PART 3: SCOPE OF WORK

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C3.1: EMPLOYER'S WORKS INFORMATION

Contents

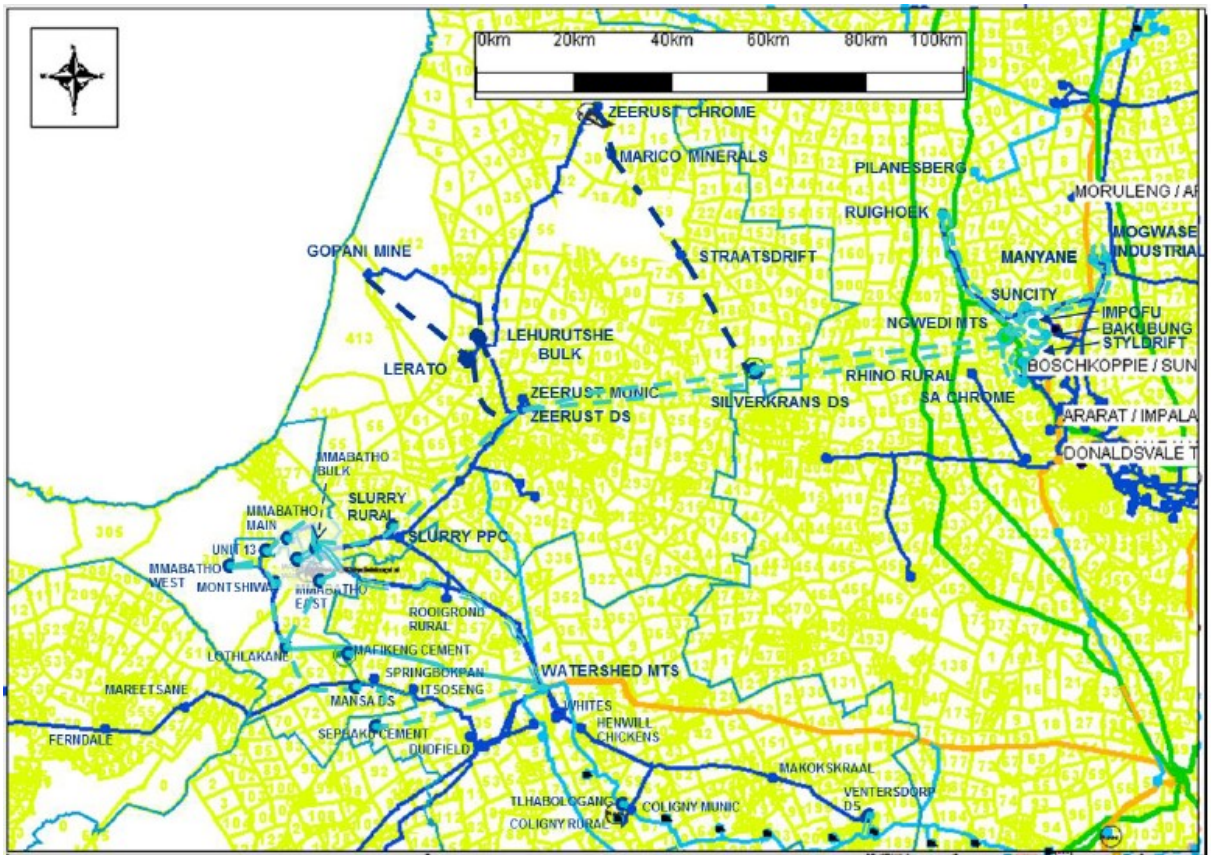
1 Description of the *works*

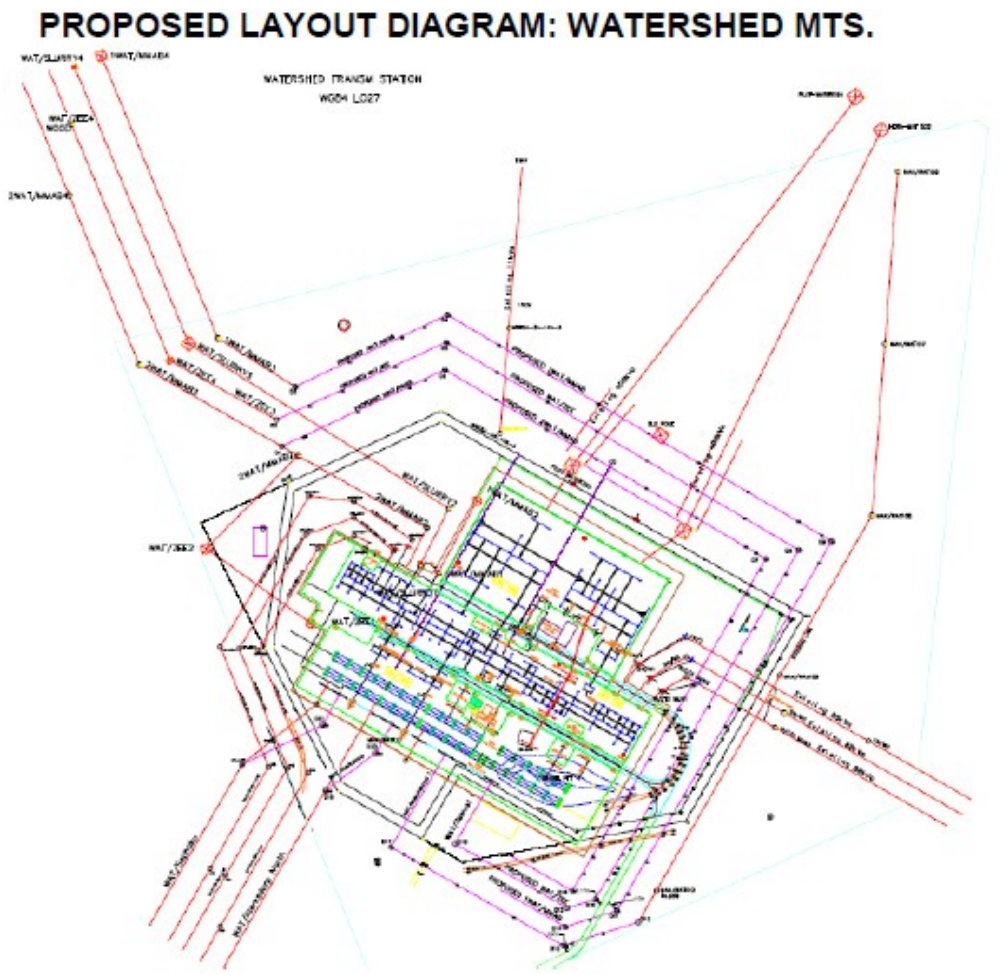
1.1 Executive overview

The construction of Rerouting of following 4x132kV lines

- Rerouting of 132kV Sephaku (0.11Km),
- Rerouting of 132kV Klerkdorp north (0.085Km),
- Rerouting of 132kV Zeerust (1.1Km) and
- Rerouting of 132kV Thlabologang (0.310Km).

The construction includes tying into the existing lines as per the relevant profiles and line route map. The line route is shown in the Geographical map & proposed layout image below; the green lines represent the existing lines and the blue lines represent the new deviation.





The line route is fairly flat and runs through properties that are owned by Eskom & farmers for the entire length of the deviation. All tower positions are accessible through the farmers & Eskom access roads. Access will be granted by around farmers & Eskom and existing roads can be used where possible. The lines will use a standard servitude with a few exceptions where the servitude will be reduced if necessary in order to avoid existing unforeseen operations. The line was profiled with ground clearance to cater for fire faults.

The deviation has multiple low voltage line crossings. The deviation has no railways and no conveyor belt. Outages to cross power lines are recommended, however if it is not possible the contractor will need to cater for live-line crossing methods. The necessary permits must be acquired for all crossings, where applicable.

A complex and time constrained execution plan is suggested for the tie-ins into the existing lines so as to minimise the outage durations. There are multiple tie-in positions for the implementation of this works. The commissioning key date for the works is critical and non-negotiable due to the high safety risk and planned completion activities. The contractors schedule is of paramount importance. It is recommended that multiple teams be planned in order to meet the sectional completion and key dates outlined in the contract data.

1.2 *Employer*'s objectives and purpose of the *works*

Watershed substation forms part of the Carletonville CLN in the North West Grid, located close to Lichtenburg in the North West Province and is supplying industrial, agricultural and residential loads. The GPS Coordinates for Watershed Substation is -26.089924S 26.144909E. All persons requiring access to site

shall notify the Project Manager two (2) weeks before such access is required. The applicant shall provide proof of identification to the Project Manager with the site access application. A permit shall be issued and all contractors/visitors are required to visibly retain the permit at all times. All contractors must attend safety training and familiarization which will be provided by the Employers safety officer before commencement of any work on site. All contractors working at Watershed substation need to be security vetted.

The objective is the construction of the 4x132kV lines deviations (Watershed-Zeerust, Watershed-Klerkdorp North, Watershed-Sephaku & Watershed-Makoskraal (future thlabologang). The works are to be constructed in accordance with the approved profiles and specifications.

A. Executive summary scope of work

It entails following BUSH CLEARING, Foundations, Tower Earthing, Erecting of Structures, Stay Rod assemblies, Dressing, Documentation, LABELLING, STRINGING and REGULATION.Dismantle the following items and remove from site Steel poles including foundations and Conductor including hardware. Lowering of earthwire attachment point for Zeerust line(lower earthwire on lattice structure to correct Zeerust line clearance).

The proposed *works include but are not limited to the following:*

- Site establishment
- Bush clearing & tree felling for access and construction purposes
- Repairing existing access, creating and maintaining access for construction purposes
- Survey and pegging of towers
- Design and installation of concrete tower foundations in various soil/rock conditions
- Manufacture, Delivery, Assembly and Erection of galvanised steel series lattice sub-transmission/Distribution line towers and masts
- Tying into the existing lines at positions
- Stringing/regulation phase conductor
- Stringing/regulation of earth conductors
- Installation of line labels, bird-guards, bird-diverters and aerial warning devices
- Rehabilitation of groundwork damage and implementation of environmental requirements
- Labelling and Re-numbering of the lines
- Dismantling of existing towers in specific areas
- Demolition of existing foundations in specific areas
-

Detailed scope of work

1. Contractor's fixed-charge items:
Contractual requirements must include following Establishment of construction camp, Establishment of facilities in construction camp such as plant, sheds, water, electricity, lighting, etc. Other fixed-charges (Specify) must include Establishment of construction plant and Removal of site establishment, etc.

2. Contractor’s time related items:
Contractual requirements must include following Operation & maintenance of facilities, Supervision, Company & head office overhead costs. Other (Specify) must include 1) Accommodation, Personnel transport and Cost of water supply for construction purposes, etc.

3. Contractor's expenses regarding Health and Safety
Contractor's cost to comply to the Construction Regulation (Volume 5, Annexure F) and the Health and Safety Specification (Volume 5, Annexure E). Cost for workers to undergo safety and induction programs for the purpose to work on the property where necessary. Cost to comply to the Environmental management Plan.

4. Test Joint

Supply all material and perform tests at an approved body as indicated below. Refer to Volume-4 for the required material. Should the Test Joint fail, the Contractor will re-test at his own cost. Before construction commences, the crimper/s to be used on the line shall be used to crimp the test pieces by an authorized person who shall perform joints on the line. This must be witnessed by Eskom Clerk of Works/construction site supervisor and test certificates to be provided as part of the Hand Over Documentation. Supply all material and test complete Kingbird assembly in accordance with Eskom technical bulletin 04TB-040. Supply all material and test complete Wolf assembly in accordance with Eskom technical bulletin 04TB-040. Supply all material and test complete 19/2.65 wire stay assembly to 115kN

5. BUSH CLEARING

Bush clearing needed and quote to do bush clearing on the whole line in accordance with the standard as identify the extent by Project Engineer. Install Farm Gates (for fences crossed by line) if required and agreed with project engineer.

6. LINE CONSTRUCTION OF FOUNDATIONS

Note: Costs are based on Soil type 3 for quotation purposes. Contractor invoices must be based on the foundation soil nomination done by the civil engineer. Soil nominations to be confirmed by the contractor and Project manager to be immediately consulted should the excavation vary from the nomination done by the geotechnical engineer. Excavate, barricade, supply and transport to pole position imported material, dispose excavated material, supply, and install complete foundation. Nominations of foundation types to be done on site by Civil Engineer. Civil Engineer to specify which of the foundation types must be used for each structure. Note: Design calculations are done on 120% of the structures (80% type 3, 20% rock). Nomination of foundation type as determined by registered civil engineer and signed off by him/her in Volume 5, Annexure D, Construction Report. Excavate, barricade, dispose of excavated material, transport to pole position imported material, supply and install complete foundations for soil type 2 on the following structures:

- Intermediate 3 pole Structures D-DT-7617 and D-DT-7850s2 “Pole, St 132kV Int 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) foundation.
- Intermediate 3 pole Structures D-DT-7617 and D-DT-7850s2 Pole "Pole, St 132kV Int 3 pole 18m,20m,18m 23kN (Bottom Att 15.8 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7851s3" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7851s3" "Pole, St 132kV Str 3 pole 20m,22m,20m 23kN (Bottom Att 17.4 m) foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Strain (2 degrees 18 m) (Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Strain (45 degrees 18 m) (Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Strain (90 degrees 18 m) (Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items) "D-WC-7602s2" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) foundation"

7. LINE CONSTRUCTION TOWER EARTHING:

Supply, install and bond tower earthing for the following structures:

- Boulder excavation - Class A
- Test footing resistance and share results with Engineer before installing the TPS(refer SCSASABF9)
- Excavate, supply and install complete 3 point star earth electrode (incl. rocky terrain). Please note that this item is a re-measurable based on footing resistance results(refer "D-DT-0642")

- Bond the Terminal structures to the substation earth mat by using 50 x 3mm flat Cu strap buried 1m deep, including excavation, supply, installation and backfilling(refer SCSASABF9).

8. LINE CONSTRUCTION ERECTING OF STRUCTURES

NOTE: The cost to supply the structures should include the cost to design the structures in accordance with 0501KR-01 rev 1. CIS or Structure-com can be approached for this. The design and full set of drawings to be submitted to the Engineer 2-weeks after the contract award. Assemble and erect the steel pole for the following structures at specified positions, including backfilling. Costs to include the connection of the stay wire to the stay rod assembly for the strain structures:

- Intermediate 3 pole Structures D-DT-7617 D-DT-7617"Pole, St 132kV Int 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) "
- Intermediate 3 pole Structures D-DT-7617 D-DT-7617"Pole, St 132kV Int 3 pole 18m,20m,18m 23kN (Bottom Att 15.8m) "
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7618" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN (Bottom Att 13.4 m) "
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d) "D-DT-7618" "Pole, St 132kV Str 3 pole 20m,22m,20m 23kN(Bottom Att 17.4 m) "
- Self support Strain Structures (non-stock items) strsce0218kw110 "Pole, St 132kV Strain (2 degrees 18 m) (Bottom Att 11 m) self support "
- Self support Strain Structures (non-stock items) strsce4518kw110 "Pole, St 132kV Strain (45 degrees 18 m) (Bottom Att 11 m) self support "
- Self support Strain Structures (non-stock items) strsce9018kw110 "Pole, St 132kV Strain (90 degrees 18 m) (Bottom Att 11 m) self support "
- Self support Strain Structures (non-stock items) str3psce3518kw158 "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN(Bottom Att 15.8 m) "

9. LINE CONSTRUCTION STAY ROD ASSEMBLIES

Proof Load Testing of Stays: Contractor to do proof load test on a sample of stays. Contractor to supply proof loading specification (approved by professional engineer) to the Project Engineer 2 weeks after contract award.Proof load testing of 19/2.65 permanent stay assembliesThe soil types for each stay position shall be nominated by a professional civil engineer or suitably qualified person in accordance with DSP-34-1657 Please Note: Stays based Type 3 soil.Installation of 113kN, 19/2.65 stay rod assemblies:

- "D-DT-7325s2" Excavate and transport imported material, barricade and dispose of excavated material, supply & install complete stay rod assembly for type 2 soil.

10. LINE CONSTRUCTION DRESSING

ESKOM SHALL SUPPLY INSULATORS AND CONDUCTOR ONLY. THE CONTRACTOR SHALL SUPPLY ALL OTHER MATERIAL. ALL MATERIAL TO BE IN ACCORDANCE WITH THE RELEVANT ESKOM STANDARDS AND SPECIFICATIONS. ONLY ESKOM APPROVED SUPPLIERS TO BE UTILISED

Dressing must include the supply, transport to specific pole position and installation of complete hardware assemblies including shieldwire hardware and bird perching brackets for the following structures:

- Intermediate 3 pole Structures D-DT-7617, D-DT-7321 & 2NT 627 "Pole, St 132kV Int 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) foundation"
- Intermediate 3 pole Structures D-DT-7617, D-DT-7321& 2NT 627 "Pole, St 132kV Int 3 pole 18m,20m,18m 23kN(Bottom Att 15.2 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (2x7618c and 1x7618d), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) foundation"
- Stayed Strain Planted Structures D-DT-7618 (1x7618d), "D-DT-7311 & D-DT-7321 & 2WT 1421-1""Pole, St 132kV Str 3 pole 20m,22m,20m 23kN(Bottom Att 17.4 m) foundation"

- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Strain (2 degrees 18 m)(Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Strain (45 degrees 18 m)(Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Strain (90 degrees 18 m)(Bottom Att 11 m) self support foundation"
- Self support Strain Structures (non-stock items), "D-DT-7311 & D-DT-7321 & 2WT 1421-1" "Pole, St 132kV Str 3 pole 16m,18m,16m 23kN(Bottom Att 13.4 m) foundation"

11. LINE CONSTRUCTION DOCUMENTATION

Complete all parts of the Construction Handbook that applies to the construction of the line (Volume 5, Annexure D)

12. LINE CONSTRUCTION STRINGING and REGULATION

12.1. STRINGING

"**Please Note**: Phase conductor shall be ordered by Eskom.
Please Note: Contractor to ensure the necessary strength and size of Pilot wire for the purpose of stringing. Cost to include temporary stays required for stringing purposes."

String the following (length is for all three phases) in according to refer TRMSCAAC1:

- Phase conductor - Single Kingbird
- Closing spans - Single Kingbird
- shield wire - wolf conductor

12.2. Line and Road Crossings

"Prepare temporary structures and do stringing for the following type of crossings refer TRMSCAAC1:

- Allow for all HV and MV lines, roads, telcom, rail, etc. crossing as per the profile"

12.3. Joints

Supply and install the following compression joints refer D-ST-34 1207:

- Midspan joint - kingbird

12.4. Damage Repair

Install repair sleeves for damaged conductors:

- Mid span repair sleeve(refer D-ST-34 1207)

12.5. Making Off and Regulation

- **D**-ST-34 1207 Making off phase conductor - Kingbird
- D-ST-34 1207 Making off shield wire - wolf
- D-ST-34 1207 Regulating - Kingbird

- D-ST-34 1207 Regulating – wolf

12.6. Clamping In

- D-ST-34 1207 Clamping-in phase conductor Kingbird
- D-ST-34 1207 Clamping-in shield wire conductor wolf

12.7. Vibration Dampers

D-ST-34 1207 Supply and install asymmetrical dampers on the phase conductors as indicated in Volume 2

13. LABELLING("ESKASAANO Rev 12-WT/1148")

Pole Identification Labels(D-DT-5050 s1)Supply and install for:

- Pole identification label

14. Phase Disks

- D-DT-5050 s2 Supply and install on terminal structures
- Substation Terminal structure

15. DISMANTLING

Dismantle the following items and remove from site the following:

- Steel poles including foundations
- Conductor including hardware
- Lowering of earthwire attachment point(lower earthwire on lattice structure to correct Zeerust line clearance)

16. Things to take note off:

Note1: The contractor is requested to quote all items. Please further note that Eskom reserves the right to decide which material should be supplied by the contractor or by Eskom.

Note2: contractor to do Tower Earthing by Supply,excavate, install and bond tower earthing. Testing of tower footing resistance. Towers to be connected to each other before the concrete cap is constructed. The Copper strap should thus be encased in the concrete cap.

Note3: Supply all material and perform tests at an approved body as indicated below. Refer to Volume4 for the required material. Should the Test Joint fail, the Contractor will re-test at his own cost. Before construction commences, the crimper/s to be used on the line shall be used to crimp the test pieces by an authorised person who shall perform joints on the line. This must be witnessed by Clerk of Works/site supervisor and test certificates to be provided as part of the HandOver Documentation.

Note4: Design foundations for all structures in accordance with 0501KR-01 rev 1 by a registered professional in each type of soil (type 1, 2, 3, 4 and rock). Designs and drawings to be submitted to Eskom Design Engineer two weeks after contract award. Designs to be Eskom Copyright. Nominations to be done on site by Contractor Civil Engineer to specify which of the foundation designs above must be used for each structure. Excavate, barricade, supply and transport to pole position imported material, dispose excavated material, supply, and install complete foundation based on a 20% Rock , 80% Type 3 and 20% Type 4 foundation, for the following structures: Costs are based on 120% foundations for

quotation purposes. Contractor invoices must be based on the foundation soil nomination done by the civil engineer.
N**ote5**: Excavate, barricade, dispose of excavated material, transport to pole position imported material, supply and install complete foundations.

Note6: Supply, transport to pole position, install and erect the steel pole for the following structures at specified positions, including backfilling. The cost to supply the structures should include the cost to design the structures in accordance with 0501KR-01 rev 1. CIS or Structurecom can be approached for this. The design and full set of drawings to be submitted to the Eskom Design Engineer 2 weeks after the contract award. Contractor to nominate and confirm all 3-pole structure pole lengths at specified pole positions before ordering the poles. Dressing must include the supply, transport to specific pole position and installation of complete hardware.

Note7: Phase conductor and earthwire already ordered by Eskom. Due to size and weight of Kingbird conductor, Contractor to ensure the necessary strength and size of Pilot wire for the purpose of stringing.

Note8: Contractor will supply all other hardware/material except/excluding phase conductors and earthwire conductor Eskom will provide. You must order according Bill of material (BOM)/volumes requirements and drawings.

Note9: Community unrest looking for business opportunity and employment (mitigation we have Community Liaising Officer & Project Steering Committee).

1.3 Interpretation and terminology

The following abbreviations are used in this Works Information:

Abbreviation	Meaning given to the abbreviation
SWP	Safe Work Procedures
DPSH	Dynamic Probe Super Heavy
AACSA	Anglo American Coal South Africa
LES	Line Engineering Services

2 Management and start up.

2.1 Management meetings

In addition to formal and informal communications between the Project Manager and the Contractor, frequent formal routine meetings are necessary throughout the duration of the contract.

All safety meetings shall be conducted in accordance with document: Safety, Health and Environmental (SHE) Specification for Relocate of 4x132kV Lines from the existing 132kV busbar to new adjacent busbar at Watershed substation
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Pre-Construction Kick-off Meeting

The first activity to take place before the Work begins is the pre-construction kick-off meeting between Employer/Project Manager and the Contractor.

More than one such meeting may be necessary when the work is to be performed in several locations (e.g. design work in an engineering office prior to commencement of construction). The meeting introduces all

personnel involved in the Work from both organisations, addresses details necessary to commence the work, establishes and records the ground rules or conditions under which the work will take place, and sets a co-operative professional tone for the future working relationship.

The pre-construction kick-off meeting takes place prior to the Contractor mobilising to site.

Regular Progress Review Meetings

Progress review meetings are held on a regular scheduled basis, usually once in a month. Due to the nature of the project and the time constraints, the progress meetings will be more frequent and will most likely take place on a weekly basis. These meetings provide a forum for review of the Contractor's operations, assessment of progress and schedule, discussion and resolution of problems facing the Contractor and the Project Manager, and coordination of the activities of all parties concerned. In general, these meetings require a minimum participation to achieve the maximum positive results.

Minutes of Meeting

The Project Manager prepares minutes of all meetings addressed above.

The minutes of the meeting contain all significant aspects of the meeting recorded together with any actions placed, and is presented to the Contractor for signature as soon as practicable after the meeting.

After the Contractor has signed the Minutes of the Meeting, they are officially published.

Regular meetings of a general nature may be convened and chaired by the *Project Manager* as follows:

Title and purpose	Approximate time & interval	Location	Attendance by:
Risk register and compensation events	Weekly	Eskom Offices / Contractors Campsite	*Employer*, *Contractor and* other representatives as required
Overall contract progress and feedback	Weekly	Contractors Campsite	*Employer*, *Contractor*, *Supervisor*, and other representatives as required.

Meetings of a specialist nature may be convened as specified elsewhere in this Works Information or if not so specified by persons and at times and locations to suit the Parties, the nature and the progress of the *works*. Records of these meetings shall be submitted to the *Project Manager* by the person convening the meeting within five days of the meeting.

All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the *conditions of contract* to carry out such actions or instructions.

2.2 Documentation control

Summary of the documentation required from the contractor before and during construction which includes the following:

Document	Before	During
Programme	x	x
Resource Schedule	x	
Health & Safety Plan	x	
Quality Assurance Plan	x	

Environmental Management Plan	x	
Safe Work Procedures	x	
Forecast Rate of Payment	x	
Materials Inventory	x	x
Drawing Register	x	
Progress Schedule		x
Application for Payment		x
Soil Type Nominations		x
Concrete Batching Note		x
Cube Test Reports		x
Stringing Records		x
Tower Resistance Readings		x
Weather Data	x	x
Monthly Safety Report		x
Inventory list of all materials	x	x
Foundation photographs		x
Weather data		x

2.3 Health and safety risk management

The Contractor shall at all times comply with the health and safety requirements prescribed by law as they may apply to the works. The Contractor shall comply with the health and safety requirements contained in in the following documents as a minimum:

- The OHS Act 85/1993, its Regulations and incorporated SANS Codes
- Eskom SHEQ Policy:32-727
- Eskom's Covid 19 Health and Safety Policy Statement: 240-155373927
- Health and Safety Specification: TPD PDPMAN-SP 84
- Working at Heights Standard: 32-418
- Life Saving Rules: 240-62196227
- Eskom Vehicle Safety Specification:32-345
- Eskom Substance Abuse, 32-37
- Eskom Occupational Health & Safety Incident Management Procedure, 32-95
- Eskom Employees Right of refusal to Work in an Unsafe Situation Procedure 240-43848327.
- Operating Regulations for High Voltage Systems Procedure: 32-846

The authorization procedure for a permit to work shall be followed by the Contractor before commencing work on site. It is the Contractor's responsibility to ensure that a permit to work is obtained before access to the work can be given. It is the Contractor's responsibility to also ensure that the safety file has been audited by the Health and Safety Representatives before establishing site.

The Contractor must be in possession of current First Level 2 certificate. The Contractor's trucks must have a valid and current crane test certificate with the truck driver and crane operator's certificate. All tools must have valid and current test certificates, which must be produced two weeks before site establishment.

The Contractor will only leave site once a written site instruction has been issued by an Eskom site representative. Working hours will be from 08h00 to 16h00 during week days (as per outages) ,weekend work to be carried out only on request by Eskom.

The Contractor is to have an Eskom certified and authorized person available in each area where work is being performed at all times in accordance within accordance with the Eskom ORHVS Procedure 32-846.

A detailed risk assessment with sufficient control measures must be done PRIOR commencement of any task on site by a competent risk assessor. The Contractor Supervisor shall ensure strict adherence to the

Safe Work Procedures and the identified control measures. If needed the Contractor is to visit construction site at own cost before work commences to familiarise him/herself with the scope of work and develop a baseline risk assessment.

Before any excavation is commenced, it will be the responsibility of the Contractor to ascertain from Responsible Eskom site Representative Site Supervisor the position of any existing services on site. Once these are indicated to the contractor they shall be deemed "known". Any costs incurred for repairs to any "known" services shall be for the contractor's account.

The Contractor's attention is drawn to the fact that other contractors will be on site hence access and interfacing with them will be required. The Contractor shall allow safe access for other contractors and Eskom personnel when required. Where multiple contractors are working close by, contractors will be required conduct a joint risk assessment and communicate shared risks to their respective contractors.

The Contractor shall establish a refuse control system. All waste is to be collected and disposed of as required by Eskom and the local authority.

The Contractor shall make his own arrangements for the provision of accommodation for his employees.

2.4 Environmental constraints and management

The *Contractor* shall comply with the environmental criteria and constraints by having an environmental management system in place that will ensure that the requirements of the environmental management plan are effectively implemented and managed. Adherence will be in-line with the following:

- Safety, Health, Environment & Quality (SHEQ) Policy 32-727
- Environmental Authorisation, DEA Reference: 14/12/16/3/3/1/1094
- No General Authorisation or Water use Licence
- EMP for Watershed Substation dated August 2013
- Construction EMPR for the Proposed Rerouting of 132kV lines and associated infracture at the Watershed Substation near Lichtenburg, North west province
- Environmental Requirements for Contractors and /or Suppliers (PDPMAN-ST-37)
- PDP ISO14001: 2015 - Environmental Management System Manual (PDPMAN-MN-03
- Waste Management Plan (TDPMAN-PN-53)

The *Contractor* is required to ensure that all goods, services or works supplied in terms of the tender/contract/order conform to all applicable environmental legislation, Eskom requirements, EA and Construction Environmental Management Programme.

The *Contractor* is reminded that adherence to Maintenance Strategy for Vegetation (240-89383921) and TRMSCAAC 5.2– "Transmission Line Towers and Line Construction" is mandatory. Deviations from these policies, standards and specifications will be regarded as a Defect.

THE CONTRACTOR'S ENVIRONMENTAL OFFICER (EO)

The contractor shall give and provide all necessary environmental superintendence during the execution of the works. The contractor shall appoint a dedicated person as Environmental Officer (EO), approved of in writing by the Project Manager (which approval may at any time be withdrawn). The EO shall be on the works at all times. The employer shall be at liberty to object to and require the contractor to remove from the works any person who in the Project Manager's opinion, misconducts himself or is incompetent in the proper performance of his duties.

The EO's sole responsibility will be to ensure compliance to the Construction EMPr, environmental legislation as well as relevant procedures and monitor and adjust environmental quality of work performed on the site. . The EO is to carry out or relay any requirements that may be deemed necessary by the ECO, to ensure that such activities are undertaken and to report back to the ECO accordingly.

The EO is responsible to manage all affected landowner's concerns, complaints and special requirements with the assistance of the ECO where necessary.

The EO is to ensure that sensitive areas are demarcated within or alongside the construction areas i.e. sites identified in the EMPr and EA. All personnel are to be informed of such sites and the reason the site is demarcated.

Site environmental management will be an item on the agenda for site meetings, and the EO and ECO are required to attend these meetings.

The contractor shall submit the name and CV of the EO, as well as an environmental plan detailing roles and responsibilities, to the Project Manager prior to construction of the works. This will be for the Project Manager's acceptance and no work can commence on site without the Project Manager's acceptance.

ENVIRONMENTAL CONTROL OFFICER (ECO)

It is the responsibility of the ECO to monitor the implementation of the EMPr and EA.

ENVIRONMENTAL MANAGEMENT

Camps Access

The Camp Site location has been identified on the Watershed substation premises. The laydown may require some clearing and maintenance.

Before construction can begin, the Contractor shall submit an Environmental Site Establishment and Layout Method statement for approval. This shall include plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place.

No occupation of the camp site will commence before all requirements as per the EMP e.g. boundary fence, portable water, ablution and sewage facilities and waste management are in place and approved by the ECO.

The layout of the camp site should be that it facilitates a circular traffic route that eliminates the need to reverse when loading and off-loading.

Under no circumstances may solid waste be buried or burned on site unless a suitable incinerator is available.

Servitude Access

No work will commence on any property before the Access Plan is negotiated and accepted by EA, the EO and ECO.

No work will commence on any property before gates at all access points are installed and agreed upon with EA.

Reporting

It is required that the EO make all documents, weekly reports; monthly reports; complaints register; environmental incident register (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken available to the ECO upon request.

Environmental Awareness Training

The contractor and sub-contractor's staff are to receive Environmental Awareness Training before commencement of the construction phase of works. The training will be presented by the EO with the assistance of the ECO. An attendance register is to be maintained. Any new staff must receive the Environmental Awareness Training.

The training should include the following, but not limited to:

- Basic environmental awareness – ecology, erosion, fire, pollution
- Environmental procedures
- Identification of protected fauna, flora and procedures to follow when encountering these
- Identification of archaeological sites, grave sites etc. and procedures to follow when encountering these.

Fires

No open fires will be permitted on site under any circumstances. The Contractor shall have fire-fighting equipment available on all vehicles working in the site, especially during the fire season.

Bush Clearing

The *Contractor* will be required to carry out the bush clearing work in two phases:

- **Phase 1**

  During the construction of the works, the clearing of an **8m wide strip** along the centreline of the servitude to allow access for all construction vehicles to tower sites, and to provide unobstructed clearances to pilot wires and conductors during stringing operations.

- **Phase 2**

  Clearing of all trees and brush along the servitude as specified, to be completed two months prior to the completion date.

Rehabilitation of Damage caused during Construction

The *Contractor* must take cognisance of the EA, Environmental Management Programme and TRMSCAAC 5.2 in the rehabilitation of damage caused during construction.

The *Contractor* is to start with rehabilitation of works and any damage caused to the environment after the stringing of the whole line to the satisfaction of the *Supervisor* and landowner.

Existing mine roads and tracks are to be maintained throughout the contract and left in at least as good condition as was found before construction commenced. The *Contractor* and *Supervisor* are to agree, using photographic evidence if necessary, as to the state of such roads and tracks before construction commences.

New access roads are to be closed on completion unless otherwise instructed. The *Supervisor* may instruct the *Contractor* to install water erosion control berms and other methods upon closure.

Tower sites are to be rehabilitated to the satisfaction of the mine and *Supervisor*. In certain circumstances re-vegetation, mulching and erosion control measures etc. may be called for.

Restrictions Applicable to the *Contractor*

All personnel are to be made fully aware of the proximity of adjacent live lines and the presence of induction.

2.5 Quality assurance requirements

The attached Specification – Supplier Contract Quality Requirements Specification - QM 58 shall apply. The requirements of this Specification are contractual.

The following is also applicable:

- Tender & Contract Quality requirements for QM58 and quality requirements for ISO 9001 standard – Form A
- Quality Assessment Criteria 3

NOTE: Supplier is to submit the following information/documentation for evaluation purposes and may include any additional information as proposed by the supplier for the Project Scope of Works.

1.	**Interface with Quality System**	State if no system in place, what SANS and international standards are complied with.
2.	**Communication**	As per contract – project organogram and responsibility matrix.
3.	**Suppliers**	How monitoring will be carried out.
4.	**Quality Planning**	Submission and approval of product inspection and test plans.
5.	**Specifications/Drawings**	As per contract requirements and "off the shelf" items.
6.	**Special Processes**	What special controls are required for special processes – foundations, concrete, welding, etc.
7.	**Quality Records**	This should state your method of control of records – your procedure.
8.	**Management Representative**	Name your management representative and quality site/manufacturing representatives.
9.	**Document Submissions**	What docs will you submit on completion of contract – Contract Quality Plan, ITP's, Test Certificates, Release Notes, Inspection Notification Forms where applicable
10.	**Post Award Quality Programme**	As per contract e.g. Statutory Requirements, Inspection and Test Plans as per supplier's system.

According to the Quality Inspection and test Plan, witnessing of the first installation of each tower type is necessary and must be witnessed by an Eskom design engineer. The QITP has hold points for the first off assembly and erection of each tower type respectively. Distribution lines department must be informed at least one week in advance to these activities and must be present during these activities.

It is required that the Eskom Engineering hold points, witness points and surveillance points be incorporated into the contractors test and inspection plan as indicated in Appendix H of the Line Specification for all the relevant line construction activities. The contractor must note the order of construction activities and identified holding points for Distribution line department staff to witness first-off activities.

2.6 Programming constraints

Programme and Resources

The Construction programme is to be submitted for acceptance in accordance with Core Clause 31 in the Engineering and Construction Contract, in terms of which resources to complete each activity must be clearly identified. The programme is to be submitted within two weeks of the *starting date*. It is suggested that Gantt or bar chart formats be used for project planning, while progress graphs/schedules be submitted at weekly meetings to monitor progress.

The programme is to include all the requirements of clause 31.2 of the Engineering and Construction Contract. The tenders will be evaluated with due consideration to the resources (both personnel and

equipment) committed to the project as indicated in the tender programme. All proposed Subcontractors and Suppliers are to be identified at tender stage and will be included in the evaluation process. The programme must include the following:

- safe work procedures which identifies the Equipment and other resources which the Contractor plans to use
- planned completion of each section of the works (as per sectional completion deadlines)
- the order and timing of the operations which the Contractor plans to do in order to Provide the Works
- provisions for:
  - float
  - time risk allowances
  - health & safety and environmental requirements
- The dates when, in order to provide the Works in accordance with his programme, the Contractor will need: Plant and Materials and other things to be provided by the Employer.

The *Contractor* revises the programme as required in accordance with Core Clause 32. Each time the programme is revised, the *Contractor* is to submit a revised Forecast Rate of Payment / Invoicing

Stringing programmes and separate Power Line Crossing Schedules are to be submitted to the *Project Manager* 40 days prior to the first planned crossing to allow for the lead times required. The Line Crossing Schedule must be aligned with the Construction Programme. Planning and co-ordination for the application of the SANRAL, farmers and Transnet crossing permits are to be indicated on the schedule and managed timeously as per the crossing schedule requirements.

Crossings will affect the construction times of some sections of the line. A detailed sequence of events has to be discussed with the contractor, project team and all the affected parties. Crossings will affect the construction times of some sections of the line. The contractor is requested to submit a presentation/visual schematic showing the sequence of events prior to the execution of each tie-in for review by the project team.

Progress

The *Contractor* monitors progress weekly in conjunction with the *Supervisor.* A weekly progress report is to be submitted to the *Project Manager* every Monday.

The *Contractor* submits his record of Work Done to Date (verified by the *Supervisor*) to the *Project Manager* on the 25th of each month. (The application is to have the same format as the relevant Bill of Quantities or Activity Schedule, and show present, previous and total quantities to date.)

2.7 *Contractor*'s management, supervision and key people

The *Contractor* provides experienced and competent personnel in the following key positions:

- Project Manager/s
- Site Manager/s
- Qualified Rigger/s
- Stringing Supervisor/s
- Foundation Supervisor/s
- Environmental Control Officer/s
- Quality Control Officer/s
- Safety Officer/s
- GCC Engineer/s

The contractor to ensure that all individuals appointed for the above key positions are registered with the relevant councils (e.g. SACPCMP & ECSA).

Supervision

The *Supervisor* will monitor and co-ordinate all construction activities in accordance with the Contract and relevant specifications.

The *Supervisor* records cube test results and other activities from inspections as required.

The *Supervisor* verifies the *Contractor*'s soil/rock nomination at each foundation position, before submission to the *Project Manager.*

The *Supervisor* will arrange and co-ordinate access to Eskom premises, the de-energisation of overhead power-lines (where possible) and substation electrical fences, crossings of national highways, railway lines and telecommunication lines, in accordance with TRMSCAAC 5.2.

NOTE: This is not the "Supervisor" as contemplated in the OHS Act Construction Regulation 6.

2.8 Invoicing and payment

Within one week of receiving a payment certificate from the *Project Manager* in terms of core clause 51.1, the *Contractor* provides the *Employer* with a tax invoice showing the amount due for payment equal to that stated in the *Project Manager's* payment certificate.

The *Contractor* shall address the tax invoice to Eskom Holdings SOC Ltd and include on each invoice the following information:

- Name and address of the *Contractor* and the *Project Manager;*
- The contract number and title;
- *Contractor*'s VAT registration number;
- The *Employer*'s VAT registration number 4740101508;
- Description of service provided for each item invoiced based on the Price List;
- Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT;
- (add other as required)

The contractor must submit an FRI within 2 weeks of contract award.

Details on how to submit invoices and additional information:

• Ensure that the Eskom order number is clearly indicated on your invoice together with the line number on the order you are billing for.
• All Electronic invoices must be sent in PDF format only.
• Each PDF file should contain one invoice; or one debit note; or one credit note only as Eskom's SAP system does not support more than one PDF being linked into workflow at a time.
• Your E-mail may contain more than one PDF file (e.g. 2 invoices on 2 separate PDF files in one e-mail)
- Send all invoices in PDF to Accounts Payable Department: Invoiceseskomlocal@eskom.co.za and a copy to the Project Manager
• If there is Cost Price Adjustment (CPA) on your invoice we recommend that you issue a separate invoice for CPA so that if there are any issues on the CPA the rest of the invoice can be paid while resolving the CPA issues.
• Your company can request a park invoice report from the Finance Shared Services (FSS) contact center which can then be followed up and corrected. You are welcome to forward the details of invoices corrected to the FSS contact center.

2.9 Insurance provided by the *Employer*

As stated for in the Employer`s Annual Construction All Risk Insurance Policy (Format A), available on request from Eskom Group Insurance.

2.10 Contract change management

Not Applicable.

2.11 Provision of bonds and guarantees

The form in which a bond or guarantee required by the *conditions of contract* (if any) is to be provided by the *Contractor* is given in Part 1 Agreements and Contract Data, document C1.3, Sureties.

The *Employer* may withhold payment of amounts due to the *Contractor* until the bond or guarantee required in terms of this contract has been received and accepted by the person notified to the *Contractor* by the *Project Manager* to receive and accept such bond or guarantee. Such withholding of payment due to the *Contractor* does not affect the *Employer*'s right to termination stated in this contract.

2.12 Records of Defined Cost, payments & assessments of compensation events to be kept by the *Contractor*

A site diary is to be kept by the *Contractor* in which all events are recorded. Records of events that could give rise to Compensation Events are to be kept up to date for inspection by the *Supervisor* and/or *Project Manager* at all times.

The *Contractor* keeps records of the following and submits copies of these records to the *Supervisor* weekly:

- Number of personnel by category and/or trade on site on a daily basis.
- Detailed list of equipment by category on site on a daily basis with an indication of its working condition i.e. working order, under repair, working but standing idle etc.
- Weather conditions as agreed with the Supervisor on a daily basis.

2.13 Training workshops and technology transfer

Not applicable to this contract.

3 Engineering and the *Contractor*'s design

3.1 *Employer*'s design

The *Contractor* shall comply with the design criteria stated in the following documents:

- Volume-1, 2, 3, 4 & 5 for Watershed 132kV line diversion

3.2 Parts of the *works* which the *Contractor* is to design

The *Contractor* to produce complete designs and working drawings for the foundations, stubs, cleats and earthing. All designs and drawings must be signed off by a registered professional civil/structural engineer and submitted to Eskom for acceptance prior to construction.

The *Contractor* to take samples of minimum of 2% of the line and send to an approved scientific soil sampling lab for evaluation of specific geotechnical properties.

Prior to installing counterpoise, soil resistivity tests should be taken to determine a suitable system for additional earthing. This will require approval from the *Project Manager*.

All foundations shall be designed and constructed in accordance with Eskom Specification TRMSCAAC Revision 5.2 and SANS 54199:2017.

3.3 Procedure for submission and acceptance of *Contractor*'s design

Where foundations or hardware are to be designed or supplied by the Contractor, a Drawing Register for all foundation designs and hardware assemblies is to be compiled and submitted for acceptance prior to installation.

A Soil Nominations Register is updated by the Contractor in conjunction with the Supervisor and submitted to the Project Manager. The Supervisor verifies the nomination of each foundation excavation.

During stringing operations, the Contractor keeps a suitably detailed Stringing Record indicating the location of drums, joints, and duration of stringing. Clearances over railways, roads, power lines, telephone lines etc. are to be measured and submitted to the Project Manager, when sagging of that section is complete.

Tower footing earthing measurements are to be done before the foundation caps have been cast so that mitigation measures can be implemented. The results must be submitted to the project manager for review. The contractor to provide a specification for the equipment that will be used for testing before starting measurements. Distribution line department must be approached via the project manager to review the suitability of equipment and measurement methodology.

Contractor to utilise back-staying method that incorporates block and sledge methodology.

3.4 Other requirements of the *Contractor*'s design

Contractor to inform Project Manager accordingly prior to commencement or change to Employers design.

3.5 Use of *Contractor*'s design

Upon acceptance of the *Contractor*'s foundation designs, copyright will pass to the *Employer*. The provision of geotechnical or other foundation related information by the *Employer* does not relieve the *Contractor* of the responsibility to investigate the soil/rock conditions, design, test and install suitable foundation systems.

3.6 Design of Equipment

Contractor to inform Project Manager prior to commencement of any activity requiring temporary works.

When stringing over existing power-lines, telecommunication lines, railway lines and roads the *Contractor* is to provide and erect suitable H-pole arrangement and nets as required by the safety regulations. Contractor to inform Project Manager of alternative construction methods or techniques that is suitable.

3.7 Equipment required to be included in the *works*

It is the responsibility of the contractor to verify equipment requirements and bring it to the attention of the client before tender award or as the line is pegged if special equipment is required.

The *Contractor* shall submit a list of all vehicles, machinery and equipment.

3.8 As-built drawings, operating manuals and maintenance schedules

On completion of the construction, it is required to compile Final As - built information to be provided as per Eskom requirements, Document 240-72252925. This must include the Aerial Laser Survey.

Two copies of Construction Records are to be compiled by the Contractor at the end of the project in a hard copy format. In addition the Contractor is to supply a Flash Disk of the records to the Project Manager.

The *Project Manager* submits relevant information as detailed in the standard to the *Contractor* within two weeks of Take-over. The *Contractor* compiles the document and submits copies to the *Employer* within four weeks after receipt of the relevant information.

A spreadsheet detailing the required information that needs to be populated during construction is also provided.

4 Procurement

4.1 People

4.1.1 Minimum requirements of people employed on the Site

People employed on site shall have all relevant documents as required by law for employment within the country, i.e. relevant work permits, security clearances and Identifications.

4.1.2 BBBEE and preferencing scheme

The required B-BBEE Recognition Level is between level 1 to 4... The Contractor is expected to maintain and improve on the BBBEE status during the contract period. In the event that the contractor downgrades on the BBBEE status during the contract period, the contractor, with SD&L will be expected to rectify the matter within time frames that will be agreed upon.

4.1.3 Supplier Development and Localisation

The *Contractor* complies with and fulfils the *Contractor's* obligations in respect of the Supplier Development and Localisation in accordance with and as provided for in the *Contractor*'s SD&L Compliance Schedule stated below:

132KV Line Watershed

SiteTABLE 1: SUPPLIER DEVELOPMENT AND LOCALISATION COMPLIANCE MATRIX FOR SUPPLIERS AND CONTRACTOR				
Criteria	**Weight (%)**	**Total Target (%)**	**Proposed Target (%)**	**Total Overall Weighted Score**
Local Content to South Africa	25%	100%	0%	0.00%
Local Content to Site (EME/QSE 1 and 2)	50%	15%	0%	0.00%
Skills development	25%			0.00%
Total	100%			0.00%
	Total Supplier Development and Localisation Score			**0.00%**

Skills development

Tenderers will be encouraged to propose skills development initiatives in terms of the skills required for this project as indicated in the table below:

TABLE 2: SKILLS DEVELOPMENT COMPLIANCE MATRIX

Skill Type (Occupation)	OFO Occupational Group	Weight (%)	Target Number of Persons to be Trained (Local to South Africa)	Proposed Number of Persons to be Trained (Local to South Africa)	Target Number of Persons to be Trained (Local to Site)	Proposed Number of Persons to be Trained (Local to Site)	Total Weighted Score
Assembler		33.00%	1	0	1	0	0.00%
Steel erectors		33.00%	0	0	1	0	0.00%
Safety and Health		34.00%	0	0	1	0	0.00%
	Total	**100.00%**	**1**	**0**	**3**	**0**	**0.00%**

The *Contractor* shall keep accurate records and provide the *Project Manager* with reports on the *Contractor*'s actual delivery against the above stated SD&L criteria.
The *Contractor*'s failure to comply with his SD&L obligations constitutes substantial failure on the part of the *Contractor* to comply with his obligations under this contract.

NB: The supplier shall submit SD&L quarterly reports to the project manager.

Contractor is required to attend monthly PSC meetings established by Watershed strengthening project. This will allow the contractor to have engagement will local communities so as to address issues pertaining to the project and to avoid disruptions during construction.

4.1.4 Preferred subcontractors

Contractor to submit the list of subcontractors in line with PPPFA, and such list is expected to include some from the local community where possible

4.1.5 Subcontract documentation, and assessment of subcontract tenders

Contractor to provide sub-contractor evaluation assessment scorecard for approval prior to acceptance.
Contractor to ensure that sub-contractors comply to Eskom's contract conditions as per principal contractor.

4.1.6 Limitations on subcontracting

A Contractor shall subcontract in line with the PPPFA requlations, where it is stated and expected that a minimum of thirty percent shall be subcontracted to designated companies which are EME and QSE's.

4.2 Plant and Materials

4.2.1 Quality

Compliance to the Supplier Quality Management: Specification, QM-58, is required.

4.2.2 Plant & Materials provided "free issue" by the *Employer*

The Employer will supply and deliver the following to the Contractor's site office:

- Phase Conductor
- Earthwire
- Composite insulators
- All other Plant and Material are to be provided by the *Contractor*

- The Contractor is to take delivery thereof, check for completeness, provide suitable and secure storage facilities and implement an efficient material management system.

- The Project Manager supplies the Contractor with a Materials Schedule indicating the total material requirement for the project. The Contractor verifies and updates the inventory for submission at monthly meetings.
- The Contractor keeps record of all material delivered and kept on site
- Upon delivery of material, the Contractor verifies each material consignment in terms of quantity and quality. If such verification cannot be performed upon delivery, the Contractor indicates on the delivery note the date by which the inspection will be made. This date is not more than seven days after receipt of the material.
- The Contractor records the results of the inspection on the delivery note, makes two copies of each delivery note, and submits the original plus one copy to the Supervisor. The Contractor submits detailed material schedule to the Project Manager on a monthly basis.
- At the end of the project, material to be returned to stores is quantified in conjunction with the Supervisor and a detailed schedule submitted to the Project Manager.
- Adequate provisions are to be made for the protection and safe transport of composite insulators and all other material to the work site and during erection. Strict adherence to the "guide to the storing, transporting and installation of composite insulators" is mandatory. Climbing down or over composite insulators is strictly forbidden – ladders and cradles must be used.

4.2.3 *Contractor*'s procurement of Plant and Materials

The *Contractor* shall comply to document Supplier Quality Management: Specification – QM-58 during fabrication, supply and delivery of foundation steelwork, reinforcing, earthing devices and all other foundation related material.

Fabrication, galvanising and delivery to site of towers complete with leg and body extensions, anti-climbing devices and tower shackles etc. in accordance with TRMSCAAC1 Rev5.2.

Supply and delivery of tower labels in accordance with 240-120804300: Standard for the labelling of Electrical Equipment within Eskom Wires Networks. The grid & distribution (North west) will advise on the preferred material within the materials approved by Eskom. All tower labels shall be made of a material approved by Eskom.

Supply, delivery and installation of additional earthing material to towers exceeding maximum earth resistance requirements.

Contractor to Supply and delivery of Bill of material and installation below:

Watershed 132kV lines diversion						
1.1 Structure - 132kV 3-pole intermediate structure						
ITEM	**DESCRIPTION**	**DRW. NO**	**SAP**	**UNIT**	**QTY**	**TOTAL**
Poles						
1	132kV 3 pole intermediate structure (18m,20m,18m)	D-DT-7617	Non-stock	set	1	2
2	132kV 3 pole intermediate structure (16m,18m,16m)	D-DT-7617	Non-stock	set	1	
Intermediate Insulator Assembly as per D-DT 7321						
2	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	6	12
3	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	3	6
4	Clamp, Trunnion L/Post Insul 25.5-38 D7010	D-DT-7010	0165511	ea	3	6
Intermediate Earth Wire Assembly (Non-Insulated) as per D-DT-7331 (for						

Wolf)						
1	Clamp, S/Wire (similar to D-DT-7003,but for Wolf		H32413	ea	1	2
2	Armour Rod, Hf Cond, 18.81/19.86 Al	D-DT-7034	0168765	ea	1	2
3	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	2	4
1.2 Structure - 132kV strain monopole self-support						
ITEM	**DESCRIPTION**	**DRW. NO**	**SAP**	**UNIT**	**QTY**	**TOTAL**
Poles						
1	132kV 02 deg strain 18m monopole self-support	strsce0218 kw110	Non-stock	ea	2	10
2	132kV 45 deg strain 18m monopole self-support	strsce4518 kw110	Non-stock	ea	5	
3	132kV 90 deg strain 18m monopole self-support	strsce9018 kw110	Non-stock	ea	2	
4	132kV 35 deg strain (16m,18m, 16m) 3pole self-support	str3psce35 18kw158	Non-stock	set	1	
Strain Insulator Assembly as per D-DT 7311						
1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	6	60
2	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	6	60
3	Clevis-Ball 16mm IEC 80x22 120kN	D-DT-6059	0222125	ea	3	30
4	Socket-Tongue 16mm 120kN	D-DT-6061	0010270	ea	6	60
5	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	6	60
6	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	6	60
7	BALL-EYE OVAL 16mm 120kN	D-DT-7008	0010258	ea	6	60
Jumper Insulator Assembly as per D-DT 7321						
2	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	3	30
3	Clamp,Susp Pivoted 25.0-40.0	D-DT-7009	0402629	ea	3	30
4	Shackle,Twisted Bolt Type 120kN	D-DT-7019	0163408	ea	3	30
Non-insulated Earth Wire Assemblies(strain) as per D-DT-7323/2-NT/697						
1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	3	30
2	Clamp,C D/End Assy Wolf 18.13 ACSR	D-DT-7000	0402499	ea	2	20
3	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	2	20
4	Turnbuckle, Eye Tongue 120kN	D-DT-7007	164300	ea	1	10
1.3 Structure - 132kV 3 pole stayed structure						
ITEM	**DESCRIPTION**	**DRW. NO**	**SAP**	**UNIT**	**QTY**	**TOTAL**
1	132kV 3 pole stayed strain (16m,18m,16m)	D-DT-7618	Non-Stock	set	2	3
2	132kV 3 pole stayed strain (20m,22m,20m)	D-DT-7618	Non-Stock	set	1	

Strain insulator Assembly as per D-DT7311						
1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	6	18
2	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	3	9
3	Clevis-Ball 16mm IEC 80x22 120kN	D-DT-6059	0222125	ea	6	18
5	Socket-Tongue 16mm 120kN	D-DT-6061	0010270	ea	6	18
6	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	6	18
7	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	6	18
8	Ball-Eye Oval 16mm 120kN	D-DT-7008	0010258	ea	6	18
# Please Note: A typical structure will have 6 vibration dampers per span, but the number of dampers depends on span lengths of specific project line design						
Jumper Insulator Assembly as per D-DT 7321						
1	Insul, Line Post 132kV 5.3kN D/E 31C	D-DT-7013	0190380	ea	3	9
2	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	3	9
3	Clamp,Susp Pivoted 25.0-40.0	D-DT-7009	0402629	ea	3	9
4	Shackle,Twisted Bolt Type 120kN	D-DT-7019	0163408	ea	3	9
Non-insulated Earth Wire Assemblies(strain) as per D-DT-7323/2-NT/697						
1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	3	9
2	Clamp,C D/End Assy Wolf 18.13 ACSR	D-DT-7000	0402499	ea	2	6
3	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	2	6
4	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	1	3
# Please Note: A typical structure will have 2 vibration dampers per span, but the number of dampers depends on span lengths of specific project line design						
Adjustable M24 Stay Assembly (115kN) as per D-DT 7325						
1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	7	21
2	Thimble,St To Fit 14mm Dia. Wire	D-DT 3026	163399	ea	7	21
3	Guygrip D/E St To Fit 19/2.65 Steel Wire	D-DT 7035	402537	ea	14	42
4	Wire Strand,St 3X4.00 1100MPa	D-DT-7036	0185944	m	180	540
5	Stayrod 133kN 2400X24 Adjust	D-DT 7023	0163384	ea	17	51
6	Stay Plate 600X600X6	D-DT-3172	163420	ea	7	21
1.4 Miscellaneous Items						
ITEM	**DESCRIPTION**	**DRW. NO**	**SAP**	**UNIT**	**QTY**	**TOTAL**
1	Joint,M/Span Comp Kingbird 23.87	D-DT-7001	0165770	ea	9	6
2	Joint, M/Span Comp Wolf 18.13	D-DT-7001	0401816	ea	3	3
3	Insul, Shield Wire C+T 120kN	D-DT-7012	0167605	ea	1	2
1.5 Test Joints						
ITEM	**DESCRIPTION**	**DRW. NO**	**SAP**	**UNIT**	**QTY**	**TOTAL**
1	Cond,Acsr Kingbird 23.90D Ungrs	D-DT-3136	0400662	m	10	20
2	Joint,M/Span Comp Kingbird 23.87	D-DT-7001	0165770	ea	1	2

3	Cond, Acsr Wolf 18.13D Ungrs	D-DT-3136	0403037	m	10	20
4	Joint, M/Span Comp Wolf 18.13	D-DT-7001	0401816	ea	1	2
5	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	1	2
6	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	2	4
7	Clamp, Comp D/End Assy Wolf 18.13	D-DT-7000	0402499	ea	2	4

1.6 Material for 3 Point Star Earth Electrode as per 2-WT/763 (Structure Footing resistance results to be submitted to the Project Engineer/COW before earthing is done)

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
1	Cond, Cu Bare Str 7/1.63 Annealed 16mm SQ	D-DT-3139	0171336	m	40	600
2	Line Tap, TFR Brass/Tinned M12	D-DT-3048	0165566	ea	1	15
3	Lug, Crimp Cu 50 SQ x M14 fixing Hole (as per D-DT-3102 but with M14 fixing hole)	McWade	Non Stock	ea	1	15
4	Clamp, Earth Rod 16 RODPH/BRNZ	D-DT-3093	0165559	ea	4	60
5	Earth Rod Cu 1500x16D Threadless	D-DT-3091	0168669	ea	4	60
6	Set Screw, Hx Galv M12x40 Nut+Wash	D-DT-3082	0163642	ea	1	15
	The amount of the annealed copper conductor to be used for earthing will depend on the resistivity test at each pole: **$0 \leq \rho \leq 300$, Cu = 20m. $300 \leq \rho \leq 600$, Cu = 40m. $600 \leq \rho \leq 900$, cu = 60m, $900 \leq \rho \leq 1500$, Cu = 80m**					

Contractor is to order the towers immediately upon contract award so as to ensure delivery of the towers when required. The shortest tower lead times are critical for completion of this works.

4.2.4 Spares and consumables

Not applicable

4.3 Tests and inspections before delivery

Compliance to the Supplier Quality Management: Specification, QM-58, is required. Quality and Inspection Test Plans to be agreed upon and signed off prior to construction.

The *Contractor* is to provide prototype towers in accordance with TRMSCAAC5.2 upon request by the *Project Manager*.

4.4 Marking Plant and Materials outside the Working Areas

Not applicable

4.5 *Contractor*'s Equipment (including temporary works).

Compliance to the Supplier Quality Management: Specification, QM-58, is required.

All the crossings are deemed to possibly utilize wooden pole support structures, crossrope structure supporting net, cranes holding up wooden frames or bull horns fitted on cranes. It is not envisioned that scaffolding will be necessary as a support structure of the construction of any crossing. Outages to cross power lines are recommended, however if it is not possible, the contractor will need to cater for live-line crossing methods.

4.6 Cataloguing requirements by the *Contractor*

Not applicable

5 Construction

5.1 Temporary works, Site services & construction constraints

5.1.1 *Employer*'s Site entry and security control, permits, and Site regulations

Entry to the site is governed by the Grid's Engineering Assistant and the Contractor shall adhere to all regulations given. All employees are to sign the Workers declaration on entering and leaving the working area. The Contractor is to have an Eskom certified and authorized ORHVS person available on site at all times in accordance with ORHVS Procedure 32-846.

The authorized ORHVS person is to have a valid first aid level 2 certificate. The authorization procedure for a permit to work shall be done before the Contractor commences work on site. It is the Contractor's responsibility to ensure that the authorization procedure for a permit to work is obtained before access to the work can be given. To arrange for an interview for authorization. The Contractor will be required to have an Eskom certified and authorized ORHVS person available in each area where work is being performed.

Relocate of 4x132kV Lines from the existing 132kV busbar to new adjacent busbar at Watershed substation falls within the boundaries of Eskom Watershed MTS substation and surrounding farmers. Eskom Watershed MTS substation and surrounding farmers will grant access to the works however this must be planned and arranged in advance and accepted by the Mine. Contractor is only authorised for access within the relevant servitude as per the OHS Act.

The *Contractor* shall arrange his own site access control and permits once established on site. Lighting and cameras for the lay down area should be arranged by the contractor. Alcohol testing is required daily on all personal. All personal need to have valid medical certificates.

The *Contractor* shall negotiate with landowners for the erection of any construction camp(s) and accommodation for his personnel, and ensuring compliance with all by-laws and requirements of the relevant authorities. All necessary services - water, electricity, sewerage, toilet facilities, telephones, etc. are to be provided by the *Contractor* to suit his needs.

All evidence of construction camp(s), batching plants, etc. are to be removed upon completion, and such areas rehabilitated to the satisfaction of the landowner and the *Supervisor*.

The *Contractor* shall provide sanitary amenities, first aid and firefighting facilities as required by the Occupational Health and Safety Act.

5.1.2 Restrictions to access on Site, roads, walkways and barricades

Access on site is restricted to the area in which the Contractor is working and which has been barricaded. Strictly no movement outside the barricaded working area unless escorted by authorized HV Plant personnel. The majority of the work is to be performed in the live HV Yard and the contractor will take all necessary precautions and work in conjunction with Eskom personnel.

The *Contractor* undertakes demarcation, construction and rehabilitation of all access roads, construction areas, tower sites etc., in accordance with TRMSCAAC5.2 and the Environmental Management Plan. Wherever possible the *Contractor* is to make use of existing access roads tracks to and in existing adjacent servitudes.

The *Contractor* allows for the implementation of procedures contained in the EMP. Deviation from these procedures resulting in damage to the environment or property will be regarded as a defect.

Access will not necessarily be continuous along the servitude. All access routes are to be marked and constructed as agreed by the *Contractor* and the *Supervisor*.

Installation of servitude gates will be in accordance with TRMSCAAC5.2 as required by the *Supervisor*. Where gates are required within the servitude, these are to be installed on the centre line to facilitate stringing, or as directed by the *Supervisor*. Wherever possible, existing servitude gates on adjacent servitudes are to be used.

The *Contractor* performs bush clearing along the servitude and at tower sites as required for access and construction purposes and/or as instructed by the *Supervisor.* Bush clearing is to be in accordance with Document 240-70172585, Vegetation Management and Maintenance within Eskom Land, Servitudes and Rights of Way, TRMSCAAC5.2 – "Transmission Line Towers and Line Construction" and the Environmental Management Plan.

Access during dismantling of existing towers will be made possible by AACSA after they have declared it safe to do so.

There should be clear separation between light vehicles (LDVs), Heavy Vehicle (HMVs) and Pedestrians at the campsite. Dedicated walkways should be made available for pedestrians. Parking and roads in lay down area should be dedicated for HMVs and LDVs respectively.

5.1.3 People restrictions on Site; hours of work, conduct and records

The Contractor is to supply Eskom with Police clearance for all the employees on site before Work commences. The normal working hours shall be from 07:30 am to 04:30 pm. Any work done outside this duration must be arranged through the senior HV Plant supervisor.
The maximum speed limit on site is 40 km/h.

The contractor must keep records of his people on Site, including those of Subcontractors which the *Project Manager* or *Supervisor* have access to at any time. These records may be needed when assessing compensation events.

Working hours should be within BCEA maximum allowable hours.
Sunday labour requires permission and has to be submitted in advance for approval.
Should any work take place after daylight hours, special permission and supervision is required.

5.1.4 Health and safety facilities on Site

There are no Toilet facilities available on site. Contractor to provide his own toilet and dining facilities in accordance with the TPD Health and Safety Specification. Refer to Clause 24 -***Contractor's Site Facilities*** in the Health and Safety Specification. No work on site will be allowed to commence before the toilet facilities are available on site.

5.1.5 Environmental controls, fauna & flora, dealing with objects of historical interest

Contractor to comply with the Construction EMP. The Contractor shall control his activities and processes in accordance with TDPMAN-ST-37: Environmental Requirements for Contractors and /or Suppliers. The Contractor shall establish a refuse control system. All waste is to be collected and disposed of as required by Eskom and the Local Authority.

5.1.6 Title to materials from demolition and excavation

All the materials from excavation and demolition must be disposed of by the Contractor except where expressly stated by the PM or the relevant staff from the Grid. All rubble and other materials must be classified, weighed and transported to a registered dumping site. See details on BOQ decommissioned and dismantled for the Project. Contractor is to dismantle will be carried out by the Eskom Asset Disposal team. Contractor to remove foundations and Conductor and tower steel will be recovered by Asset Disposal.

5.1.7 Cooperating with and obtaining acceptance of Others

Not applicable.

5.1.8 Publicity and progress photographs

The use of cameras on site is proposed in order to monitor construction activities on site.

The supervisor will record progress by means of a photographic record as required by the Project Manager. All works will be photographed at the QITP hold points so that a photographic record exist of the quality compliance of the works during the various stages of construction

The Contractor may also take photographs as a photographic record of the progress. The Contractor must obtain the Project Managers permission to take photos on Site for any other purpose.

Use of a drone mounted camera must be co-ordinated with Eskom Watershed MTS substation and surrounding farmers.

5.1.9 *Contractor*'s Equipment

The Contractor must keep a daily record of all equipment on site. The information differentiates between hired and Contractor-owned equipment. The Record must also clearly indicate when equipment is working and who the operator of the equipment was for the recorded shift.

5.1.10 Equipment provided by the *Employer*

No Plant is provided "free issue" to the Contractor for this Contract. All plant is to be provided by the Contractor. Certain Materials are provided "free issue" to the Contractor.

5.1.11 Site services and facilities

- Electricity is not available at the proposed lay-down area. A connection point can be made available by Eskom Watershed MTS substation and surrounding farmers but this must be negotiated with them
- Water is not available at the proposed lay-down area. A tie in point can be made available by Eskom Watershed MTS substation and surrounding farmers but this must be negotiated with them
- Security should be deemed as not available, and the contractor should make his own arrangements. Lighting and cameras for the lay down area should be arranged by the contractor
- The contractor is to supply his ablution facilities.
- The contractor shall establish a refuse control system. All waste is to be collected and disposed of as required by Eskom and the local authority
- The Contractor supplies all plant and materials required to complete the Works
- The Contractor shall provide everything else necessary for providing the Works.

5.1.12 Facilities provided by the *Contractor*

The *Contractor* is to provide the following items to facilitate the *Employer's* site *Supervisors* project administration within 2 weeks of contract award:

- Site office as per proposed lay-down area on Eskom Watershed MTS substation and surrounding farmers premises. Upon Completion, the office will remain the property of the *Contractor.*
- The contractor shall make his own arrangements for provision of accommodation for his employees.
- The *Contractor* shall provide sanitary amenities, first aid and fire fighting facilities as required by the Occupational Health and Safety Act.
- Concrete batching and mixing plant(s) established by the *Contractor* shall be solely dedicated to the *works.* The *Supervisor* shall approve the design, operation and location of the plant(s).
- All necessary services are to be provided by the *Contractor* to suit his needs.
- Upon completion, the area is to be rehabilitated to the satisfaction of the landowner and the *Supervisor*.

5.1.13 Existing premises, inspection of adjoining properties and checking work of Others

There are no households within the servitude. The Contractor is required to monitor the check before construction can commence in this area.

5.1.14 Survey control and setting out of the *works*

The *Employer* marks the line route with iron pegs at each bend point. Co-ordinates of each bend point will be provided. The *Contractor* is solely responsible for pegging of tower positions in accordance with the co-ordinates and line profiles.

5.1.15 Excavations and associated water control

Compliance to the EMP and TRMSCAAC 5.2 – "Transmission Line Towers and Line Construction" is required.

5.1.16 Underground services, other existing services, cable and pipe trenches and covers

Contractor to inform the Project Manager of any of the above services are identified.

5.1.17 Control of noise, dust, water and waste

Compliance to the EMP and TRMSCAAC1 5.2 – "Transmission Line Towers and Line Construction" is required.

5.1.18 Sequences of construction or installation

The construction of this project will have to be scheduled in a manner where the contractor, designers, grid and project management work hand in hand. This line can be built starting at any point. However, access and work during the wet season may be limited and must be planned and catered for in the Contractors schedule.

Outages will be required for the tie-ins to the existing lines and line need to be built and strung first before the outages on the three existing lines are issued.

5.1.19 Giving notice of work to be covered up

Not applicable.

5.1.20 Hook ups to existing works

Refer to Line Specification for information.

5.2 Completion, testing, commissioning and correction of Defects

5.2.1 Work to be done by the Completion Date

On or before the Completion Date the *Contractor* shall have done everything required to Provide the Works except for the work listed below which may be done after the Completion Date but in any case before the dates stated. The *Project Manager* cannot certify Completion until all the work except that listed below has been done and is also free of Defects which would have, in his opinion, prevented the *Employer* from using the *works* and Others from doing their work.

	Item of work	**To be completed by**
	As built drawings	Within 4 weeks after Completion
	Rehabilitation, removal of temporary works, removal of	Within 4 weeks after Completion

	equipment, etc.	

The contractor advises the supervisor when sections of the line are available for final inspection, and provides assistance if required.

By the completion date in the contract data, the contractor shall complete all work required for the commissioning of the line. All other work (rehabilitation, installation of retaining walls, ground-works, removal of temporary works, removal of construction camps, batching plants etc.) shall be completed within four (4) weeks of take-over. The supervisor and/or landowner prior to the release of any retention moneys held against this contract shall approve such work.

5.2.2 Use of the *works* before Completion has been certified

Not applicable

5.2.3 Materials facilities and samples for tests and inspections

The Contractor shall comply with attached document titled “Transmission Line Towers and Line Construction” (TRMSCAAC1 Rev 5.2)

The *Contractor* provides his own equipment for the testing of concrete cubes on site, or, should he make use of an independent testing facility, ensures that test results after 7 days and 28 days are made available to the *Supervisor* within 5 days of each test.

A minimum of 5% of foundation systems shall be subjected to proof load testing.

Upon delivery, the *Contractor* assembles one test sample for each hardware assembly to ensure compatibility with the tower.

The *Contractor* provides for the making up of samples and testing of compression joints in accordance with TRMSCAAC5.2 before stringing commences.

The *Contractor* to conduct tower footing resistance tests before the casting of concrete for the foundation caps.

5.2.4 Commissioning

Commissioning of the 4x132kV lines is planned prior to commissioning one line at time will be commissiioned. Commissioning of the line will be conducted by North west Grid Lines, Distribution operating unit & Servitude and HV Plant personnel in accordance with the approved Commissioning Program.

5.2.5 Start-up procedures required to put the *works* into operation

Not applicable.

5.2.6 Take over procedures

Take-over of The Works will be in accordance with NEC ECC3 hand over Certification.

- The Contractor advises the Supervisor when the line is available for final inspection and Aerial Laser Survey, and provides assistance if required.
- By the Completion Date in the Contract Data, the Contractor shall complete all work required
- The Contractor maintains the works until the defects date with regard to making good erosion caused by his operations, shrinkages, imperfections, settlements, etc.

5.2.7 Access given by the *Employer* for correction of Defects

If necessary, the Project Manager will arrange for the contractor to have access to the line after it has been taken over in order to correct a defect.

5.2.8 Performance tests after Completion

Line Impedance tests will be conducted by Distribution operation unit (Northwest) after construction and tie-in of the Works. This will be done during the outage after all stringing is done and before the line is switched back.

5.2.9 Training and technology transfer

Not applicable.

5.2.10 Operational maintenance after Completion

Not applicable.

6 List of drawings

6.1 Drawings issued by the *Employer*

This is the list of drawings issued by the *Employer* at or before the Contract Date and which apply to this contract.

Note: Some drawings may contain both Works Information and Site Information.

Drawing number	Revision	Title

C3.2 *CONTRACTOR*'S WORKS INFORMATION

This section of the Works Information will always be contract specific depending on the nature of the *works*. It is most likely to be required for design and construct contracts where the tendering contractor will have proposed specifications and schedules for items of Plant and Materials and workmanship, which once accepted by the *Employer* prior to award of contract now become obligations of the *Contractor* per core clause 20.1.

Typical sub headings could be

a) *Contractor*'s design
b) Plant and Materials specifications and schedules
c) Other

This section could also be compiled as a separate file.