

DECEMBER 2023

## MARIKANA TAILINGS STORAGE FACILITY (TSF)

### DETAILS OF TAILINGS STORAGE FACILITY

<b>Tailings Storage Facility (TSF) Name</b>	Marikana
<b>Operation</b>	Kroondal - K2 Concentrator
<b>Operational Status</b>	Active
<b>Operating Segment</b>	RSA - PGM
<b>Location</b>	Approximately 15 km outside the town of Rustenburg in the North-West Province - please refer to Figure 1
<b>Latitude, Longitude (decimals)</b>	-25.732519, 27.40939
<b>Ore Source</b>	Underground
<b>Type of Storage Facility</b>	Impoundment (upstream development)
<b>Deposition Methodology</b>	Spigot
<b>Year of Commissioning</b>	2002
<b>Consequence Classification (GISTM, 2020)</b>	Very High
<b>Operating Contractor</b>	EnviroServ Waste Management (Pty) Ltd
<b>Engineer of Record (EoR)</b>	Knight Piesold (Pty) Ltd (KP)
<b>Current Maximum Height (m)</b>	27
<b>Final Maximum Height (m)</b>	41
<b>Maximum Storage Capacity (tons/month)</b>	200 000
<b>Total Volume Already Deposited (Mm<sup>3</sup>)</b>	12,8
<b>Life of TSF (year)</b>	2030 @2m/yr



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## TECHNICAL ASPECTS:

### Design Criteria

GISTM and best practice guidelines including Australian National Committee on Large Dams (ANCOLD) (Guidelines on Tailings Dams, July 2019). Site specific design criteria were specified by the EoR. Details are included in the Design Basis Report (DBR).

### Stability Assessment and Mitigation Measures

A detailed stability assessment based on piezocone probing and limited laboratory results was conducted in 2023.

(KP reference.: 301-00851/09 Rev 0, July 2023).

All the FoS are above the recommended limits and thus no mitigation measures were required. This assessment will be refined based on laboratory testing results and shear vanes test results once they become available in Q1 2024

Historically, seepage was first identified on the eastern part of the TSF which resulted in Phase 1 buttressing. Thereafter, seepage on the north-west & west flanks were observed which resulted in an extension of the existing buttress (Phase 2). During the 3rd quarter inspection in 2021, seepage was noted on the north-east and south-east corner of the TSF. Another buttress extension (Phase 3) was carried out and completed in March 2022.

### Dam Breach Assessment

Assessment completed in 2022

(KP Reference: PR301-00851/05, Rev 0, 17 February 2023)

### Area of Inundation

Has been identified by EoRs – please refer to Figures 2 and 3

### Summary of Human Exposure

Consequence classification has been based on Population at Risk (PAR). Communities have been identified and are being engaged through various means including Community Engagement Forums (CEF)



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## DOCUMENTATION:

### Site Specific OMS Manual

Version 2022 available  
Mandatory Code of Practice (MCOP) Reference No: ZA-PGM's-MCOP-CON-TLS-0101 is in place (dated June 2019)

### Design Basis Report (DBR)

Version 2022 available  
(KP Reference: SAND301-00851/07 Rev 0, 27 February 2023)

### Environmental Management System

The Environmental Management System is ISO accredited (ISO 14001:2015)

The initial Environmental Management Programme (EMPr) is dated 2010. Numerous addendums have been submitted with the latest being in 2016.

### Surveillance:

#### Surveillance Frequency

Daily by the Operator and monthly reports of critical controls submitted to and reviewed by the EoR

#### Surveillance Technology/System

K2Fly Decipher

#### Deformation Monitoring

Interferometric Synthetic Aperture Radar (InSAR)

#### Phreatic Surface Levels & Pore Pressure Measurements

Standpipe piezometers  
AquaSense Retrofit piezometers (IoT device)

## RISK MANAGEMENT / EMERGENCY PREPAREDNESS:

### Risk Assessment

Annual Risk Assessment (Bowtie and Fault Event Tree) completed with no untoward risk identified

### Risk Management

Site specific OMS Manual in place  
Site specific Trigger Action Response Plans (TARPs) in place  
Critical controls established and implemented

### Site Specific Emergency Preparedness & Response Plans (EPRP)

Version 2023 available  
Annual emergency mock drill for a catastrophic TSF failure – undertaken on 12 June 2023 with SSW employees and contractors.

Environmental emergency preparedness is managed on site according to ISO14001: 2015.



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## CLOSURE & POST CLOSURE

### Closure Planning

In place - report prepared by Golder Associates  
(Golder Reference: 20353611-341349-2, April 2021)

### Closure Costing

Adequate financial capacity in place  
Financials prepared by Golder Associates  
(Golder Reference: 21467925-349386-1, December 2021)

### Asset Insurance Cover

In place – July 2022 to June 2024

## Independent Reviews:

### Independent Tailings Review Board (ITRB)

13 July 2022 with no material concerns identified

### Future ITRB Review

2024

### Performance Reviews

Annual and quarterly reports and inspections completed  
by EoR  
(KP reference: RI301-00851/13 Rev 0, 20 April 2023)

### Dam Safety Review (DSR)

Carried out by an independent third party in 2020. All  
recommendations at the time have been addressed in  
the last 3 years.  
(KP Reference: RI301-00851/01 Rev B, August 2019)

Next review scheduled for 2024



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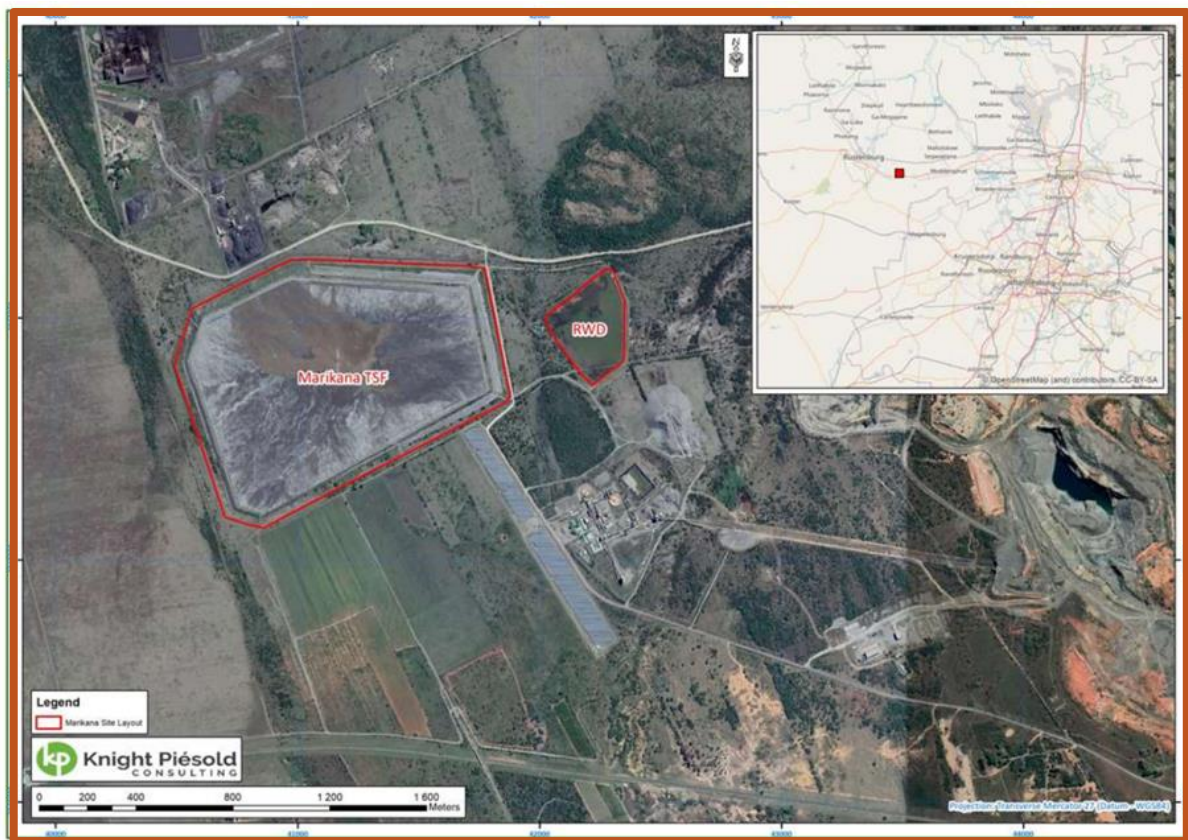


Figure 1: Layout of Marikana TSF





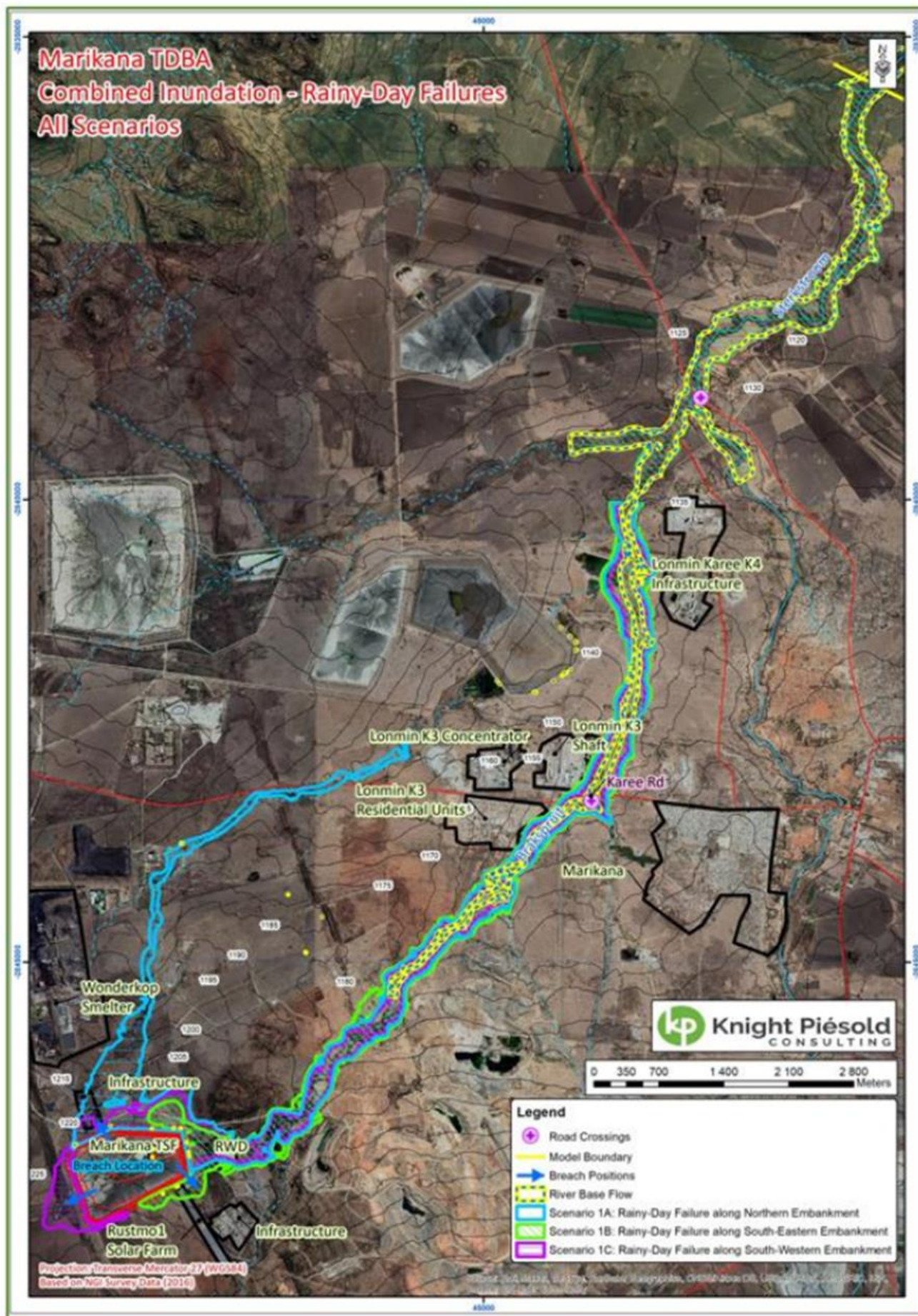
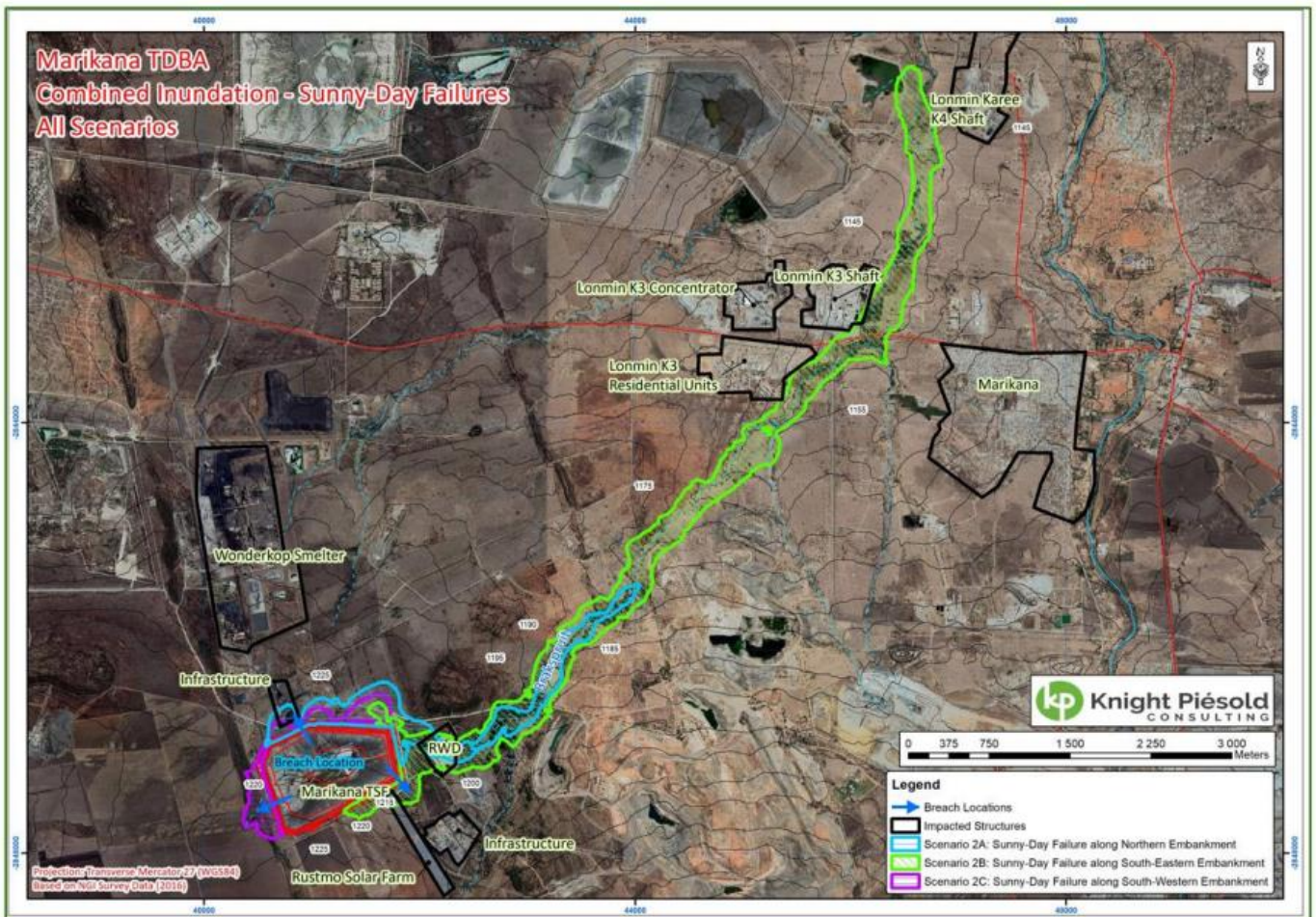


Figure 2: Consolidated view of the rainy-day failure scenario inundation boundaries





**Figure 3:** Consolidated view of the sunny-day failure scenario inundation boundaries

