



**Client**  
SRK Consulting



**Location**  
Modikwa TSF,  
Burgersfort, South Africa



**Period**  
February - April 2022

### Modikwa Tailings Dam Complex, Burgersfort, South Africa

SRK Consulting contracted PMI for the execution of CPTu, SCPTU, Mostap Sampling, Shear Vane Testing and installation of Vibrating Wire Piezometers (VWP) at Modikwa Tailings Dam in Limpopo, South Africa.

PMI subsequently mobilised and executed the contract gathering the required subsurface data and installing the VWP.

### The Scope of Work included

- 17 No CPTu - total depth 408.13m
- 37 hours of Dissipation testing
- 95 No SCPTu
- 16 No Mostap Samples
- 26 No VWP installations
- 3585m cabling
- 5 No Data Loggers
- 1 No Main Hub
- Testing and commissioning of VWP equipment

### PMI Resources on Site

- 2 No PMI 200kN hydraulic CPT rig's (1 trailer & 1 truck mounted rig)

### Methodology

#### CPTu

The PMI CPT machine is a 20 ton push capacity rig manufactured by Geomil with a 20 ton capacity Hydraulic Ram set. The whole assembly is mounted on a heavy duty trailer fitted with 4 outriggers used for levelling. The assembly also has a system which is used to install 4 ground anchors to hold it place during the testing operation.

The tests were performed using the piezocone cone manufactured by Geomil. The piezocone has a 60° cone tip of surface area 1500mm<sup>2</sup>, and a friction sleeve of surface area of 22500mm<sup>2</sup> and same diameter as the cone. Pore pressure filter is located at the U2 position.

#### Seismic Testing

To conduct an SCPTu, a normal CPTu is performed which is paused at regular intervals to generate a seismic waveform at the surface, a shear wave. The seismic waveform travels through the ground and is detected by the accelerometers in the Seismic Piezocone.

#### Mostap Sampling

Mostap samples were conducted using the same rig as the piezocone testing. The piezocone and electronic cabling was exchanged for a sampling cone fitted at the end of the rod string. The cone was inserted into the ground and advanced using the rig hydraulics to the start of the desired sampling depth.

Once at the desired sampling depth, a wire string and hook were inserted down the rod string, until the hook latched on to the cone tip lock.

A sharp pull on the wire string disengaged the cone tip lock. Thereafter, the rod string was advanced a further 500mm, where a sample was collected within a plastic liner. The rod string was retrieved and the plastic liner, containing the sample was extracted. End caps were placed on the ends of the sample tube and presented to the client.

#### Shear Vane Testing

PMI makes use of a GVT-100 field vane tester which is designed for the use of CPT tubes as actuating and extension rods, with casing tubes acting as friction reducer. A special protection shoe on the toe of the casing tubes protects the vane while it is advanced into the subsoil.

#### VWP Installation

After conducting a CPT, the rods and cone were extracted, and the rig remained in position over the CPT hole.

Prior to installation of the piezometer, all necessary preparation work was conducted according to the manufacturer's guidelines.

An oversized heavy-duty cone tip was fitted to the piezometer, in order to create a pushing lip surface. This is illustrated in the image below.

The push in piezometer is inserted into the hole. Using the CPT hydraulics in combination with the CPT rods, the piezometer is advanced down the hole

to the required depth by pushing on the oversized lip of the cone tip.

Once the piezometer is at the desired level, the CPT rods are extracted, leaving the piezometer at the desired location.

A trench was dug, and the data cables were laid into the trench and then covered with ground material.

The data logger was installed at specified locations per the Client's request and the cables were then connected to the data logger.



### Conclusion

The contract was executed within budget and on time.

