

GeoQuest

Geological, Environmental, GIS & Hydrogeological Services

CENTRAL & SOUTHERN AFRICA



AN ENVIRONMENTAL, GEOLOGICAL (GEOTECHNICAL) HYDROGEOLOGICAL & GIS CAPABILITY STATEMENT 2021



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1 COMPANY OVERVIEW

GeoQuest is a fully independent Consultancy Group based in Zambia and the Democratic Republic of Congo providing high quality, efficient, cost effective and innovative Environmental, Sociological, Geological, Geotechnical, Hydrogeological and GIS services.

The company provides expertise to the Mining / Exploration, Environmental, Water Development, Construction and Agricultural Sectors in Zambia and Central / Southern Africa.

GeoQuest is made up of a dedicated core team of Zambian and DRC based professionals (including Zambian and DRC nationals as well as expatriates). The group provides multi-disciplinary teams and / or individuals (e.g. Geoscientists, Environmental and Sociological Scientists, Hydrologists and Technicians) with hands on experience tailored to meet the particular requirements and needs of each client. GeoQuest is committed to providing high quality and cost effective technical as well as full or partial project management services.

Since its formation, GeoQuest has provided a very wide variety of both field and office based Geological, Environmental, Sociological and Hydrogeological Consultancy Assignments.

GeoQuest is fully registered with The Zambia Environmental Management Agency ('ZEMA') to provide Professional Environmental Services in Zambia.

GeoQuest is also fully licensed by the Engineer's Registration Board ('ERB') to practice Engineering (Professional Geology, Hydrogeology and Environmental Services) in accordance with Cap 432 of The Laws of Zambia.

In addition, GeoQuest is registered as a corporate member of the Geological Society of Zambia ('GSZ'), and all geoscientists working for GeoQuest are registered members of the Geological Society of Zambia.

Further information about any of the above can be provided upon request by contacting:

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2 OUR ENVIRONMENTAL CAPABILITIES

GeoQuest's Environmental Department specialises in a range of environmental services aimed at assisting in the planning and design of new development projects and the management and monitoring of existing operations.

Our areas of expertise include:

- Approvals and Licensing
- Environmental Project Briefs (EPB) – Projects with a low environmental impact
- Environmental Impact Statements (EIS) – Projects with a high environmental impact
- Environmental Monitoring Programmes / Single Surveys:
 - Acid Rock Drainage
 - Air Quality, Dust, Noise
 - Aquatic & Terrestrial Flora / Fauna
 - Radionuclides / Radiation Exposure
 - Radon
 - Sediment, Soil & Bedrock
 - Surface & Groundwater
- Environmental and Compliance Auditing (according to IFC and EP standards)
- Environmental and Waste Management Plans
- Emergency Response Plans and Staff Training
- Resettlement Action Plans (RAP)
- Sociological Impact Studies and Public Consultations
- Project Management
- Tailor Made Environmental Training Courses (e.g. Acid Rock Drainage, ...)

3 OUR GEOLOGICAL (GEOTECHNICAL) HYDROGEOLOGICAL & GIS CAPABILITIES

GeoQuest (singularly and with key associates) also provides a wide range of Geological (geotechnical), Hydrogeological and GIS services.

Our areas of expertise include:

3.1 Geological (Geotechnical) & Hydrogeological Services

- Geological & Geotechnical Site Assessments (Geological / Soil Mapping, Profiling, Testing and Analysis)
- Groundwater Resources Assessment and Evaluation Studies
- Borehole Siting
- Ground Geophysics (including ground Magnetics and Resistivity as well as other applications e.g. - VLF, EM & Ground Penetrating Radar)
- Hand Held GPS & DGPS Surveying
- XRF Surveying
- Drilling Contractor Procurement / Selection and Liaison
- Supervision and Management of Well Drilling, Construction and Development
- Hydraulic Test Pumping
- Well Field Design & Monitoring

3.2 GIS Services

GeoQuest can provide GIS / Database solutions for the integration, management and modelling of both geological and non-geological (e.g. environmental / sociological) spatial data including airborne and ground geophysical surveys, geological, geochemical, aerial photography and satellite imagery.

Services Include:

- Data Capture, Compilation and Verification
- Data Conversion (Projection and Datum)
- Mapping and final Map Production
- Information Integration and Target Generation
- Setup, Maintenance and Management of Project and Countrywide GIS Databases
- Scanning and Digitising (up to A0) including Geo-referencing
- Specialist knowledge of ArcView and MapInfo Professional Software Ongoing Database Management

4 HISTORICAL TRACK RECORD

We provide below a selected summary list of some of the major Environmental- and Social-, Hydrogeological- and Geological / Geotechnical projects which GeoQuest has completed within Zambia in the past:

4.1 Examples of Environmental / Social Assessments:

- Ministry of Mines and Mineral Development: Zambia Mining Environmental Remediation and Improvement Project (ZMERIP) - Preparation of a National Plan for the Prioritization of Rehabilitation and Closure of Mine Waste Facilities. 2019 – 2021.
- Rio Tinto: Stakeholder Mapping and Asset Survey – Ngala, Mufulira, Copperbelt Province. 2020
- Rio Tinto: Stakeholder Mapping and Asset Survey – Solwezi, North Western Province. 2020
- Southern African Power Pool: Pre-feasibility Studies for the Environmental and Social Impact Assessment for the Proposed Luapula River Hydroelectric Scheme. 2018 - 2019.
- Kalumbila Mining Plc.: Environmental Training Course, Basics of Acid Rock Drainage. 2019.
- Rio Tinto Mining & Exploration Zambia Ltd: Verification of IUCN Bird Sanctuary, Solwezi Dome, North Western Province, Zambia. 2019.
- Kansanshi Mining Plc.: Sampling and analysis of Radionuclides (Th-232 and Ra-226, water samples). Second opinion for Kansanshi's ongoing Monitoring Program. 2019.
- Jubilee Metals Solutions Ltd.: Fatal Flaws/Deficiencies Analysis of Mining Licenses / Operations. 2019.
- Kansanshi Mining Plc.: Sampling and Analysis of Radionuclides (K-40, Bi-212, Bi-214, Pb-212, Pb-214, Ra-226 and Rn-222, water and soil samples). Second opinion for Kansanshi's ongoing Monitoring Program. 2018.
- Moxico Resources Plc.: Environmental and Social Baseline Study for the Proposed Mimbula Copper Project. 2018.

- Bushbuck Resources: Stakeholder Engagement Meetings during Bushbuck's Implementation of their Exploration Program (License 19653-HQ-LPL). 2017.
- Nippon Koei: Water Quality Assessment of the Kafue River at the Iolanda Water Intake Plant. 2016.
- Lafarge Cement Zambia Plc: Environmental Study and Assessment of the use of Alternative Fuels in the Cement Production Process. 2014 – 2015.
- Kansanshi Mining Plc: Assessment and Recommendations for Groundwater Monitoring at Kansanshi Mine. 2013.
- Environmental Council of Zambia: Development of Environmentally Sound Solid Waste Management Practices in Zambia. 2010.
- Zambia Information and Communication Technology Authority ('ZICTA'): A National Baseline Survey to Establish the Level of Compliance with the Set National Human Exposure Safety Limit. 2010.
- UNICEF: National Rural Water Supply and Sanitation Programme. Feasibility and Environmental Study. 2009.

4.2 Examples of Environmental Project Briefs Conducted:

- MMG Zambia Ltd.: 29 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Rio Tinto Mining & Exploration Zambia Ltd: 30 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Bushbuck Resources: 15 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- BHP Billiton: 12 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Anglo Exploration (Zambia Ltd.): 10 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Vale Zambia Ltd.: 4 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Phelps Dodge: 2 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Bollore Africa Logistics: An Environmental Project Brief for Bollore Chingola Logistics Hub.
- Blackthorn Resources: 6 Environmental Project briefs different Large Scale Prospecting Licenses.
- KPR Investments: 10 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Grassroots Resources: 7 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Rift Petroleum / Tower Resources: 2 Environmental Project Briefs for Large Scale Oil and Gas Prospecting Licenses.
- Katanga Resources: 4 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- Zambezi Resources: 2 Environmental Project Briefs for different Large Scale Prospecting Licenses.
- A variety of other Medium and Small Scale Exploration Companies: 22 Environmental Project Briefs for different Large Scale Prospecting Licenses.

4.3 Examples of Environmental / Social Impact Assessments and Monitoring / Audit Exercises Conducted:

- Enterprise Power Zambia Limited: Environmental and Social Impact Assessment and Resettlement Action Plan for the Kalumbila - Kolwezi 330kV Transmission Line Development Project. 2020-2021.
- JICA-ZESCO: Environmental Impact Assessment and Resettlement Action Plan for the Southern Area Transmission System Development Project. 2015 – 2018.
- Intrepid Mines Ltd.: Environmental Monitoring. 2013 – 2016.
- Denison Mines Zambia: Implementing Denison Mines (Z) Ltd.'s Environmental Monitoring Program for the Mutanga Project. 2012 – 2016.
- Intrepid Mines Ltd.: An Independent Environmental Audit of Operations in License Areas 16385-HQ-LPL, 14265-HQ-LPL, 14266-HQ-LPL and 14267-HQ-LPL. 2015.
- First Quantum Minerals Ltd. (Kalumbila): Environmental Impact Statement for the Sentinel, Intrepid and Enterprise Projects. 2012.
- Mwembeshi Resources: Environmental Impact Statement for Large Scale Mining Activities under License Number 15547-HQ-LML in Luangwa District. 2012.
- First Quantum Minerals Ltd. (Kansanshi): Environmental Audit for the Environmental Protection Fund. 2011.
- African Energy Resources Ltd.: Implementing African Energy Resources' Environmental Monitoring Program for the Chirundu Uranium Project. 2009.

4.4 Examples of Geological (Geotechnical) & Hydrogeological Assessments:

- Bosch Projects (Pty) Ltd.: A Stage 1 Geological and Topographic Study of the Proposed Distell Cider Facility Development, Plot Numbers PH5IND/5 and PH5IND/6, at the Lusaka South Multi-Facility Economic Zone. 2019.
- Mimosa Resources Ltd.: A Feasibility Level Hydrogeological Study for the Fishtie Copper Project, Mkushi, Central Province, Zambia. 2018-2019.
- Neoen Renewables Zambia Ltd.: A Brief Geological / Geotechnical 'Fatal Flaws' Summary Assessment of a Proposed Solar Development Site, Kafue Industrial Area, Lusaka Province, Zambia. 2018.
- Phanes Group: A Brief Geological / Geotechnical 'Fatal Flaws' Summary Assessment of a Proposed 'Refit-Getfit' Solar Development Site, Nampundwe, Zambia. 2018.
- Sterling and Wilson Pvt. Ltd., (Neoen): A Geological and Geotechnical Study at the 54 MW Solar PV Power Project Site at the Lusaka South Multi-Facility Economic Zone on Behalf of Sterling and Wilson Pvt., Ltd. 2017.
- Zambian Breweries Plc: Phase 1 - A Geological / Geophysical Investigation of Properties – Stands A24, A15, A11, A12, A13, A14 and A25 within the Lusaka South Multi Economic Zone (MFEZ). For a Proposed Malting Plant. 2014- 2015.
- Zambian Breweries Plc: Phase 2 - A Water Evaluation & Site Investigation Report of Properties – Stands A24, A15, A11, A12, A13, A14 and A25 within the Lusaka South Multi Economic Zone (MFEZ). For a Proposed Malting Plant. 2014.
- Zambeef Products Plc: A First Pass Geological / Geotechnical Assessment of the Site for the Proposed Feed Mill and Grain Silos at Nampamba Farms, Mpongwe District. 2014.
- The Royal Norwegian Embassy: Geotechnical / Geophysical Investigation of Plot Sub Division B of Sub Division 45 of farm 377A, Woodlands, Lusaka. 2010.

5 OUR CLIENTS

In the Geological (Geotechnical), Environmental & Hydrogeological Sectors GeoQuest's clients have included:

- Agriflora Farms
- African Energy Resources Ltd.
- Agvan Farms
- Albidon Ltd.
- African Infrastructure Consultants (AICON)
- Anglo Exploration (Zambia Ltd.)
- Zutari (formerly known as Aurecon South Africa (Pty) Ltd.)
- Barrick / Lumwana
- BHP Billiton
- Blackthorn Resources Ltd.
- Bonanza Farms
- Bolloré Africa logistics Ltd.
- Bushbuck Resources Ltd.
- Centre for Infectious Disease Research
- Chilanga Cement (Lafarge Cement Zambia Plc.)
- Christian Vision
- Cena Farms
- Chivuna Mission School and Clinic
- Civil Concepts (Pty) Ltd.
- Copperbelt Energy Corporation
- Copperbelt University
- Denison Mines
- Department of Water Affairs
- Enterprise Power Zambia Limited
- Enviro-Flor Farms
- Environmental Council of Zambia
- Horizon
- GetFit/Refit
- Glensol
- Intrepid Mines Ltd.
- John Ken Estates
- Japan International Cooperation Agency (JICA)
- Kagem Mining Ltd.
- Khamazi Farms
- Kansanshi Mining Plc./First Quantum Minerals Plc.
- Kalumbila Mining Plc. /First Quantum Minerals Plc ZCCM-IH
- Kalumbila Mining Plc. /First Quantum Minerals Plc
- Lafarge Zambia Plc.
- Lusaka Water and Sewerage Company
- Ministry of Mines and Mineral Development (Mines Safety Department)
- MMG Exploration (Zambia) Ltd.
- Moxico Resources Plc.
- Mukubwa Resources Ltd.
- National Resource Development Centre
- Ndola Lime
- Neoen
- Nyati Milling
- Optiquet Corporation Ltd.
- Phanes
- Rift Petroleum/Tower Resources
- Rio Tinto Exploration Ltd
- Scimitar Farms
- Sterling and Wilson Pvt. Ltd.
- Southern African Power Pool
- TEPCO
- The Royal Norwegian Embassy
- Total
- UNICEF
- Wangwa Farms
- Waterbuck Resources Ltd.
- World Bank
- York Farms
- Zambeef Products Plc
- Zambian Leaf Tobacco Company
- Zambian Air Force
- Zambian Breweries Plc. (SABMiller Plc.)
- Zambian Communications Technology Authority (ZICTA)
- ZCCM-IH
- ZESCO

GeoQuest has worked closely at times or in strategic alliance with other consultancy groups including AICON, CSA, DMT GmbH & Co. KG, GTK (Finish Geological Survey), MDM

Engineering, Norconsult, RSG Global, SMEC, Snowdens, SRK, U-Series, Venmyn-Rand, Wardell-Armstrong, WE-Consult and Worley Parson.