

CAPABILITY



TSF

Tailings Storage Facilities

NURIZON Consulting Engineers is a 13-year-old leading consulting engineering company with significant experience in tailings management.

We provide a comprehensive range of services, including:

- ◆ Tailings dam design and engineering
- ◆ Tailings characterization and testing
- ◆ Tailings management planning
- ◆ Tailings closure and rehabilitation
- ◆ Tailings risk assessment and mitigation
- ◆ Engineer of Record Services

Our team of experienced engineers has a comprehensive understanding of the latest tailings management technologies and best practices. We are committed to providing our clients with safe and sustainable solutions that meet their specific needs.

We specialize in the design and engineering of tailings dams for a variety of industries.

We work closely with our clients to develop innovative and cost-effective solutions that meet their operational and regulatory requirements.

Some of our notable tailing's projects include:

- Black Chrome Mine, Limpopo Province, South Africa
- Kookfontein Mine, North West Province, South Africa
- Luna Mining Multiple Tailings Facilities in Democratic Republic of Congo

Find the full list of Geotechnical and TSF Project Experience at the end.



Tailings Dam Design and Engineering

We specialize in the design and engineering of tailings dams for a variety of commodity industries, including coal, gold, chrome, copper, and platinum operations. Our team has experience with a wide range of tailings dam types and construction methods. We work closely with our clients to develop innovative and cost-effective solutions that meet their operational and regulatory requirements.

Tailings Characterization and Testing

We offer a full range of tailings characterization and testing services to help our clients understand the properties of their tailings and develop appropriate management strategies. Our testing capabilities include:

- Physical testing (e.g., particle size distribution, specific gravity, shear strength)
- Chemical testing (e.g., pH, salinity, metals content)
- Geotechnical testing (e.g., consolidation, permeability, triaxial shear)

Tailings Management Planning

We assist our clients in developing and implementing tailings management plans that comply with all applicable regulations. Our plans cover all aspects of tailings management, from the design of tailings dams to the operation and closure of tailings facilities.

We also offer operational support services to help our clients ensure that their tailings facilities are operating safely and efficiently. Our services include:

- Tailings dam monitoring and inspection
- Tailings slurry management
- Tailings dust suppression
- Tailings water recovery

Tailings Closure and Rehabilitation

We help our clients to develop and implement tailings closure and rehabilitation plans that meet all applicable regulations and environmental standards. Our plans cover all aspects of tailings closure, from the decommissioning of tailings dams to the revegetation of tailings facilities.

Tailings Risk Assessment and Mitigation

We conduct tailings risk assessments to identify and evaluate the potential risks associated with tailings facilities. Our assessments consider a wide range of factors, including the geotechnical stability of the tailings dam, the properties of the tailing's slurry, and the potential for environmental impacts.

Once we have identified potential risks, we develop mitigation plans to reduce the likelihood or severity of those risks. Our mitigation strategies may include:

- Tailings dam design modifications
- Operational procedures changes
- Emergency preparedness and response planning

Engineer of Record Services: (EoR)

Our Engineer of Record services includes the following:

- *Technical expertise and experience.*
- *Leadership and guidance (design intent).*
- *Regulatory compliance.*
- *Quality compliance.*
- *Safety and sustainability.*
- *Independent technical review.*

NURIZON Consulting Engineers is a trusted partner for tailings management services. We have a team of experienced engineers who provide our clients with safe and sustainable solutions that meet their specific needs. If you are looking for a reliable and experienced tailings management consultant, we encourage you to contact us today.

NURIZON

CONSULTING ENGINEERS



NURIZON CONSULTING Pty Ltd



Route 21 Corporate Park
Regency Pavilion – Suite 6A
36 Regency Drive
Gauteng, South Africa



info@nurizon.co.za
+27 12 345 3649



NURIZON INTERNATIONAL Limited



Suite 6.03, 6th Floor
One Crown Square
Woking, GU21 6HR
United Kingdom



info@nurizon.co.uk
+44 1483 366 033



NURIZON's TSF Projects Experience

Client	Description	Country
Black Chrome Mine	Tailings Storage Facility (TSF) and associated infrastructure design, for a Chrome Beneficiation Plant sized for an input of 80,000 tonnes per month Run-of-Mine (ROM) with a feed grade of 33% to 34% (2023)	Limpopo Province of South Africa
Practara Metals & Mining Advisory	Khoemacau Copper Mine Techno Economic Fatal Flaw Assessment in terms of the Tailings Storage Facility and associated infrastructure (2023).	Kalahari Copperbelt in Botswana, Africa
Bauba Resources (Pty) Ltd.	Kookfontein Mine. Development of the Kookfontein Mine Tailings Storage Facility (TSF) ($\pm 30,000\text{tpm}$), for tailings generated from the Chromite and PGM Beneficiation Facilities. The design also includes a detailed geotechnical investigation, access road and 21km raw water supply pipeline design. (2022 / 2023)	North-West Province, South Africa
ERO Copper / UMS	Boa Esperança Project. Owners Team (Tailings Storage Facility Expert). Tailings Disposal and Management Facilities of the Boa Esperança Copper Project, which comprises the development of an open pit mine, and copper sulphides concentrator (2022)	Tucumã, Province of Pará, Brazil
Vanadium Resources (Pty) Ltd.	Steelpoortdrift Vanadium Mine - Design of the Concentrator and Salt Roast Plant's Tailings Storage Facilities (TSF) and associated civil engineering and stormwater management design (including geotechnical investigations and design) (2022).	Limpopo Province, South Africa
Anglo American Platinum	Mogalakwena Mine - Design and construction support for the upgrade of the Mogalakwena Mine's North Concentrator's final tailings infrastructure (2022)	Limpopo Province of South Africa
Bauba Hlabirwa Mining Investments	Moeijelijk Chrome Mine - Tailings Storage Facility Monitoring (External Audit) (2021)	Limpopo Province of South Africa
Luna Mining	KALUMINES MINE. Planning and detail design of the new Tailings Dam, Return Water Dam and Stormwater Management.	Lubumbashi, The Democratic Republic of the Congo
OMI Solutions (PTY) Ltd.	Kareevlei Diamond Mine's geotechnical investigation, focusing on the i) Infrastructure and Plant Area ii) TSF Area and iii) stockpile/dump area (2021)	Northern Cape Province of South Africa

NURIZON's Geotechnical Projects Experience

Client	Description	Country
BHM Construction International (UK) Ltd.	Design and Construction of the Tema - Aflao Road (17km) - Phase 1: Geotechnical investigation and bridges (4 off) foundation design (up to 800mm diameter piles, 19m deep) (2021 to 2023)	Accra, Ghana
Sereti Green	Geotechnical Investigation for the Ummbila Wind Farm project, in terms of the Main Transmission Substation, Collector Substation and Overhead Line (2013)	Mpumalanga Province of South Africa
Mainstream Renewable Power South Africa	Geotechnical Investigations for the Varsfontein Substation and Overhead Power Line	Western Cape Province of South Africa
IQS Holdings	Geotechnical Investigation for the Robinson Deep Landfill Extension. Robinson Deep Landfill is an existing landfill site located in Turffontein, Johannesburg	Johannesburg, Gauteng Province of South Africa
OMI Solutions (Pty) Ltd.	Geotechnical Investigation in terms of Spitzkop Mine's Stormwater Management Plan, in support of the Mine's Water Use and Waste Licences and Stream Diversion (2023)	Limpopo Province of South Africa
OMI Solutions (PTY) Ltd.	Geotechnical Investigation for the Amatshe Central Gold Mine Operations (2021)	Gauteng Province of South Africa
Hatting and Ndzabandzaba Attorneys	Expert Witness – Dolomitic Stability (Irene X10) (2021)	Irene, Gauteng Province of South Africa
Anglo American / Practara	Twickenham Mine SWMP – Geotechnical Investigation (2021)	Mokopane, Limpopo Province of South Africa
Sefateng Chrome Valley Development	Sefateng Chrome Mine. Geotechnical, civil, structural, mechanical, and electrical design for a material handling system at their Sefateng Chrome Mine (300t/hr Main Conveyor system), including an underground conveyor, overland conveyors, waste conveyor, transfer towers and Luffing / Slewing Conveyor (2021)	Near Steelpoort, Limpopo Province, South Africa
Red Kite Environmental Solutions (Pty) Ltd.	Mphahlele Mining Right Application Project - Geotechnical Investigation for the (i) Infrastructure and Plant area ii) TSF (tailings storage facility) area and iii) stockpile / dump area (2021)	Near Lebowakgomo in the Limpopo Province of South Africa
Motjoli Iron Ore Company (Pty) Ltd.	Meletse Iron Ore Project - Geotechnical Investigation (2020)	Thabazimbi, Limpopo Province of South Africa
Afritin Mining	Uis Tin Mine – Process Plant Upgrade – Geotechnical Investigation (2020)	Town of Uis, located in the Erongo region of Namibia

URU Metals Ltd.	Zebediela Nickel Project - Geotechnical Investigation for the (i) Infrastructure and Plant area (including roads) ii) TSF (tailings storage facility) area and iii) stockpile / dump area (2020)	Approximately 5.7km northeast of Mokopane, Limpopo Province of South Africa
Lynca Meats	New Butchery – Geotechnical Investigation (2020)	Meyerton, Gauteng Province of South Africa
Anglo American Platinum	Mortimer Electrical Separation Project - Geotechnical Investigation (2019)	Approximately 15 km west of Northam, Limpopo Province of South Africa.
Eskom	Eskom, Merensky - Steelpoort Line - Electrical Overhead Support Foundations (2019)	Steelpoort, Limpopo province of South Africa
Lynca Meats	Industrial Wastewater Treatment Plant – Geotechnical Investigation (2019)	Meyerton, Gauteng Province of South Africa
URU Metals Ltd.	Zebediela Nickel Project - Geotechnical Investigation for the (i) Infrastructure and Plant area (including roads) ii) TSF (tailings storage facility) area and iii) stockpile / dump area (2020)	Approximately 5.7km north east of Mokopane, Limpopo Province of South Africa
Lynca Meats	New Butchery – Geotechnical Investigation (2020)	Meyerton, Gauteng Province of South Africa
Exxaro	Leeuwpan Coal Mine, Life of Mine ("Lifex") Project - Geotechnical, civil, structural and architectural detail design, project management, tender and construction documentation and construction support for the construction of 46 houses as part of the Leeuwpan Coal Mine resettlement plan. (2019)	Botleng, approximately 3km north of Delmas, Mpumalanga Province of South Africa
Eskom	Booysendal, Northam - Electrical Overhead Support Foundation Nominations (2019)	Northam, Limpopo province of South Africa
Mandlaglo Commodities (Pty) Ltd	Tala, Bethal Coal Mine - Geotechnical Investigation Report (2019)	Bethal area of Mpumalanga, South Africa
Erwat	Dolomitic Stability Investigations for 19 ERWAT (East Rand Water Care Works) Wastewater Treatment Plants – 2-year appointment (2017 – 2018)	Gauteng Province, South Africa
Evergreens	Dolomitic stability investigation, geotechnical investigation and foundation design for the new Evergreens Development, adjacent to the R21 (2016)	Gauteng Province, South Africa
Contracta	Geotechnical Investigation and foundation design for the new Kumasi International Airport's terminal building and extension of the runway and apron (2018)	Kumasi, Ghana

Erwat	Dolomitic Stability investigation for the new PST at the ERWAT Waterval Wastewater Care Works (2018)	Gauteng Province, South Africa
Rand Water / Mathosi	Geotechnical Investigation and foundation design for two substations at the Rand Water Zuikerbosh Pumping Station (2017)	Near Vereeniging, South Africa
Erwat	Dolomitic Stability investigation for the new PST at the Olifantsfontein Wastewater Care Works (2017)	Gauteng Province, South Africa
Patio Warehouse / Saiyl	Geotechnical Investigation and foundation design for the new Patio Warehouse in George (2018)	George, Western Cape Province
Transnet	Phalaborwa Line – Proposed New Loops at Brakspruitbrug and Palmloop - Geotechnical Investigation (2016)	Limpopo Province, South Africa
Coffey Mining	Lucunga Phosphate Project. Geotechnical Investigation for the (i) Tailings Storage Facility Area, (ii) Process Plant Area and (iii) IDZ (Industrial Development Zone) Area.	Zaire Province, Angola
Doosan Heavy Industries & Construction Co. Ltd	Geotechnical Investigation for the Thabametsi 600MW Coal Fired power plant. (2015)	Limpopo Province, South Africa
Transnet	Komatipoort Line – Proposed new Loops at Nagel and between Nagel and Mhlume - Geotechnical Investigation (2015)	Mpumalanga Province, South Africa
Lula Mining	KALUMINES MINE. Planning and detail design of the new Tailings Dam, Return Water Dam and Stormwater Management.	Lubumbashi, The Democratic Republic of the Congo
SA Lion Park	Geotechnical Investigation and Dolomitic Stability Investigation for the proposed new Lion Park. (2013)	Gauteng Province, South Africa
Trafigura Services South Africa (Luna Mining)	Mbola Mine - 1. Geotechnical Investigation and report regarding the stability of the existing Tailings Dam wall. 2) Design of the two new Tailings Storage Facilities (TSF). (2013)	Lubumbashi, The Democratic Republic of the Congo
Coal of Africa Limited	Mooiplaats Coal Project. Pollution Control Dam Geotechnical Investigation	Mpumalanga Province, South Africa