



## Overview

Geotechnical Engineering and Engineering Geology is an essential component of civil engineering, mining, petroleum, or any other engineering concerned with construction on or in the ground. This discipline supplied by GCS in-house, usually uses the principles of soil mechanics and rock mechanics to investigate subsurface conditions and materials; determine the relevant physical/mechanical and chemical properties of these materials; evaluate stability of natural slopes and man-made soil deposits; assess risks posed by site conditions; design earthworks and structural foundations; and monitor site conditions, earthworks and foundation construction.

- The GCS Geotechnical and Engineering Geology Unit draws its experience from a number of different divisions within the company including Water, Waste, Environmental and GIS.
- Typical geotechnical engineering projects begin with a review of project needs to define the required material properties. Then follows a site investigation of soil, rock, fault distribution and bedrock properties on and below an area of interest to determine their engineering properties including how they will interact with, on or in a proposed construction. We, especially provide a very close combination between the above and Hydrogeology.

## GCS Services Offered

- Feasibility studies and Site Investigations for Municipal Infrastructure including pipelines, reservoirs, water treatment plants, domestic waste sites, roads and housing.
- Mine Open Pit Slope Depressurisation and Stability Assessments. Detailed geological, hydrogeological and geotechnical data are often a notable unknown factor in the design and operation of an open pit, the lack of which may pose a significant risk to the mining venture. GCS offer a phased and systematic approach towards site assessment and implementation of depressurisation systems and the identification and mitigation of geotechnical constraints.
- Site Investigations for Civil Engineering support including:
  - Test pitting, auger boreholes, in-situ sampling.
  - Penetrometer testing including DPL, DCP, DPSH and CPTu.
  - Geophysical Surveys including resistivity, magnetic, electromagnetic, seismic, GPR and gravity surveys.
  - Permeability testing including percolation tests, double ring infiltrometer and Lefranc.
  - Geotechnical drilling and in situ borehole testing including SPTs, pressuremeter, Lugeon/Packer tests.
  - Plate-load tests and compaction assessment for founding conditions.
  - All associated laboratory testing and analysis for disturbed and undisturbed samples.

For all Geotechnical enquiries please contact Nino Welland Tel: +27 (0) 11 803 5726 | [ninow@gcs-sa.biz](mailto:ninow@gcs-sa.biz) or Pieter Labuschagne Tel: +27 (0) 31 764 7130 | [pieterl@gcs-sa.biz](mailto:pieterl@gcs-sa.biz)

South Africa  
[www.gcs-sa.biz](http://www.gcs-sa.biz)

Johannesburg  
+27 (0) 11 803 5726

Pretoria  
+27 (0) 12 348 1114

Durban  
+27 (0) 31 764 7130

Eastern/Western Cape  
+27 (0) 83 259 5065



Czech Republic  
Ostrava  
+420 595 170 874  
[jiri.beranek@gcs-cz.biz](mailto:jiri.beranek@gcs-cz.biz)  
[www.gcs-cz.biz](http://www.gcs-cz.biz)

Lesotho  
Maseru  
+266 5228 1123  
[keneiloe@gcs-ls.biz](mailto:keneiloe@gcs-ls.biz)  
[www.gcs-ls.biz](http://www.gcs-ls.biz)

Namibia  
Windhoek  
+264 61 248 614  
[info@gcs-na.biz](mailto:info@gcs-na.biz)  
[www.gcs-na.biz](http://www.gcs-na.biz)

Zambia  
Lusaka  
M +260 950 493 330  
[info@gcs-zm.biz](mailto:info@gcs-zm.biz)  
[www.gcs-zm.biz](http://www.gcs-zm.biz)

### Fields of experience

- Mine Waste Storage Facilities and Dams.
- Mine Pit and Slope Stability.
- Mine Rehabilitation Studies (cover design and compaction studies)
- Water Causeways and Culverts
- Bridges, roads and tunnels
- Pipelines and reservoirs
- Power lines
- Dolomite stability and undermining investigations
- Rural and Urban Infrastructure investigations (schools and hospitals)
- Housing developments (NHBC registered)
- Industrial development Site Assessments
- Materials assessments and usage
- Ground improvement

