL OBLIGATIONS IN RELATION TO LABOUR

The EPWP workers to be employed in the programme (EPWP) shall be directly contracted to the Contractor. Over and above the construction and project management responsibilities, the contractor will be expected to perform the tasks and responsibilities as set out in this specification.

Implementation of labour intensive practices under the Expanded Public Works Programme (EPWP) is required to a value of not less than 10% of the tendered contract amount for wages paid to local labour.

SN 07 PAYMENT OF WORKERS

Employers must pay workers at least the minimum rate as stipulated in the Ministerial Determination: Expanded Public Works Programme

Workers can be paid on the basis of the number of tasks completed. These workers are referred to as "task-rated workers". Alternatively, workers can be paid on a daily rate.

There are jobs where it is not possible to pay workers on the basis of tasks performed. These workers must be paid on the basis of the amount of time they worked. They are referred to as "time-rated workers".

On the task-based system, a worker is paid for each task completed or part thereof.

If workers are informed a day before that work will not take place the next day, they should not be entitled to any payment.

Workers will be paid a training allowance in case they are required to attend agreed training programmes. This should be equal to 100% of the daily task rate for task-rate workers or 100% of the daily rate of pay for time-rated workers. All the costs of training will be covered, for example, travel, trainers, material, tuition fees.

Where a worker participates in a learnership, the relevant learnership determination must be used to determine the training allowance whilst on training.

Each worker must be given written particulars of employment and verbal explanations in an appropriate language of their rate of pay and how this is to be calculated.

Where a project is completed earlier than anticipated the worker should receive the full agreed remuneration for the stipulated period of the contract if the pay for the task was to be calculated on the basis of time. Where such work was to be performed on a task-based system, the full agreed remuneration for the task should be paid for early completion.

SN 08 GENERIC LABOUR INTENSIVE SPECIFICATION

The Generic Labour-intensive specification below is the same as SANS 1921-5, Construction and management requirement for works contracts- Part 5: Earthworks activities which are to be performed by hand and should be included in the scope of works without amendment or modification as set out below.

SN 08.01 Scope

This specification establishes general requirements for activities which are to be executed by hand involving the following:

a) trenches having a depth of less than 1.5 metres
b) cleaning of storm water drainage
c) cleaning of roads and sidewalks
d) clearing of fence routes
e) cleaning and site keeping
d) cleaning of buildings

SN 08.02 Precedence

Where this specification is in conflict with any other standard or specification referred to in the Scope of Works to this Contract, the requirements of this specification shall prevail.

SN 08.03 Hand excavateable material

Hand excavateable material is material:

a) granular materials:
   i) whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or

   ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b) cohesive materials:

   i) whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or

   ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

Note:

i) A boulder, a cobble and gravel is material with a particle size greater than 200mm, between 60 and 200mm.

ii) A dynamic cone penetrometer is an instrument used to measure the in-situ shear resistance of a soil comprising a drop weight of approximately 10 kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60°with respect to the horizontal) into the material being used.

SN 08.04 Trench excavation

All hand excavateable material in trenches having a depth of less than 1,5 metres shall be excavated by hand.

SN 08.05 Compaction of backfilling to trenches (areas not subject to traffic)

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers

a) to 90% Proctor density;

b) such that in excess of 5 blows of a dynamic come penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than10% gravel of size less than 10mm and contains no isolated boulders, or

c) such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

SN 08.06 Excavation

All hand excavateable material including topsoil classified as hand excavateable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand.

The excavation of any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

SN 08.017 Clearing and grubbing

Grass and small bushes shall be cleared by hand.

SN 08.08 Shaping

All shaping shall be undertaken by hand.

SN 08.09 Loading

All loading shall be done by hand, regardless of the method of haulage.

SN 08.10 Haul

Excavation material shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150 m.

SN 08.11 Offloading

All material, however transported, is to be off- loaded by hand, unless tipper-trucks are utilised for haulage

SN 08.12 Spreading

All material shall be spread by hand.

SN 08.13 Compaction

Small areas may be compacted by hand provided that the specified compaction is achieved.

SN 08.14 Grassing

All grassing shall be undertaking by sprigging, sodding, or seeding by hand.

SN 08.15 Stone pitching and rubble concrete masonry

All stone required for stone pitching and rubble concrete masonry, whether grouted or dry, must to be collected, loaded, off loaded and placed by hand.

Sand and stone shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.

Grout shall be mixed and placed by hand.

SN 08.16 Manufactured Elements

Elements manufactured or designed by the Contractor, such as manhole rings and cover slabs, precast concrete planks and pipes, masonry units and edge beams shall not individually, have a mass of more than 320kg. In addition the items shall be large enough so that four workers can conveniently and simultaneously acquire a proper hand hold on them.

SN 08.17 Roads

The following operations may be carried out using labour intensive methods:

1. Site clearance
2. Layer work construction including loading, hauling and spreading material.

Note: All compaction should be done using conventional compaction equipment and where necessary the use of heavy machinery may be employed to loosen material for excavation by hand. Where significant use of blasting is indicated, then the Works are probably not suitable for labour intensive methods.

3. Where higher standards of roads are to be constructed then the following operations may be included:

- Macadam base course either dry, water bound or emulsion bound; foamed bitumen gravel; emulsion treated gravel; or slurry bound or composite macadams.
- Application of bitumen bound surface treatment (cold) including spreading and dragging of chips.
- Slurry treatments to existing or new road surfaces.
- In situ concrete roads
- Segmented block paved roads.
- Cast in-situ block pavements (hyson-cells);
- Road markings.

4. Fencing.
5. Erection of road signs.
6. Grass maintenance.
7. Road reserve maintenance.
8. Rubble masonry bridges, culverts and retaining walls

SN 08.18 Storm water

The following operations may be constructed using labour intensive construction methods:

1. Gabions and reno mattresses.
2. Small diameter pre-cast concrete elements (pipes and arches).
3. Grassed or lined water channels

SN 08.19 Sewers

The following operations may be constructed using labour intensive construction methods:

1. Sewer manholes either in brickwork or using specially manufactured pre-cast manhole rings (individual mass less than 320kg).
2. Sewer manhole covers and lids using specially designed pre-cast units.
3. Maturation or flocculation ponds with least dimension not exceeding 100m.

SN 08.20 Water

The following operations may be constructed using labour intensive construction methods:

1. Laying of water pipelines, fittings and house connections in all materials (including steel) where the mass of individual pipe lengths does not exceed 320kg.
2. Construction of ferro-cement reservoirs.
3. Excavation for membrane lined and floating roof reservoirs.

4. Construction of small masonry reservoirs.
5. Spring and well protection measures

SN 08.21 Haul of Material

Where the haul of any material exceeds 200m, consideration should be given to the use of local resources for transporting material. This includes the use of animal drawn vehicles and small trailer combinations utilising locally sourced tractors. All loading and off loading can be done by hand.

SN 08.22 Electricity

The following operations may be constructed using labour intensive methods:

1. Excavation of trenches for reticulation of all voltages.
2. Excavation for and erection of poles for overhead lines.
3. Installation of all electricity cables (joints and terminations by qualified persons).

SN 08.23 Bill of quantities

Labour-intensive works is highlighted in the bills of quantities for the payment items relating to labour-intensive works (LI).

SN 09 REPORTING

The Consultant shall, before certifying a contractor's payment certificate, ensure that the contractor has submitted labour information in a format and timeframe specified by the employer. If the information submitted by the contractor is inadequate the consultant shall not submit the payment certificate to the employer for payment.

The Contractor's payment invoices shall be accompanied by labour information for the corresponding period in a format specified by the employer. If the contractors chooses to delay submitting payment invoices, labour returns shall still be submitted as per frequency and timeframe stipulated by the Employer. The contractor's invoices shall not be paid until all pending labour information has been submitted.

SN 10 MEASUREMENTS AND PAYMENT

The number of EPWP workers specified for this contract that will receive orientation and life skills development training is 15 and technical training is 15

SN 10.01 PAYMENT FOR EMPLOYMENT AND TRAINING OF EPWP WORKERS (TARGET: - 15 EPWP WORKERS)

SN 10.01.01 Orientation and Life Skills development training for EPWP workers for an average of 10 days per EPWP worker.....Unit: PC Sum

SN 10.01.02 Technical skills training for EPWP workers for an average of 20 days per EPWP worker.....Unit: PC Sum

SN 10.01.03 First Aid Level 1 training for EPWP workers for an average of 5 days per EPWP worker.....Unit: PC Sum

SN 10.01.04 Profit and attendance for administration of items 1 and 2 above..... Unit: %

SN 10.02 PAYMENT FOR TRAVELING OF EPWP WORKERS

SN 10.02.01 Travelling (based on return trip/EPWP worker) ..... Unit: worker/ day

The unit of measurement shall be the number of EPWP workers transported from the nearest local community to the work place and back on a daily basis. The tendered shall allow for the cost of each worker to be able to safely reach the work place and travel back each day and shall be measured as a number for each worker per day.