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ANNEXURE A1 – SCOPE OF WORK

ENQUIRY NUMBER: AHT26755
DESCRIPTION: OPENING AND CLOSING OF ELECTRICAL CABLE TRENCHES FOR PetroSA IN MOSSEL BAY

1. SCOPE OF WORK

1.1 SERVICES:

1.1.1 Scope Requirements:

a) The scope of work is for associated activities related to electrical trenches including but not limited to trenching, excavation, tiling, tape installation, cable laying, cable marking and reinstatement of trenches.
b) A competent person with experience pertaining to trench standards applicable to this industry as well as to the SANS Code of Practice 10142 will be required to supervise the excavation of trenches to expose faulty cables.
c) The person shall undergo the Permit to Work training at PetroSA to sign permits as the responsible person in charge as well as have attended

'Confined Space' training or be required to attend such training before any excavations work can commence.

d) The supervisor shall also be responsible for obtaining all the necessary safety authorizations and permits to perform the job. These permits include excavation, safety and hot work, road closure as well as work permits.
e) The supervisor and Supplier personnel will be required to undergo Medical Induction as required by the PetroSA Medical Station and be declared fit for work by a qualified Occupational Health Practitioner. All relevant medical tests will be for the account of the Supplier.
f) The supervisor will need to familiarize themselves with the listed PetroSA specifications and Standards. The supervisor shall ensure that all PetroSA standards, procedures, regulations and specifications shall be adhered to.
g) Completion of all Quality Assurance/ Quality Checklist documentation remains the responsibility of the Supervisor.
h) The following equipment is recommended for the execution of the services;
    - LDV max 1 ton
    - Truck 3 ton
    - Truck 5 ton
    - Truck 6 to 10 ton
    - JCB
    - Compressor
    - Concrete/tar cut. mach
    - Replacement of Blade
    - Water pump
    - Rammer
    - Generator
    - Vibrator

1.1.2 Underground Installation

Trench Routes

- The cable trench shall be excavated along the routes indicated on the relevant drawings.

1.1.3 Paved Areas

a) The Supplier shall remove paving slabs or bricks along the cable route carefully and stack them for reuse when repairing the surface.
b) The excavation shall be backfilled and compacted to its original density.

1.1.4 Cable Trenches

a) The location where the trench is to be opened will be indicated to the Supplier by PetroSA personnel.
    i. The excavation of the trench must expose the cables and also be 3m on both sides from the fault location.
b) The Supplier shall excavate by hand ONLY, Power driven mechanical excavators may not be used for trenching operations, unless with the written approval of the Engineer.

c) The Supplier shall remove all sharp projections, which could damage the cable where the trench is excavated through rocky formations, and shall remove all loose rocks, material, etc from the bottom of the trench.
d) Cables 11 kV and below, passing underneath roads, railway lines or foundations, shall be pulled through fibre ducts, heavy wall plastic or galvanised steel pipe sleeves or pre-cast concrete culverts.
e) Filling of trenches shall not commence before the PetroSA authorized representative has inspected and approved the cables and cable joints situated in the section of trench concerned and instructed the Supplier whether to use excavated material as backfill or whether to use new backfill.
f) All trenches shall be backfilled and reinstated as follows:
g) Two 100 mm thick layers of soil sifted through a 6mm mesh shall be laid directly under and over the cables respectively and consolidated by hand ramming only.
h) When instructed by the authorized PetroSA representative imported fill shall be arranged by the Supplier and paid for at scheduled rates.
i) The concrete slabs must be laid 200mm above the cables. The slabs shall be laid close butted, convex end to concave end, directly above each cable throughout the underground portion except where otherwise protected by ducts. Only unbroken cable protection slabs may be used.
j) The minimum dry densities of backfilling after compaction shall not be less than 1600kg/cubic metre.
k) All excavations made shall be backfilled in 150mm layers, the soil in each layer being well rammed and consolidated and sufficient allowance made for settlement. Any cable damaged shall be replaced by the Supplier at his own expense.
l) Backfilling at duct entries shall be such that it does not stress or damage the cables during compaction from the top.
m) Trenches across roads, access ways or footpaths shall not be left open. If trenching, cable laying and back filling cannot be done during the same shift, the portion of trench across the full width of the road, etc, must be temporarily backfilled and consolidated sufficiently to carry the traffic concerned without subsidence. Alternatively, adequately strong cover plates shall be laid across the trench.
n) Where other trenches or holes for poles are left unattended for any period of time, these areas must be clearly barricaded by means of a PVC danger warning tape zigzagging between two steel wires spaced 300mm apart with the bottom wire approximately 300 mm above ground level and with realistic interval supports. **The cost of the danger tape, wire and supports will be for the Supplier's account.**
o) The Supplier shall provide shoring in places where the danger exists of the trench collapsing and causing damage to formations or other nearby structures.
p) Removal of accumulated water or other liquid from trenches shall be done by the Supplier at his expense.
q) The Supplier shall provide all pumps and appliances required to carry out this operation.
r) Water or any other liquid removed shall be disposed of without creating any nuisance or hazard.
s) Fine sand for bedding backfill around cables shall be free from clay, gravel, stones and other foreign matter.

t) Backfill including fine sand layers surrounding cables shall be well watered and compacted to eliminate cavities that may cause collapse of the trench top due to settling of the soil or sand.
u) Where cables are laid in areas under concrete paving, a slot shall be left in the paving over the whole cable reserve.
v) After completion of the cable trench backfill and compaction, the slot shall be closed with a separately cast 10 MPa concrete paving. The slot closure-paving slab shall be level with the adjoining paving and of the same thickness and shall have its top surface tinted with red oxide to a depth of 20 mm.
w) Both sides of the slot closure paving shall be cast against a bitumen impregnated soft board, all in accordance with the project standard drawings.

1.1.4.1 Excavated Material

- No excavated material shall be left closer than 300 mm from the side of the excavation. The excavated material which is considered by the Engineer to be suitable for bedding material for the cable shall be placed separately on one side of the trench so that it is available when required. The excavated material shall take up as small an area as possible with the safety of the workmen and Works taken into consideration.

1.1.5 Cables Inside Battery Limits

- The upper layer of power cables in earth trenches inside battery limits shall be at least 600 mm below final grade level, all in accordance with project standard drawings.

1.1.6 Measurements

a) All measurements for payment purposes shall be made jointly by representatives of the Supplier and the Employer and shall be agreed upon by both parties. The Supplier shall be responsible to obtain the employer's representative's signed approval of such measurements before submitting for payment.

b) Full detail of the cable trench dimensions and classification of the type of excavation shall be recorded and signed by the Contractors representative and the PetroSA representative as the final quantities for such excavations.

c) Determination of trench volume for measurement purposes shall be based on measured length and specified width and depth. No allowance shall be made where trenches have to be widened at the bottom to accommodate cables, cable joints and protection slabs.

d) Inspections and recordings shall be completed before the installation of any bedding or backfilling. The Supplier shall be responsible to keep all records as proof of progress and as basis for claims for payment. The classification of different types of ground for measurement purposes shall be as follows:

e) Soft rock will be taken as broken or friable rock which can be removed by pick or mechanical excavator or paving breaker. This includes hard clay.

f) Hard rock will be taken as rock which cannot be removed by mechanical excavator and requires drilling and blasting or splitting. This includes reinforced or plain concrete.

1.1.6.1 Maintenance of Excavations

- The Supplier shall maintain the excavation in a good condition, free of water, mud, loose ground, rocks, stones, gravel and other strange material until the cables are installed and the excavation is backfilled and compacted.

1.1.7 Variation Orders

The scope of the Services shall be subject to changes by additions, deletions or revisions thereto by PetroSA. The Supplier shall be advised of any such changes by written notification from PetroSA describing the change. The Consultant shall promptly perform and strictly comply with each such change when so instructed by PetroSA. Any extra services resulting from such changes will be charged at the Supplier's normal or agreed rates.

1.1.8 General

a) Any re-works identified by PetroSA where initial job was not done properly, shall be for the Supplier's account.

b) Any damage to PetroSA property during the execution of the works shall be for the Supplier's account to remedy immediately.