



## **SPECIFICATION AND BACKGROUND**

### **1. PURPOSE**

Approval is required for service providers to tender for Service and Maintenance of high-tension (11kV) electrical reticulation systems at all four (4) campuses and associated facilities namely: Auckland Park Kingsway Campus (APK), Sophiatown Residence, Auckland Park Bunting Road Campus (APB), JBS Park, UJ Island, JBS Towers Doornfontein Campus (DFC), Qoboza/Khambule Building, and Soweto Campus (SWC) for a (1) one-year period with option to extend for an additional (2) two years based on performance for a total of (3) three years.

### **2. BACKGROUND**

UJ requires to appoint suitably qualified persons or organizations for the following work at the University of Johannesburg: for Service and Maintenance of high-tension (11kV) electrical reticulation systems at all four (4) campuses, JBS Park, UJ Island, Sophiatown Residence and Q/k Building. The service provider shall perform one (1) major routine maintenance (Service) and testing of the following equipment per year:

- High Voltage Switchgear (Switchboards)
- High Voltage Power Transformers (Standards – IEC 60422:2013 and 60422:2005)
- Earthing (Standards – SANS 10313:2010 and SANS 10199:2010)
- Substations and mini substations
- Service provider will be required to be on standby for emergencies and call outs at all times.

- The service provider shall attend the call out within 1 hour (60 minutes)

### **3. SCOPE OF WORK**

- 3.1. The scope comprises of High Voltage Switchgear, High Voltage Transformers, Substations, Mini-substations, 11kV cable, earthing and lightning protection as follows:

#### **High Voltage Switchgear**

- Open all covers and where applicable clean and remove dust
- Inspect cable terminations
- Test HV protection relays by secondary injection for trip timing
- Trip and rack out 11KV breakers
  - Oil Circuit Breakers (OCB): Open oil tank and check condition of main contact
  - OCB: Inspect oil condition, check for oil leaks, ensure oil level is correct
  - OCB: Inspect condition of tank gasket and replace if necessary
  - OCB: Replace OCB oil if necessary (New Virgin Oil)
  - Vacuum Circuit Breaker (VCB): Pressure test vacuum bottles at 22KV DC
  - SF6 Circuit Breakers: Evaluate, Clean, Service, Test and Refill gas if low
- Service and lubricate switch and trip mechanisms
- Trip test HV circuit breakers by secondary injection through protection relays
- Test 11 000/110 volt potential transformers for correct operation
- Verify voltage and current loads to instrumentation
- Service batteries and test battery trip unit for correct operation
- Clean High Voltage Switch rooms
- Check switchgear and switch rooms for compliance with the Occupational Health and Safety Act and other applicable regulations as required.

### **High Voltage Transformers**

- Test transformer temperature and buchholz relay alarm and trip
- Inspect cable terminations
- Wipe down transformers and insulators with trichloroethylene
- Clean transformers
- Take transformer oil samples for routine testing (Oil purification not included)
- Test transformer oil samples at accredited laboratory and submit report
- Ensure that oil levels are correct, top up oil if necessary (New Virgin Oil)
- Replace silica gel if required
- Clean HV transformer room
- Check transformer and transformer room for compliance with the Occupational Health and Safety Act and other applicable regulations as required.

### **Mini – Substations**

- Overall maintenance and cleaning of mini-substations
- Check and test secondary Low Voltage wiring
- Conduct infra-red scans for hot spots
- Inspect High Voltage protection-fuse size and protection
- Top up transformer and switchgear oil if necessary
- Inspect instrumentation
- Service and check switching mechanisms
- Test thermal tripping where applicable
- Check mini-substations for compliance with the Occupational Health and Safety Act and other applicable regulations as required.

### **Earthing and Lightning Protection**

- Conduct earthing and lightning protection survey in accordance to SANS 10313:2010 and SANS 10199:2010

**NOTE:** The above tasks shall be done on an **annual basis** (Will be discussed and confirmed during handover and shall be configured on Archibus Maintenance

Management System. A checklist will be issued on the agreed frequency to ensure that the scope is adhered to)

### **11kV Cable Maintenance Strategy**

The purpose of this testing is to ensure the footprint of the cable is taken which points out the overall condition of the cable insulation. For the critical cables: 11kV cable from the main substation to campus and 11kv cables to the ring the following testing is required:

- VLF testing (tan delta), or alternative.
- Ramp-up curve to be included in the report (with baseline curve).
- Applicable standards shall be used for Acceptance Criteria.
- Cable replacement strategy shall be provided to UJ based on the results of the testing.
- Cable baseline readings shall be taken upon appointment of the service provider thereafter every 6 months.

### **Exclusions:**

- Broken parts will be quoted for and replaced on the client's account.
- Fill up oil on transformers and circuit breakers where required
- Repair and maintenance of smart meters
- Call out and emergencies will be quoted for and paid by the client.

**NOTE:** The drawings of the High-Tension reticulation are attached separately.