Tronox KZN Sands (Pty) Ltd

ENVIRONMENTAL RISK ASSESSMENT, REHABILITATION, DECOMMISSIONING AND MINE CLOSURE PLAN

Fairbreeze Mine Extension into Heleza Moya Farm

41104206-359464-04
NOVEMBER 2023

CONFIDENTIAL

Tronox KZN Sands (Pty) Ltd

ENVIRONMENTAL RISK ASSESSMENT, REHABILITATION, DECOMMISSIONING AND MINE CLOSURE PLAN

Fairbreeze

CONFIDENTIAL

PROJECT NO. 41104206

OUR REF. NO. 41104206-359464-04

DATE: NOVEMBER 2023

WSP

Building 1, Maxwell Office Park
Magwa Crescent West, Waterfall City
Midrand, 1685
South Africa

Phone: +27 11 254 4800

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Final
Remarks	Draft Report	Final Report
Date	November 2023	November 2023
Prepared by	Orapeleng Mosito	Orapeleng Mosito
Signature		
Checked by	Brent Baxter	Brent Baxter
Signature		
Authorised by	Johan Bothma	Johan Bothma
Signature		
Project number	41104206	
Report number	41104206-359464-04	
File reference	41104206-359464-04 Environmental Risk Assessment Mine Closure Plan	

QUALITY CONTROL

Issue/revision	First issue	Final
Remarks	Draft Report	Final Report
Date	November 2023	November 2023
Prepared by	Orapeleng Mosito	Orapeleng Mosito
Signature		
Checked by	Brent Baxter	Brent Baxter
Signature		
Authorised by	Johan Bothma	Johan Bothma
Signature		
Project number	41104206	
Report number	41104206-359464-04	
File reference	41104206-359464-04 Environmental Risk Assessment Mine Closure Plan	

CONTENTS

TABLES

FIGURES

APPENDICES

LIST OF DEFINITIONS

Care and Maintenance	This involves processes and conditions to ensure that mine site is kept in safe and stable state following cessation of active mining activities. It includes the maintaining and implementation of corrective actions as requires as well as conducting the required inspection and monitoring to demonstrate achievement of success of the implemented rehabilitation and maintenance measures.
Closure	Is a phase when active mining and processing activities have ceased and final decommissioning and mine reclamation are being implemented or completed.
Contingencies	This allows for making reasonable allowance for possible oversights/omissions and possible work not foreseen at the time of compilation of the closure costs. An allowance of between 10% and 20 % is usually made based on the accuracy of the estimations.
Decommissioning	This relates to the situation after cessation of active mining activities involving the demolition/removal and/or transfer of surface infrastructure and the initiation of implementation of general site rehabilitation or reclamation
Independent expert/s	A specialist or an auditor who has no business, financial, personal or other interest in undertaking such tasks excluding normal and fair remuneration for work performed for the operations and where there are no circumstances that ma compromise the objectivity of that specialist or auditor in performing tasks for the operations.
Integrated mine closure	Integrated mine closure is a dynamic and iterative process that considers environmental, social and economic issues at an early stage of mine development and is developed throughout the life of the mine. Fundamental to this is the need to consider closure as an integral part of the mine operations' core business.
Post closure	The period of on-going care and maintenance, as per Tronox KZN Sand's own arrangement as well as arrangements with relevant third parties
Post mining" or "End land" use	The "use" for which land, previously affected by mining activities and associated processes, can be utilized through appropriate engagement processes. Mined lands may be returned to pre-mining land use, post closure, or alternative land uses.
Preliminary and Generals (P&Gs)	This is a key cost item which is directly related to whether third party contractors are applied for site rehabilitation. This cost item comprises both fixed and time-related charges. The former makes allowance for establishment (and de-establishment) of contractors on site, as well as covering their operational requirements for their offices (electricity/water/communications), latrines, etc. Time-related items make allowance for the running costs of the fixed charged items for the contract period.

Rehabilitation	The re-instatement of a disturbed area into a usable state (not necessarily its pre-mining state) as defined by broad land use and related performance objectives.
Remediation	Process to modify disturbed land to ecologically functional or economically useable state, to assist in the rehabilitation process by enhancing the quality of an area through specific actions to improve especially bio-physical site conditions
Scheduled Closure	Closure that happens at the planned date and/or time horizon
Site relinquishment	Receipt of closure certificate and handover to third parties for on-going care and maintenance, if and when required.
specialist	According to the 2015 Financial Provisioning Regulations, “specialist” means an independent person or persons who is qualified by virtue of his or her demonstrable knowledge, qualifications, skills or expertise in the mining, environmental, resource economy and financial fields
Stable Land Form	A final form that requires minimal to no maintenance work.
Unscheduled Closure	Immediate closure of an operation, representing decommissioning and rehabilitation of the site in its present state
Planning/Pre-construction	refers to the phase in which planning takes place, namely: exploration, environmental studies, finalising designs, etc.;
Construction	refers to the phase in which the site is prepared, and infrastructure is established (e.g. vegetation clearance, access road preparation, construction camp establishment, infrastructure placement, etc.)
Operation	refers to the phase in which physical mining and production takes place – this phase will include roll over mining and on-going progressive rehabilitation efforts;
Decommissioning and rehabilitation	refers to the inter-linked phases in which existing infrastructure is removed and final rehabilitation efforts are applied, and their success monitored
The closure phase	commences once the ore-extracting activities of a mine have ceased, and final decommissioning and mine rehabilitation is being completed. This phase usually ceases 3-5 years after physical closure activities and would align with the issuance of a closure certificate;
Post-closure	refers to the phase in which maintenance and rehabilitation monitoring are undertaken to ensure that the mines closure objectives are met. Post-closure typically commences once a closure certificate has been received. The duration of the post-closure phase is defined by the duration of the applicable residual and latent environmental impacts.

ACRONYMS AND ABBREVIATIONS

Abbreviations	Explanation
DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
EMS	Environmental Management System
GDP	Gross Domestic Product
LFA	Landscape Function Analyses
LoM	Life of Mine
MRA	Mining Rights Area
NEMA	National Environmental Management Act
ROM	Run of Mine
TSF	Tailings Storage Facility
WHO	World Health Organisation
WRD	Waste Rock Dump

UNITS OF MEASUREMENT

Abbreviations	Explanation
km	Kilometre
ha	Hectare
m	Metre
mbgl	Metres below ground level
m3	Cubic metres
mm	Millimetre
mamsl	Metres above mean sea level
mt	million tonnes
mta	million tonnes per annum
t	ton
tpa	tonnes per annum

1 INTRODUCTION

Tronox KZN Sands (Pty) Ltd (herein referred to as Tronox) has appointed WSP Group Africa (Pty) Ltd (WSP) as the independent Environmental Assessment Practitioner (EAP) to undertake permitting of the proposed expansion of mining into portions of the Heleza Moya property. In 2022 Tronox acquired the 118 ha Heleza Moya property, located between the Fairbreeze primary wet plant (PWP) and the approved Fairbreeze B (FBB) mining area. The Heleza Moya property has previously been incorporated into the Fairbreeze Mining Rights Area (MRA). The extension of mining into this area will add two years to the life of mine of Fairbreeze.

Tronox is now making application to extend mineral sands mining into parts of Heleza Moya to enable this area to be mined together with the approved FBB orebody which lies to the immediate north and west of Heleza Moya. No changes in on-site processing infrastructure accompany this application. Similarly, no changes in on-site residue disposal infrastructure are required.

The Heleza Moya surface rights cover an area of approximately 118.6 hectares (ha) over portion 3 of Lot 88 of the farm Emoyeni 9105 and is located immediately south of Mtunzini town and extends southwards for approximately 12 km west of the N2 highway, in uMlazi Local Municipality, within King Cetshwayo District Municipality in the of KwaZulu-Natal Province.

Tronox has operated the Fairbreeze mineral sands mine for nearly 10 years. The mine comprises four approved mining areas (Pits A, B, C and C-Extension), an onsite primary wet plant (PWP) and a fines residue storage facility[1] (RSF). Heavy mineral concentrate from the PWP containing ilmenite, zircon, rutile and other mining co-products, is transported by road to the Tronox Central Processing Complex (CPC) which includes a Mineral separation plant and smelter where titanium dioxide and pig iron are produced. The existing Fairbreeze Mine infrastructure will be utilised, and no new surface infrastructure such as offices, dams, stores facility, workshops, or change house will be required for the project. Similarly, no new residue storage facility will be required.

In accordance with Section 24P of the National Environmental Management Act, Act 107of 1998 (NEMA) Tronox must, before the Minister responsible for mineral resources issues the Environmental Authorisation (EA), comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts. This Final Rehabilitation, Decommissioning and Closure Plan (FRDCP) aims to meet this requirement and has been prepared in accordance with the requirements of the NEMA Financial Provisioning Regulations (2022) (NEMA GNR 1147), as amended, (Financial Regulations).

1.1 SCOPE AND PUROSES

This report presents the closure input in support of the EA application for the Fairbreeze mine extension new infrastructure and mining development project (and not the entire mining right) and addresses the requirements of the Financial Regulations. This report only summarises information

[1] The Mega Sebeka RSF has recently been expanded to include additional capacity. This expansion, known as Everglades, was approved in 2022.

that is pertinent to the authorisation process and does not replace the on-going closure planning processes.

1.2 OBJECTIVES OF THE REPORT

According to the Financial Regulations, financial provision must be made for annual rehabilitation, final rehabilitation, decommissioning and closure activities at the end of prospecting, exploration, mining or production operations and remediation and management of latent or residual environmental impacts which may become known in the future (Table 1-1). To address these requirements this document includes only the final rehabilitation, decommissioning and mine closure plan, and an environmental risk assessment report, as Fairbreeze mine extension project is not yet operational and mining activities are still planned for execution.

Table 1-1 – NEMA GNR 1147 Appendix 3, 5 and 5 requirements and associated sections where they are formally addressed

No.	Requirement	Relevant Section
Annual Rehabilitation Plan – Appendix 1		
3.1	details of the: 3.1.1 specialist or specialists that prepared the plan; 3.1.2 professional registrations and experience of the specialist or specialists; 3.1.3 applicant or holder, including but not limited to the name, physical address, postal address and contact details; and 3.1.4 timeframes of implementation of the current, and review of the previous mitigation and rehabilitation activities;	2 No review required as this is new mine. Time frames are provided in 10
3.2	the pertinent environmental and project context highlighting issues which are different to those indicated and considered in the final rehabilitation, decommissioning and mine closure plan which relate directly to the planned annual mitigation and rehabilitation activity (e.g., drought, machine failure or anormaly);	5.1 and 5.6
3.3	results of modelling impacts for the proceeding 12 months with a view to informing mitigation and rehabilitation activities going forward;	This is a new project, no operational activities have commenced as yet
3.4	an identification of activities not undertaken, and targets not met in the rehabilitation experienced in the preceding 12 months;	This is a new project, no operational activities have commenced as yet
3.5	Any risks which materialised or anomalies which impacted on the environment over the preceding 12 months, and how these were incorporated into the risk model for the operations;	This is a new project, no operational activities have commenced as yet
3.6	Details of the planned progressive mitigation and rehabilitation activities or measures for the forthcoming 12 months, including those which will address the shortcomings contemplated in paragraph 3.4 above or which address the risks which materialised or were identified from monitoring in the preceding 12 months, and including: 3.6.1 if no areas are available for progressive rehabilitation concurrent with mining, an indication to that effect and motivation why no progressive rehabilitation can be undertaken; 3.6.2 where areas are available for progressive rehabilitation the following must be tabulated: 3.6.2.1 the nature or type of activity and associated infrastructure to be undertaken; 3.6.2.2 planned remaining life of the activity and impact under consideration;	This is a new project, no operational activities have commenced as yet

No.	Requirement	Relevant Section
	3.6.2.3 area already disturbed or planned to be disturbed in the period under review; 3.6.2.4 percentage of the area already disturbed, including the bulking factor and volume of material stockpiled; 3.6.2.5 percentage of the area to be disturbed and anticipated bulking factor and volume of material for stockpiling; 3.6.2.6 area and volume of material available for progressive mitigation and rehabilitation activities; 3.6.2.7 percentage of the area disturbed and volume of material identified in paragraph 3.6.2.4 above and on which progressive mitigation and rehabilitation activities can be undertaken 3.6.2.8 notes to indicate why total available or planned to be available areas differs from area already disturbed or planned to be disturbed 3.6.2.9 notes to indicate why progressive rehabilitation will not be undertaken on the full available or planned to be available area; 3.6.2.10 the pertinent closure objectives and performance targets that will be addressed in the forthcoming 12 months of operations, which objectives and targets are aligned to the final rehabilitation, decommissioning and mine closure plan; 3.6.2.11 details of mitigation and rehabilitation activities planned on the area the forthcoming 12 months; 3.6.2.12 description of the relevant closure design criteria adopted in the annual mitigation and rehabilitation activities and the expected final sustainable end state of land once all mitigation and rehabilitation activities are complete for the activity or aspect;	
3.7	A site plan indicating at least the total area disturbed, area available for rehabilitation and the area to be rehabilitated per aspect or activity'	This is a new project, no operational activities have commenced as yet
3.8	A review of the proceeding 12 months of mitigation and rehabilitation activities, indicating comparison between activities planned and actual mitigation and rehabilitation implemented, which should be tabulated and as a minimum contain; 3.8.1 area planned to be rehabilitated during the period under review; 3.8.2 actual area rehabilitated 3.8.3 if variance between planned and actual exceeds 15%, motivation indicating reasons for the inability to rehabilitate the full area	This is a new project, no operational activities have commenced as yet
3.9	Costing, based on market related figures, including: 3.9.1 an explanation of the closure cost methodology 3.9.2 auditable calculations of costs per activity or infrastructure; 3.9.3 Cost assumptions; and 3.9.4 monitoring and maintenance costs likely to be incurred during the period of execution of the progressive rehabilitation.	6 13.1 13.3 13.2 13.3
Final Rehabilitation, Decommissioning and Mine Closure Plan – Appendix 2		
3.1	Details of 3.1.1 the person or persons that prepared the plan; 3.1.2 the professional registrations and experience of the person or persons who prepared the plan 3.1.3 the applicant or holder, including but not limited to the name, physical address, postal address and contact details;	2
3.2	the context of the project, including but not limited to: 3.2.1 mineral/s to be or being mined, mining method, area already mined or to be mined in the case of a greenfields site, the backlog in rehabilitation if relevant, annual extraction rate, overall	5

No.	Requirement	Relevant Section
	extraction rates, life of mine and any material information and issues that have guided the development of the plan; 3.2.2 an overview of: 3,2,2,1 the environmental context, including but not limited to air quality, quantity and quality of surface and groundwater, land, soils, terrestrial and aquatic biodiversity; 3.2.2.2 the social context that may influence closure activities and post-mining land use or be influenced by closure activities and post-mining land use; and 3.2.2.3 other mining activities within a 20 km radius of the mining area;	5.6 5.6.8
3.3	Stakeholder issues and comments that have informed the plan;	
3.4	The mining plan and schedule for full approved operations, including: 3.4.1 appropriate description of the mine plan; 3.4.2 drawings and figures to indicate how the mine develops; 3.4.3 what areas are disturbed and will be disturbed; and 3.4.4 how infrastructure and structures (including ponds, residue stockpiles etc.) develop during operations;	5.3
3.5	Details of preferred sustainable end state of the operations including: 3.5.1 the legal and governance framework and interpretation of these requirements for the closure design principles; 3.5.2 a description of sustainable end state and post mining economy to be achieved, objectives and targets, which objectives and targets must reflect the local environmental and socio-economic context, the regulatory and corporate requirements and stakeholder expectations; 3.5.3 a description and evaluation of alternative closure and post closure options where these exist, that are practical with socio-economic context; and 3.5.4 environmental opportunities and constraints in which the operation is located;	4 8 8
3.6	Findings of an environmental risk assessment and modelling process leading to the most appropriate closure strategy, including: 3.6.1 a description of the risk assessment methodology including risk identification and quantification, to be undertaken for all areas of infrastructure or activities or aspects for which an applicant and holder has the responsibility to mitigate an impact or risk at closure; 3.6.2 an identification of receptors most sensitive to potential risks and the monitoring of such risks with a view to informing mitigation and rehabilitation activities; 3.6.3 an identification and modelling of conceptual closure strategies to avoid, manage and mitigate the impacts and risks; 3.6.4 a reassessment of risks to determine whether, after the implementation of the closure strategy, the latent risks has been avoided and/or how it has resulted in avoidance, rehabilitation and management of impacts and whether this is acceptable to the mining operation and stakeholders; 3.6.5 an explanation of changes to the risk assessment results, as applicable in annual updates to the plan; and 3.6.6 design principles for achieving the closure objectives, including the proposed final sustainable end state which is appropriate, feasible and possible to implement and which meets the principles of sustainable development, including: 3.6.6.1 description of appropriate and feasible final post-mining land use for the project area; 3.6.6.2 a map of the proposed final sustainable end state of the land; 3.6.6.3 a motivation for the preferred closure option within the context of the risks and impacts that are being mitigated; 3.6.6.4 a definition and motivation of the closure and post-closure period, taking cognisance of the probable need to implement post-closure monitoring and maintenance for a period sufficient to demonstrate that the risks threshold criteria have been achieved; and	6

No.	Requirement	Relevant Section
	3.6.6.5 details associated with any ongoing research on closure options and post mining economy options;	
	3.6.7 closure actions, including:	9
	3.6.7.1 a detailed description of the assumptions made to develop closure actions in the absence of detailed knowledge on site conditions, potential impacts, material availability, stakeholder requirements and other factors for which information is lacking;	
	3.6.7.2 the development and documentation of a description of specific technical solutions related to infrastructure and facilities for the preferred closure option, which must include all areas, infrastructure, activities and aspects associated with mining for which the mine has the responsibility; and	
	3.6.7.3 the development and implementation of plans to address threats and opportunities and any uncertainties associated the proposed closure actions, which will be used to identify and define any additional work or research that is needed to reduce the level of uncertainty;	10
	3.6.8 a schedule of actions for the annual rehabilitation plan, and the final rehabilitation, decommissioning and mine closure plan which will ensure mitigation, rehabilitation and management of impacts including ongoing pumping and treatment of extraneous water:	
	3.6.8.1 linked to the mining work programme, if greenfields, or to the current mine plan, if brownfields, including assumptions and schedule drivers; and	
	3.6.8.2 including a spatial map, showing planned spatial progression throughout operations;	
	3.6.9 an indication of the organisational capacity that will be put in place to implement the plan, including:	12
	3.6.9.1 organisational structure as it pertains to the plan	
	3.6.9.2 responsibilities; and	
	3.6.9.3 training and capacity building that may be required to build closure competence;	
	3.6.10 an indication of gaps in the plan, including an auditable action plan and schedule to address the gaps;	
	3.6.11 closure and risk threshold criteria for each activity or infrastructure in relation to environmental aspects with auditable indicators;	13
	3.6.12 the closure costs based on cost estimates for operations, or components of operations as follows:	
	3.6.12.1 costing, calculated using market related figures and current value of money and no discounting or net present value calculations;	
	3.6.12.2 costs must be calculated for the rehabilitation, maintenance and long term monitoring being undertaken on all disturbed areas and associated environmental impacts	
	3.6.12.3 costs calculations must be based on rehabilitation, maintenance and long-term monitoring of activities undertaken by third party;	
	3.6.12.4 where appropriate, a differentiation between capital, operating, replacement and maintenance costs;	
	3.6.12.5 the closure costs estimation must include cost assumptions and auditable calculations of costs per activity or infrastructure; and	
	3.6.12.6 cost estimates for operations, or components of operations as follows:	

No.	Requirement	Relevant Section
	<table><tr><th>End of life of operation (or components of operation) from year of assessment</th><th>Design effort</th><th>Degree of accuracy in cost estimation</th></tr><tr><td>> 30 years</td><td>Pre-Conceptual / Class 5 Estimate / up to 2% of complete definition</td><td>-50% to + 50%</td></tr><tr><td>10 to 30 years</td><td>Conceptual / Pre-feasibility / Class 4 Estimate / up to 15% of complete definition</td><td>-30% to + 30%</td></tr><tr><td>5 to 10 years</td><td>Preliminary / Feasibility / Class 3 Estimate / up to 40% of complete definition</td><td>-20% to + 20%</td></tr><tr><td>Less than 5 years</td><td>Detailed Designs / Bid / Tender / Class 2 estimate up to 75% of complete definition</td><td>-10% to + 10% (or less)</td></tr><tr><td colspan="3">*The calculations for operations with 5 or less years must include a line item for carrying out specialist studies up to Detailed Design effort to improve the degree of accuracy to +/- 10% as well as contingency to ensure sufficient funds for closure by third party. Motivation must be provided to indicate the accuracy in the reported number and as accuracy improves, what actions resulted in an improvement in accuracy</td></tr></table> 3.6.13 the estimated costs must be expressed for each year based on the rate of extraction and extent of disturbed area; 3.6.14 the risk modelling and the calculation of closure cost estimation must be updated annually during the operation's life to reflect known developments, including changes from the annual review of the closure strategy assumptions and inputs, scope changes, the effect of a further year's inflation, new regulatory requirements and any other material developments; 3.6.15 monitoring, auditing and reporting requirements contemplated in these Regulations; 3.6.16 schedule of reporting requirements contemplated in these Regulations; and 3.6.17 motivations for any amendments made to the final rehabilitation, decommissioning and mine closure plan, given the monitoring results in the previous auditing period and the identification of gaps as above.	10.1 6.1
Environmental Risk Assessment Plan (Scheduled closure) – Appendix 3		
3.1	Details of: 3.1.1 the person or persons that prepared the plan; 3.1.2 the professional registrations and experience of the person or persons who prepared the plan; 3.1.3 the applicant or the holder including but not limited to: name, physical address, postal address, contact details; and 3.1.4 rights, permits, licences and authorisations associated with the operation including the right or permit number, environmental authorisation number, and similar details of all other authorisation received e.g. water use licence, waste management licence, etc.	2
3.2	Details of the assessment process used to identify and quantify the post-closure and possible latent risks including: 3.2.1 a description of risk assessment methodology inclusive of risk identification and quantification; 3.2.2 substantiation why each risk will occur post closure, including why the risk was not or could not be mitigated during progressive mitigation and rehabilitation or during the implementation of the final rehabilitation, decommissioning and mine closure plan; 3.2.3 a detailed description of the drivers that could result in the manifestation of the risks after closure; 3.2.4 a description of the expected timeframe in which the risk is likely to manifest, typically as expected years after closure, and the duration of the impact, including motivation to support these timeframes; 3.2.5 a detailed description of the triggers which can be used to identify that the risk is imminent or has manifested, how this will be measured and any cost implication thereof; 3.2.6 results and findings of the risk assessment or risks which will occur post-closure; and 3.2.7 an explanation of changes to the risk assessment results as applicable in annual updates to the plan.	6

<table>
<tr><th>No.</th><th>Requirement</th><th>Relevant Section</th></tr>
<tr><td>3.3</td><td>Management activities, including-
3.3.1 monitoring results and findings, which informs adaptive or corrective management and/or risk reduction activities;
3.3.2 an assessment of alternatives to mitigate or manage the impacts once the risk has become manifested, which must be focussed on practicality as well as cost of the implementation; and
3.3.3 a detailed description of how the alternative will be implemented;</td><td>This is a new project, no operational activities have commenced as yet</td></tr>
<tr><td>3.4</td><td>Calculation of costs for implementing the alternatives to manage and monitor latent impacts until the agreed risk threshold is reached using market related figures and the current value of money and no discounting or net present value calculations which must –
3.4.1.1 include costs to determine whether the risk is imminent or has manifest are to be included in the assessment as there are monitoring costs likely to be incurred during the implementation of the strategy to manage or mitigate the impacts once the risk has become manifest;
3.4.1.2 be based on the management , mitigation , rehabilitation , maintenance and long term monitoring of activities undertaken by the third party;
3.4.1.3 be calculated for the management, mitigation, rehabilitation, maintenance and long term monitoring of latent impacts for all disturbed areas and associated environmental impacts;
3.4.1.4 include the costs for the management, mitigation, rehabilitation, maintenance and long term monitoring of activities for the latent impacts must include costs assumptions and auditable calculations of costs per activity or infrastructure;
3.4.1.5 include the risk modelling and the calculation of post closure cost estimation must be updated annually during the operation's life to reflect known developments, including changes from the annual review of the closure strategy assumptions and inputs, scope changes; and
3.4.1.6 include the cost estimates for modelling and calculation of post-closure costs must be calculated using accuracy estimations as follows:
<table>
<tr><th>End of life of operation (or components of operation) from year of assessment</th><th>Design effort</th><th>Degree of accuracy in cost estimation</th></tr>
<tr><td>> 30 years</td><td>Pre-Conceptual / Class 5 Estimate / up to 2% of complete definition</td><td>-50% to + 50%</td></tr>
<tr><td>10 to 30 years</td><td>Conceptual / Pre-feasibility / Class 4 Estimate / up to 15% of complete definition</td><td>-30% to + 30%</td></tr>
<tr><td>5 to 10 years</td><td>Preliminary / Feasibility / Class 3 Estimate / up to 40% of complete definition</td><td>-20% to + 20%</td></tr>
<tr><td>Less than 5 years</td><td>Detailed Designs / Bid / Tender / Class 2 estimate up to 75% of complete definition</td><td>-10% to + 10% (or less)</td></tr>
<tr><td colspan="3">*The calculations for operations with 5 or less years must include a line item for carrying out specialist studies up to Detailed Design effort to improve the degree of accuracy to +/- 10% as well as contingency to ensure sufficient funds for closure by third party. Motivation must be provided to indicate the accuracy in the reported number and as accuracy improves, what actions resulted in an improvement in accuracy</td></tr>
</table></td><td>13</td></tr>
<tr><td>4</td><td>Part 2
Context for the environmental risk assessment report for unscheduled closure
For unscheduled closure, the contents of Part 1 – 3.1 to 3.3.4 (inclusive of 3.3.4) apply as well as the calculation of costs for implementing the activities to manage and monitor latent impacts until the agreed risk threshold is reached using market related figures and the criterial identified for scheduled closure based on –
4.1 an assessment of latent impacts for the current disturbed area as well as the disturbance for the next 12 months of operation; and
4.2 costs associated with the management, mitigation, rehabilitation and monitoring of latent impacts for the existing extent of the area disturbed until the risk threshold is reached based on costs for technologies immediately available, including water treatment technologies.</td><td>6</td></tr>
</table>

2 DETAILS OF THE SPECIALIST

The details of the professionals who contributed to the preparation of the annual rehabilitation plan (ARP), final rehabilitation, decommissioning and mine closure plan (FRDCP) and environmental risk assessment (ERA) are provided in Table 2-1.

Table 2-1 – Details of the specialist[2]

Team member	Role / Study Discipline	Qualifications and Experience	Company / Location
Johan Bothma	Project director, technical review	Director: Mine Closure PrLArch, ML(Prof) SACLAP 18 years' experience	WSP South Africa
Orapeleng Mosito	Project management, closure planning and costing specialist	Principal Associate B.Sc. Agric (Soil Science) 18 years' experience in mine closure	WSP South Africa

[2] According to the 2015 Financial Provisioning Regulations, "specialist" means an independent person or persons who is qualified by virtue of his or her demonstrable knowledge, qualifications, skills or expertise in the mining, environmental, resource economy and financial fields.

3 PROJECT APPROACH

The approach followed with the development of this FRDCP was as follows:

- Assessment of relevant available background information regarding Heleza Moya and Fairbreeze Mine, and specifically the additional infrastructure that will be built
- Establishment of a preliminary understanding of the baseline legal and environmental context
- Formulation of the foundational aspects that guide closure planning, including the closure vision and the envisaged next land use
- Identification of closure-related risks associated with the extension project
- Establishment of the closure scenario that provides the closure planning battery limits and the key assumptions related to the baseline environmental information, commencement of mining activities until cessation of operations, and the closure period and beyond
- Formulation of the closure objectives and closure measures to be implemented to achieve the closure vision, the next land use and to mitigate the potential closure risks identified
- Development of appropriate monitoring and maintenance guidelines
- Estimating the cost to implement the closure measures as devised
- Recommendation of several key principles and activities to be undertaken to ensure quality concurrent rehabilitation and the achievement of the closure vision, next land use and necessary risk mitigation
- Compilation of a succinct report that documents the approach followed in developing the closure input for the EIA process

4 LEGAL AND GOVERNANCE FRAMEWORK

The requirement for final rehabilitation, decommissioning and closure comes primarily from the legislative requirements of the MPRDA and the NEMA. The relevant extracts from each of these is presented in this section.

- **MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT, ACT 28 OF 2002**

The following extracts relate to the principle of closure for any right issued under the MPRDA:

- Section 43(1): The holder of a prospecting right, mining right, retention permit, mining permit, remains responsible for any environmental liability, pollution, or ecological degradation, and the management thereof, until the minister has issued a closure certificate to the holder concerned.
- Section 43(4): An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report.
- Section 43 (5): No closure certificate may be issued unless the Chief Inspector and the Department of Water Affairs and Forestry have confirmed in writing that the provisions pertaining to health and safety and management of potential pollution to water resources have been addressed.

- **MINERAL AND PETROLEUM RESOURCES DEVELOPMENT REGULATIONS**

The following extracts from the MPRDA Regulations are specifically applicable to the preparation of this FRDCP:

- Regulation 51 An environmental management programme contemplated in section 39(1) of the Act must include the following:
  (a): A description of the environmental objectives and specific goals for-
  (i)mine closure;

- Regulation 54: Quantum of financial provision:
  (1) The quantum of the financial provision as determined in a guideline document published by the Department from time to time, include a detailed itemization of all actual costs required for-
    (a) premature closure regarding-
      (i) the rehabilitation of the surface of the area
      (ii) the prevention and management of pollution of the atmosphere
      (iii) the prevention and management of pollution of water and the soil, and
      (iv) the prevention of leakage of water and minerals between subsurface formations and the surface.
    (b) decommissioning and final closure of the operation, and
    (c) post closure management of residual and latent environmental impacts.
  (2) The holder of a prospecting right, mining right or mining permit must annually update and review the quantum of the financial provision –
    (a) in consultation with a competent person

(b) as required in terms of the approved environmental management programme or environmental management plan, or
(c) as requested by the Minister.

- Regulation 56: Principles for mine closure:
  In accordance with applicable legislative requirements for mine closure, the holder of a prospecting right, mining right, retention permit or mining permit must ensure that –

  (a) the closure of a prospecting or mining operation incorporates a process which must start at the commencement of the operation and continue throughout the life of the operation
  (b) risks pertaining to environmental impacts must be quantified and managed proactively, which includes the gathering of relevant information throughout the life of a prospecting or mining operation
  (c) the safety and health requirements in terms of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) are complied with
  (d) residual and possible latent environmental impacts are identified and quantified
  (e) the land is rehabilitated, as far as is practicable, to its natural state, or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development, and
  (f) prospecting or mining operations are closed efficiently and cost effectively.

- Regulation 61: Closure objectives
  Closure objectives form part of the draft environmental management programme or environmental management plan, as the case may be, and must –

  (a) identify the key objectives for mine closure to guide the project design, development and management of environmental impacts
  (b) provide broad future land use objective(s) for the site, and
  (c) provide proposed closure costs

- Regulation 62: Contents of closure plan:
  A closure plan contemplated in section 43(3)(d) of the Act, forms part of the environmental management programme or environmental management plan, as the case may be, and must include –

  (a) a description of the closure objectives and how these relate to the prospecting or mine operation and its environmental and social setting
  (b) a plan contemplated in regulation 2(2), showing the land or area under closure
  (c) a summary of the regulatory requirements and conditions for closure negotiated and documented in the environmental management programme or environmental management plan, as the case may be;
  (d) a summary of the results of the environmental risk report and details of identified residual and latent impacts
  (e) a summary of the results of progressive rehabilitation undertaken
  (f) a description of the methods to decommission each prospecting or mining component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts

(g) details of any long-term management and maintenance expected
(h) details of a proposed closure cost and financial provision for monitoring, maintenance and post closure management
(i) a sketch plan drawn on an appropriate scale describing the final and future land use proposal and arrangements for the site
(j) a record of interested and affected persons consulted, and
(k) technical appendices, if any.

- **NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)**

The environmental requirements relating to mining activities were regulated in terms of the MPRDA, before 8 December 2014. Recent legislative amendments and the drive towards a "one environmental system'' have resulted in the inclusion of the requirement for rehabilitation, decommissioning and closure planning and associated financial provisions into the NEMA. Related sections of the Act are listed below:

Section 24P: Financial provision for remediation of environmental damage:

1. An applicant for an environmental authorisation relating to prospecting, mining, exploration, production or related activities on a prospecting, mining, exploration or production area must make the prescribed financial provision for the rehabilitation, management and closure of environmental impacts, before the Minister of Minerals and Energy issues the environmental authorisation.
2. If any holder or any holder of an old order right fails to rehabilitate or to manage any impact on the environment, or is unable to undertake such rehabilitation or to manage such impact, the Minister of Minerals and Energy may, upon written notice to such holder, use all or part of the financial provision contemplated in subsection (1) to rehabilitate or manage the environmental impact in question.
3. Every holder must annually assess his or her environmental liability and, if circumstances so require, must adjust his or her financial provision to the satisfaction of the Minister of Minerals and Energy
4. (a) If the Minister of Minerals and Energy is not satisfied with the assessment and financial provision contemplated in this section, the Minister of Minerals and Energy may appoint an independent assessor to conduct the assessment and determine the financial provision.
   (b) Any cost in respect of such assessment must be borne by the holder in question.
5. The requirement to maintain and retain the financial provision contemplated in this section remains in force until the Minister of Minerals and Energy issues a certificate to such holder, but the Minister of Minerals and Energy may retain such portion of the Financial provision as may be required to rehabilitate the closed mining or prospecting operation in respect of latent or residual environmental impacts.
6. The Insolvency Act, 1936 (Act No. 24 of 1936), does not apply to any form of financial provision contemplated in subsection (1) and all amounts arising from that provision.
7. The Minister, or an MEC in concurrence with the Minister, may in writing make subsections (1) to (6) with the changes required by the context applicable to any other application in terms of this Act.

- Section 24R: Mine closure on environmental authorisation:

(1) Every holder, holder of an old order right and owner of works remain responsible for any environmental liability, pollution or ecological degradation, the pumping and treatment of extraneous water, the management and sustainable closure thereof until the Minister of Minerals and Energy has issued a closure certificate in terms of the Mineral and Petroleum Resources Development Act, 2002, to the holder or owner concerned.
(2) When the Minister of Minerals and Energy issues a closure certificate, he or she must return such portion of the financial provision contemplated in section 24P as the Minister may deem appropriate to the holder concerned but may retain a portion of such financial provision for any latent and or residual environmental impact that may become known in the future.
(3) Every holder, holder of an old order right or owner of works must plan, manage and implement such procedures and requirements in respect of the closure of a mine as may be prescribed.
(4) The Minister may, in consultation with the Minister of Minerals and Energy and by notice in the Gazette, identify areas where mines are interconnected, or their impacts are integrated to such an extent that the interconnection results in a cumulative impact.
(5) The Minister may, by notice in the Gazette, publish strategies in order to facilitate mine closure where mines are interconnected, have an integrated impact or pose a cumulative impact.

- FINANCIAL PROVISIONING REGULATIONS

The Financial Provisioning Regulations under the NEMA (GNR1147) were promulgated on the 20th of November 2015. The regulations (as amended) amongst others aim to:

(a) establish the obligations of an applicant and the holder to progressively plan, implement and manage activities and procedures to mitigate and rehabilitate environmental damage caused by operational activities
(b) regulate the manner in which an applicant or holder must determine, provide, set aside maintain and manage financial security for undertaking progressive rehabilitation, decommissioning, closure and post closure activities associated with reconnaissance, exploration, prospecting, mining and production operations.

These regulations provide for, inter alia:

- Determination of financial provision: An applicant or holder of a right or permit must determine the financial provision using prescribed template, spreadsheet and master rates for implementing the activities associated with progressive rehabilitation, decommissioning and mine closure and the management of latent environmental impacts.
  Scope of the financial provision: Rehabilitation and remediation; decommissioning and closure activities at the end of operations; and remediation and management of latent or residual impacts.
- Regulation 4: Every applicant and holder has an obligation to plan, finance, implement and manage such procedures, requirements, activities and measures in respect of mitigation, progressive rehabilitation, final rehabilitation, decommissioning, closure and post closure activities related to reconnaissance, exploration, prospecting, mining and production operations as identified in these regulations.

Purpose of financial provisioning:

- Regulation 6: The financial provision must guarantee the availability of sufficient funds for-
  (a) Progressive rehabilitation
  (b) Decommissioning and closure activities, and
  (c) The mitigation and management of latent environmental impacts including the ongoing pumping and treatment of polluted water or extraneous water where relevant
  To ensure that –
    (i) A reconnaissance, exploration, prospecting, mining or production operation can be rehabilitated to the approved sustainable end state at the scheduled or unscheduled closure of operation, and
    (ii) Latent impacts post-closure are mitigated, rehabilitated and managed

Determining of the financial provision using prescribed template, spreadsheet and master rates:

- Regulation 7(1): An applicant must determine the financial provision using prescribed template, spreadsheet and master rates for implementing the activities associated with progressive rehabilitation, decommissioning and mine closure and the management of latent environmental impacts.

  (3) The completion of the information provided in the template, spreadsheet and determination of the financial provision contemplated in subregulation (1) and the review and reassessment contemplated in subregulation (2) must be undertaken by independent specialist
  (4) An applicant contemplated in subregulation (1) must submit, with the documentation for an environmental authorisation in terms on the Environmental Impact Assessment Regulations, the completed template and spreadsheet for approval by the Minister

Availability of financial provision

- Regulation 9(2) An applicant contemplated in regulation 7(1) and regulation 8(1) must provide proof of the arrangements made to secure the financial provision prior to the issuing of the environmental authorisation in case of-
    (a) a financial guarantee, a letter from the financial institution confirming that it will issue the financial guarantee should the requisite permission, permits, rights or authorisations be granted
    (b) A closure rehabilitation company or a closure rehabilitation trust, a signed affidavit from the directors or trustees confirming the deposit of the approved sum, and
    (c) Proof of a security provided under section 30 of the National Water Act, 1998 (Act No. 38 of 1998) where such security has been provided

Responsibility of an applicant or holder to consult and disclose information

- Regulation 16 (1) An applicant contemplated in regulation 7(1), 7(5), 8(1) and 8(5) must subject the documentation contemplated in those subregulation to the consultation requirements as prescribed in the Environmental Impact Assessment Regulations

Appendices 2 and 3 of the Financial Provisioning Regulations provides the minimum content of a final rehabilitation, decommissioning and closure plan and requirements for the Environmental Risk Assessment Report, respectively. This FRDCP has been prepared to align with these requirements.

- **OTHER GUIDELINES**

The following additional guidelines which relate to financial provisioning and closure have been published in the South African context:

- Best Practice Guideline G5: Water Management Aspects for Mine Closure (Department of Water Affairs and Forestry, 2008): This guideline was prepared by the DWAF (now Department of Human Settlements, Water and Sanitation -DHSWS) and aims to provide a logical and clear process that can be applied by mines and the competent authorities to enable proper mine closure planning that meets the requirements of the relevant authorities. This guideline is aimed primarily at larger scale mine and includes certain principles related to closure and water management. The following technical factors which should be considered during closure, and those which are likely to relate to the opencast mining of coal, have been considered:

    - Broad closure principles:
        - Management measures at closure should primarily be of a passive nature with minimal long-term maintenance and operating costs;
        - The final landform must be sustainable, must be free-draining, must minimise erosion and avoid ponding;
        - Concurrent rehabilitation must be undertaken in a manner that supports the final closure landform in order to ensure/avoid that rehabilitation does not need to be redone at a later stage; and
        - Land use plan which is directly inter-linked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water
        -
    - Land use plan: directly interlinked with water management issues insofar as water is required to support the intended land use- in this regard the surrounding communities and the land uses implemented rely on available ground and surface water to be sustained. Management of water quality and quantity has been identified as an aspect to be covered in this FRDCP.
    - Biodiversity plan: will address issues that are interrelated with the mine water management plan, particularly with regard to the environmental water balance and the effects that mining may have thereon.
    - Social and labour plan: issues may have a bearing on water management insofar as there may be a requirement for water in implementation of these plans, e.g. use of rehabilitated mine land for agriculture.
    - Cumulative impacts: from a number of sources within the same zone of impact could be an important consideration within a single mine where it refers to multiple source terms, or alternatively it could apply to the consideration of the cumulative effects of different mines.
    - Risk based approach: a risk-based approach will include the risk of failure of systems or management strategies. The consequences of such failure should be taken into

account and the necessary contingency and/or emergency measures should be addressed either in the management measures and/or in the financial provisions.

- Long term water quality: For mines that exploit ore bodies containing reactive minerals (such as sulphides), the closure planning and liability assessment should pay particular attention to long-term water quality issues. Closure should not have a negative impact on other water users.
- Public participation and consultation: consultation is fundamental to closure and there is a need for full involvement of stakeholders in the development of the final closure plans, and in the agreement of closure objectives- in this regard this FRDCP has been made available through the EIA public participation process for comment by relevant stakeholders.

- **Guideline for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine (Department of Minerals and Energy, 2005):**

- The objectives of the guideline include the need to improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of mining activities. Whilst this guideline predates the recent NEMA Financial Provisioning Regulations, it does contain certain principles and concepts that remain valid and have been considered in this FRDCP.
- The Land Rehabilitation Guidelines for Surface Coal Mines (LRSSA, 2019): the guideline provide consolidated and up to date descriptions of good rehabilitation practice, and approaches to land rehabilitation specifically related to surface coal mining in Mpumalanga, South Africa. This guideline has been consulted an referenced extensively in the land rehabilitation components of the FRDCP.

5 MINE DESCRIPTION AND CONTEXT

The proposed project is for the mining of mineralised coastal sands at the Fairbreeze Mine, including, titanium dioxide slag, rutile, zircon, leucoxene and high purity iron. The target product destination includes various end users. There are four ore bodies presently forming part of the Fairbreeze Mine, known as:

- Fairbreeze A (FBA)
- Fairbreeze B (FBB)
- Fairbreeze C (FBC)
- Fairbreeze C extension (FBCX)

Fairbreeze C is mined out and largely rehabilitated while FBC-X is nearing completion. Soil stripping and initial phases of mining have commenced at FBB. The current proposal is to expand the FBB ore body to include economically viable mineralised areas within Heleza Moya, as an extension to FBB. Figure 5-1 indicates, in orange shading, the extent of the area that will be disturbed by the proposed Heleza Moya mining activities (main block) and associated topsoil stockpiles (the “tail in the south of the site”).

Figure 5-1 - Extent of the area that will be disturbed by proposed mining at Heleza Moya

5.1 PROJECT LOCATION AND EXTENT

The Fairbreeze MRA is located south-west of the town of Mtunzini and extends southwards for approximately 12 km west of the N2 highway, in uMlalazi Local Municipality, within King Cetshwayo District Municipality in the of KwaZulu-Natal Province, as shown on Figure 5-2.

The Heleza Moya surface rights covers an extent of approximately 118.6 hectares (ha) over portion 3 of Lot 88 of the farm Emoyeni 9105. The property lies within the Fairbreeze mining right area. The Heleza Moya property is situated within the Fairbreeze mining right area as shown in Figure 5-3**.**

5.2 DESCRIPTION OF THE AFFECTED PROPERTY

The proposed project area is in the uMlalazi Local Municipality that falls under the King Cetshwayo District Municipality in the province of KwaZulu-Natal. The mining rights area is also bound to the east by the Umlazi Nature Reserve and Mondi plantations.

Table 5-1 indicates the farm portions that fall within the proposed Heleza Moya Project.

Table 5-1 – Details of the site and its locality

<table>
<tr><td>Farm Name</td><td>Mining Right holder

Tronox KZN Sands (Pty) Ltd is applying for EA amendment supported by the basic assessment process which entails the compilation of Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) for the extension of the Fairbreeze mining operations which entails an opencast mining pit and associated facilities (stockpiles etc) located on the farm:

■ Heleza Moya.

Heleza Moya tenement falls within the approved Fairbreeze mining right and was recently acquired through a sale agreement.</td></tr>
<tr><td>Application Area (Ha)</td><td>The extension of the Fairbreeze mining operations footprint covers an extent of 118.6 hectares (ha) to the mining footprint, where 73.22 ha of this mineral resource has been identified as the mineable reserve.</td></tr>
<tr><td>Magisterial District</td><td>King Cetshwayo District Municipality</td></tr>
<tr><td>Distance and direction from nearest towns</td><td>The Fairbreeze Mine is located immediately south of Mtunzini town and extends southwards for approximately 12 km west of the N2 highway. The geographic coordinates at the centre of the site are approximately: 29°00’18.88” S and 31°41’55.09” E.</td></tr>
<tr><td>21-digit Surveyor General Code for each Farm Portion</td><td>
<table>
<tr><th>SG Office</th><th colspan="4">Major Region</th><th colspan="5">Minor Region</th><th colspan="7">Erf / Farm Number</th><th colspan="5">Portion Number</th></tr>
<tr><td>N</td><td>0</td><td>F</td><td>U</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>9</td><td>1</td><td>0</td><td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>3</td></tr>
</table>
</td></tr>
</table>

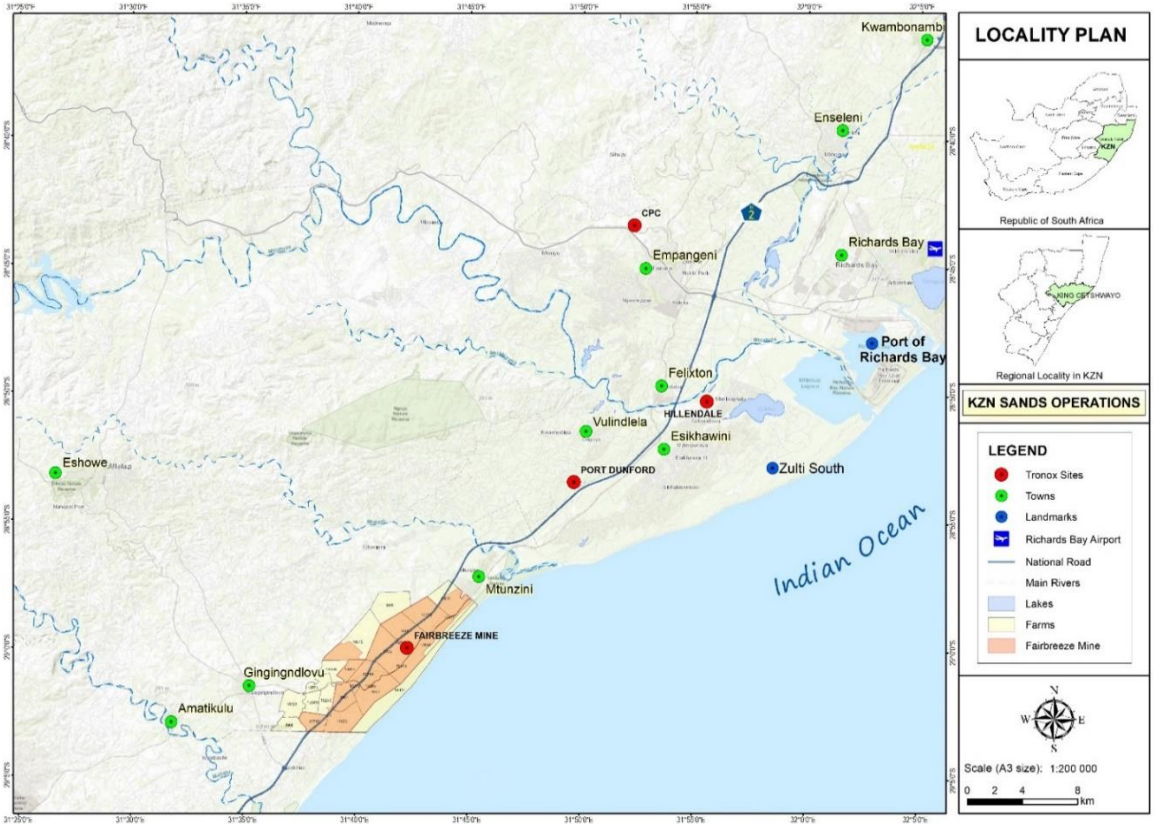

Figure 5-2 - Regional locality plan indicating the Fairbreeze MRA and position of Heleza Moya

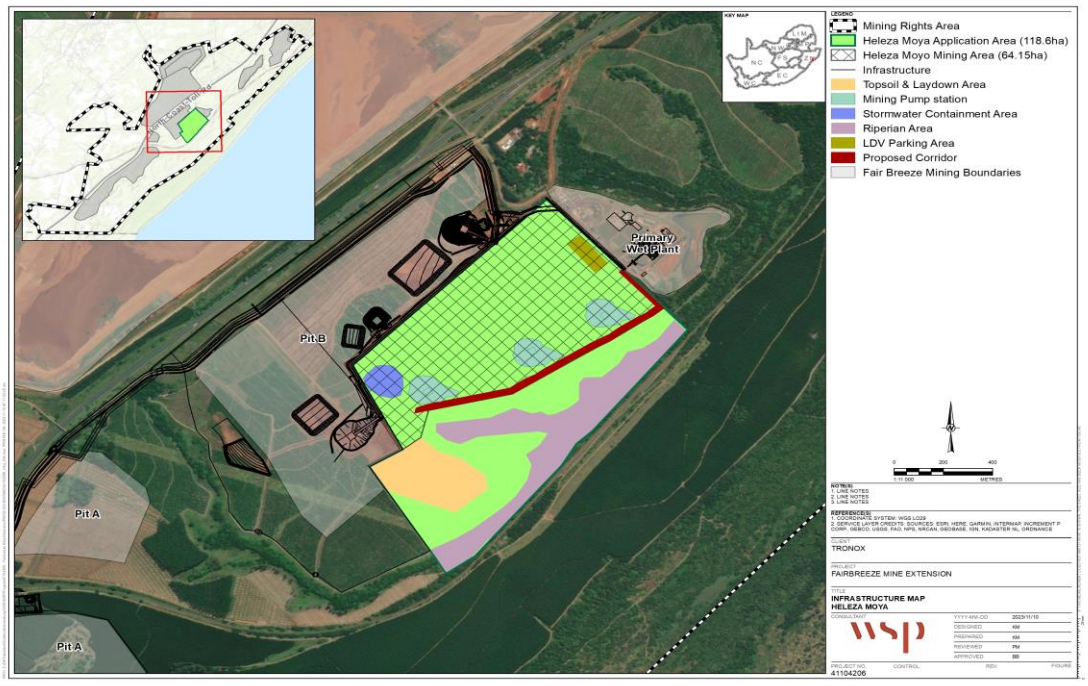

Figure 5-3 - Current Mining Rights area and the proposed Heleza Moya mining and topsoil areas

5.3 PROPOSED MINING METHOD AND RELATED PROCESSES

The proposed mining process will involve Heleza Moya RoM material being mined using hydraulic mining method. The Heavy mineral concentrate (HMC) will be trucked to the Tronox CPC for further beneficiation process. The detailed steps required for the mining of material from the ore body include the preparation of the mining area through the removal of vegetation and the stripping of topsoil. Specific topsoil stockpile areas have been identified and will be managed as per the existing practice at Fairbreeze mine as defined by the existing Environmental Management Programme (EMPr).

The topsoil to be stripped is regarded as the uppermost surface layer of soil, it typically extends to a depth of 300 mm from the earth's surface. It has the highest concentration of organic matter and microorganisms and is where most of the earth's biological soil activity occurs, including plant growth. It is composed of mineral particles, organic matter, water and air. The material will be hauled to the designated topsoil stockpile.

The mining method employed at the current Fairbreeze mine is hydraulic mining. A jet of high-pressure water will be aimed at a mining face, thereby cutting into and loosening the in-situ sand so that it collapses onto the floor. The water from the jet will acts as a carrier medium for the sand or Run of Mine (ROM), due to the high clay fines content contained in the ROM. The slurry generated by the monitors, flows to a collection sump where oversize material is removed, and the slurry is then pumped towards the Primary Wet Plant (PWP) through a system of booster pumps. The varying grade and slimes content requires the mining of different faces concurrently to reduce large variations. Up to six monitors and three pump station (collection sump) will operate to produce rates up to 2 160 tonnes per hour. This hydraulic mining method which is in use at the FBB will continue as the FBB pit is extended to include the Heleza Moya ore body.

At the PWP the heavy minerals will be separated from the sand, silt and clay fractions. The heavy mineral concentrate will then be trucked by road to Tronox CPC at Empangeni for refinement. The fine discard or slimes material from the PWP will be pumped to an existing Residue Storage Facility (RSF) while the coarse discard or tailings will be pumped back to the mining area to backfill the mining voids. The mined-out areas will be rehabilitated to achieve a pre-mining land capability.

To move from the FBB mining area onto the Heleza Moya area, some of the mining components will be relocated onto the Heleza Moya property. These include the mining pumps stations which are installed by excavating the ore body mechanically and installing the pump station such that the hydraulicly slurried ROM can flow to the pump station under gravity. The high-pressure water lines will be extended from the current FBB area onto Heleza Moya to power the hydraulic monitor guns.

Backfilling of the mined-out areas will be undertaken once mining in an ore body (or part thereof) is completed, and the backfilling infrastructure is in place. Sand tails and return water pipelines will thus also be installed in areas post mining either located on previously mined footprint or along the perimeter of the mining footprint based on practical on-site considerations. Backfilling will be undertaken with coarse dewatered sand that will be returned from the PWP and distributed with open-end method. Backfilling will be undertaken so that no mining void remains, but the post-mining surface will be lower than the original surface due to the removal of the slimes component from the landscape, but will be free draining.

Once the mining area is backfilled it will be contoured mechanically to assure slopes blend into the current landscape, or so that the slopes mimics the pre-mining gradients. The topsoil stockpiled before

the mining will be returned and the area will be vegetated as per the rehabilitation process implemented on the current Fairbreeze mine areas.

The mining schedule and pit floor contours for mining of the FBB and Heleza Moya ore body are indicated in Figure 5-4, while the backfill schedule and post mining landform contours are indicated in Figure 5-5. and a diagrammatic representation of the existing mining and beneficiation process as indicated in Figure 5-6. Mining of the Heleza Moya ore body adds two years to the life of mine of Fairbreeze. The physical mining however take place at the time that the FBB or body as mined as previously described. Thus, mining at Fairbreeze will fall within the period 2024-2028 as indicated in Figure 5-4 with backfill, reshaping and final rehabilitation taking approximately another three years thereafter.

Figure 5-4 - FBB and Heleza Moya mining schedule (LHS) and pit floor contours (RHS)

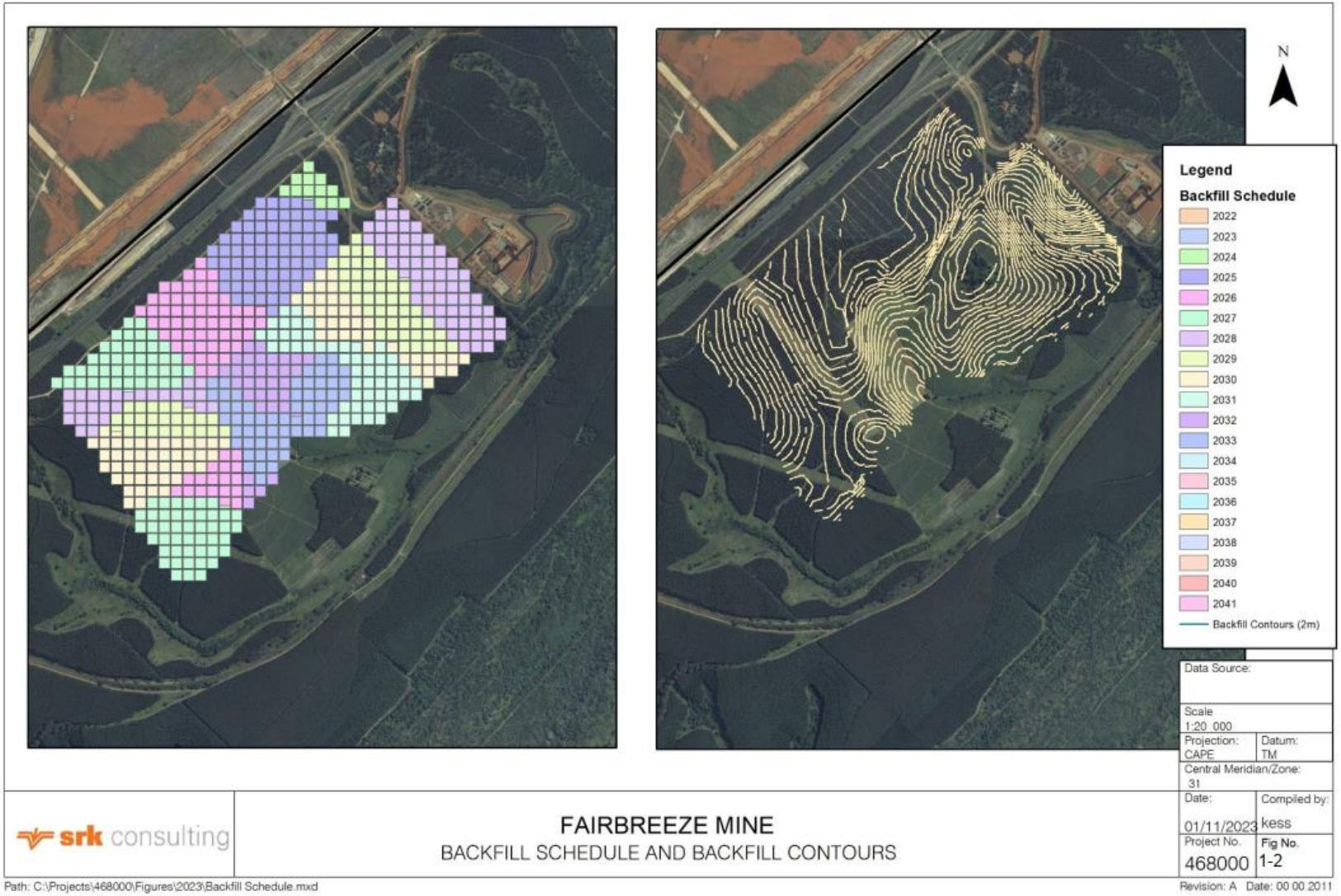

Figure 5-5 - FBB and Heleza Moya backfill schedule (LHS) and post mining landscape contours (RHS)

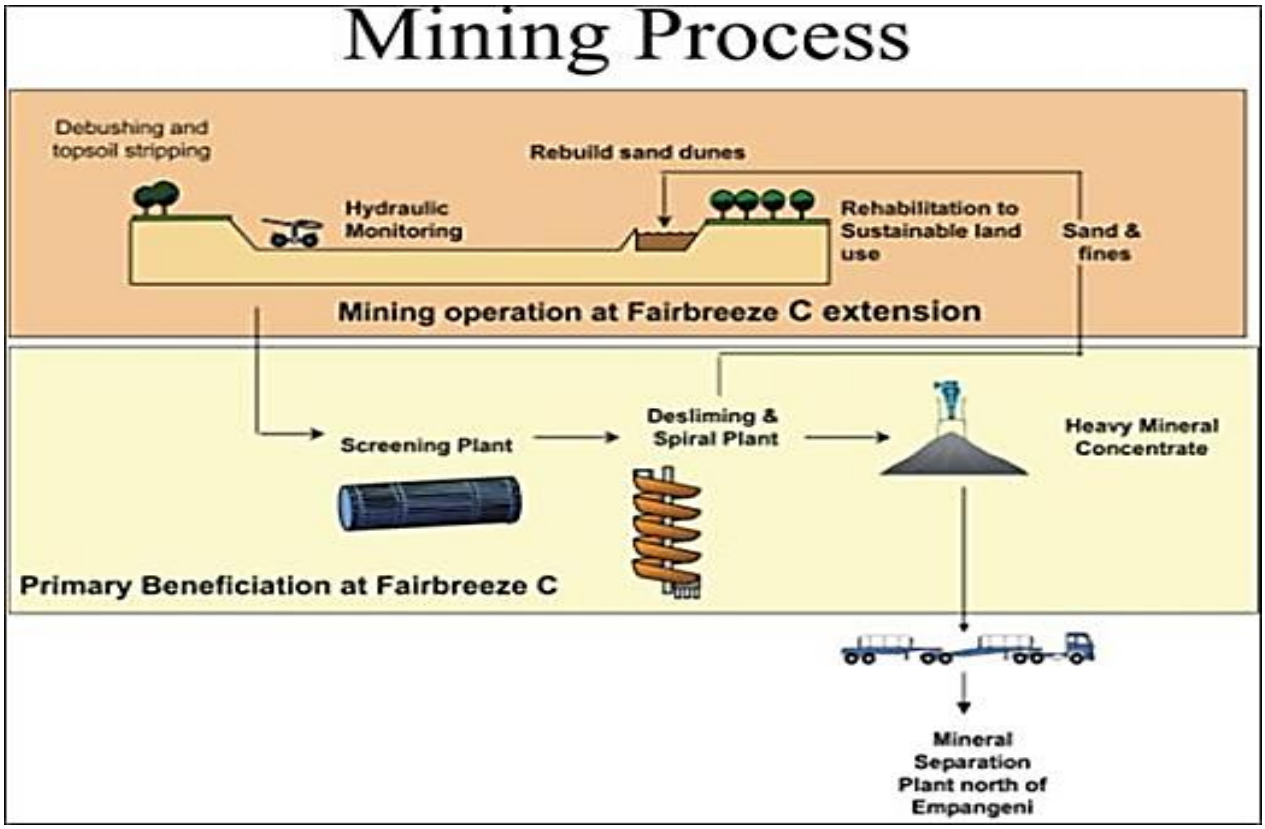

Figure 5-6 - Diagrammatic representation of the Fairbreeze mining and beneficiation process flow

5.4 SILT MANAGEMENT

The ROM slurry from hydraulic mining operations will flow to a pump station from where it will be pumped to the existing primary wet plant (PWP). The PWP is located immediately adjacent to the Heleza Moja area as previously indicated. At the PWP the heavy minerals are separated from the sand, silt and clay fractions. The heavy mineral concentrate is trucked by road to Tronox CPC at Empangeni for refinement. The fine residue from the PWP is pumped to an existing Residue Storage Facility (RSF) while the coarse sand tailings are pumped back to the mining area to backfill the mining voids.

5.5 MINING INFRASTRUCTURE TO BE UTILIZED FOR EXPANSION PROJECT

The FBB and Heleza Moya ore bodies will be mined together in a continuous manner as indicated in the preceding figures. Consequently, there is nominal new equipment that will be required to sustain mining on Heleza Moya. As mining progresses the following mining equipment will be extended into the Heleza Moya pit area, or developed in support of the mining activity, as indicated in Figure 5-3:

- Limited road development for access, and a designated Light Duty Vehicle (LDV) parking
- A corridor running down the North Eastern and south-eastern edge of the mining area within which infrastructure and access will be contained,
- A topsoil stockpile (40 m x 40 m x10 m) and laydown area (9.4 ha) in the south of the site,

- Three pump stations along the southern (downslope) portion of the proposed mining area and
- Stormwater containment to enable stormwater born sediment to be contained

Importantly, because the Heleza Moya ore body will be mined as part of the ongoing operations, and at a combined reduction rate that falls within the limits of the on-site infrastructure, there is no need for any additional power or water supply to the site and similarly as stated previously no need for any additional residue deposition capacity. The life of mine planning for the Fairbreeze operation has accounted for expansion of the Mega Sebega RSF through inclusion of the Everglades RSF expansion which was authorised in 2022. Similarly, there is existing bulk power supply to Fairbreeze and water requirements are met from the existing licensed offtake via the Mthlathuze water pipeline.

5.6 ENVIRONMENTAL CONTEXT

A brief overview of the environmental and social setting of the Heleza Moya site, within the Fairbreeze MRA is provided below. The intent of this description is not to provide an exhaustive summary but rather a focused context setting description of the site character, as it pertains to influencing reclamation and closure planning.

5.6.1 CLIMATE

The regional climate can be described as subtropical and humid with moderate rainfall with ambient temperatures ranging between 11.4°C and 40.0°C. Diurnal variations in temperature occur due to the influence of land-sea breeze circulation on the airflow of the region.

The study area falls within a summer rainfall region, with approximately 60% of the annual rainfall occurring between October and February. Average annual rainfall is approximately 1150 mm and periods of intense rainfall are not uncommon, frequently caused by cut off low-pressure systems or cyclonic systems moving in from the ocean (e.g. Cyclone Demoina in 1984). Characteristic of such potential periods of extreme rainfall, the 1:50 year potential maximum daily rainfall event is indicated as 350mm.

5.6.2 TOPOGRAPHY

The overall topography within the Fairbreeze area is undulating and comprises low hills and dunes lying parallel to the coastline. The Fairbreeze mining rights area extends from the coastal Terrace, over the initial coastal dunes and dips to the north-west into areas of agriculture. The N2 National Road runs roughly along the watershed; the Heleza Moya site lies on the coastal side of the N2 on a north-east facing coastal dune front, separated from the crest of the ridge and by the FBB ore body. The Heleza Moya properly slopes towards the coast, with the Amanzimnyama River forming the lowest point on the site, and adjacent to the existing rail line which forms the coastal boundary of the site. The small perennial Amanzimnyama stream is excluded from the proposed mining development and appropriately buffered.

5.6.3 GEOLOGY

The Fairbreeze deposits are thought to consist almost entirely of older (Pliocene parent) Berea-type red sands, which have been exposed to a long period of weathering resulting in the disintegration of the original components to form silt-sized particles and clay. These sands are generally well sorted and sub-rounded to rounded. Progressive enrichment in the swash zones of several beaches, which developed along the large coastal beach / dune system, resulted in the concentration of heavy minerals. The Natai Metamorphic and Structural Province and the Karoo Igneous Province are

considered to be the primary source rocks (amphibolites, gneisses, schists,granitoids etc.) for heavy minerals.

Heavy minerals, derived from inland rocks and sediments, were deposited into the ocean by the Tugela River, concentrated as a result of progressive enrichment in the swash zones of several beaches, which developed along the large coastal beach I dunal system. Ilmenite, zircon, rutile and leucoxene form the valuable heavy minerals (VHM) of this deposit.

5.6.4 LAND USE, LAND CAPABILITY AND SOILS

The following information was obtained from the Tronox_Fairbreeze_Soils and Agricultural potential soil study, (WSP 2023)

Land-use in the study area includes commercial forestry (Eucalyptus), commercial farming (sugar cane), nature reserve (Umlalazi Nature Reserve) and neighbouring residential areas (Mtunzini).

The DFFE 2016 Land Capability dataset, which categorises South Africa into 8 classes of agricultural land capability, shows that the site is dominated by High to Very High land capability classes (see Figure 6-1). The most recent DFFE Agricultural Sensitivity screening tool (DFFE, 2016) highlights that the agricultural sensitivity of the site is mostly very high with areas of high and medium agricultural sensitivity. This risk is related to the extent of agricultural land that could be lost due to development.

What was seen on site is aligned to the information presented in these datasets. The majority of the site is dominated by deep, well-drained Hutton and Clovelly soils, which usually fall into Class I or II Arable Land. This is suitable for very intense or intensive cultivation. In the case of the study site, an erosion hazard exists, so the soils fall into Class II Arable Land.

The ARC-ISCW Landtype Memoirs 2016 database shows that the area is dominated by the Ab86 land type, which includes red/yellow, freely drained, deep (1.2m+) apedal soils. The WR90 soils database shows that the project site is dominated by the Fw10/11 land type, which describes a moderately deep to deep (0.6m – 1.2m+) sandy Fernwood soil form

These databases are broadly in agreement with the findings of the Fairbreeze Rehabilitation Study (ARC, 2011) and with what was found on site. In keeping with a typical catena sequence, the soils identified in the high-lying parts of the site were identified as red, well-drained Hutton soils ; further down the slope slightly less well-drained, yellow-brown Clovelly soils were identified still further down the slope where the site starts to flatten out leached, light grey Fernwood soils were identified, and in the lowest parts of the site clay-rich, wet, dark Tukulu soils were identified.

Of the four hydro-pedological soil types that exist - recharge soils, interflow soils, responsive soils and stagnating soils – only recharge and interflow soils were identified at the study site. The red, well-drained Hutton soils and, to a lesser extent, the yellow-brown Clovelly soils are recharge soils. The Fernwood and Tukulu soils identified in the lower, flatter portions of the site are interflow soils.

5.6.5 BIODIVERSITY

The study area is located in the Indian Ocean Coastal Belt Biome, with embedded elements of the Forest Biome. According to the 2018 SANBI mapping of South Africa's regional vegetation types, the study area comprises two vegetation types, namely Maputaland Coastal Belt (CBA 1) and Swamp Forest (FOa2). Similarly, the finer-scale provincial vegetation mapping for KwaZulu-Natal (Ezemvelo, 2011) also identifies Maputaland Coastal Belt and Swamp Forest: Ficus Trichopoda Swamp Forest in

the study area. The broader region in which the study area is located is referred to as the Maputaland-Pondoland-Albany Hotspot on account its rich biodiversity attributes.

Having said this, the majority of the site has been transformed by past agricultural practice comprising a combination of commercial timber, sugarcane and other crops. The proposed mining area at the site is completely transformed. Conversely, the lower slope is modified. The Amanzimnyama stream runs just inside the south eastern boundary of the property. A small portion of the site, as correctly identified in regional studies, comprises swamp forest at the extreme eastern point of the site where the stream exits from the site towards the junction with the Siyaya river. These riparian portions of the site are not subject to disturbance.

5.6.6 SURFACE WATER

The portions of the Fairbreeze mining rights area in proximity to the Heleza Moya property are drained by the Amanzimnyama River (a small perennial stream) and the Siyaya River to the north-east. The confluence of these two small rivers is approximately 1 km downstream of the Heleza Moya site, with the Amanzimnyama having its origin to the west of Heleza Moya and flowing to the north-east across the site. The Siyaya has its origin to the north of Heleza Moya (just to the west of the Mega Sebeka RSF) and flows under the N2 and to the east of the PWP. Following the confluence of these two small rivers they flow as the Siyaya River into a small coastal estuary of the same name.

The water quality in these systems is monitored by Tronox and reported on to the DWS annually. The systems are susceptible to sedimentation, which will require focus during rehabilitation given the erodible nature of the coastal sands returned as backfill to mined out areas.

5.6.7 GROUNDWATER

The groundwater gradient in the local area largely mimics topography, as one would expect in the coastal sands present on the site. Various groundwater studies have been undertaken since before the inception of mining at Fairbreeze. These are reported in a suite of water reports, the most recent of which is appended to the Basic Assessment Report for the Heleza Moya project.

Groundwater levels are fairly close to natural ground level and are typically intercepted by the mining pit, requiring active management of water percolated into the mining areas, which becomes combined with the operational water used for hydraulic mining. Importantly, once mined areas have been backfilled with sands following the extraction of the heavy mineral fraction, the groundwater gradient is likely to be restored and revert to their state not dissimilar from pre-mining conditions.

5.6.8 SOCIAL

The Project is located within the uMlalazi Local Municipality situated in the King Cetshwayo District Municipality of the Kwa Zulu Natal Province. The Heleza Moya property is located immediately south-west of the PWP and roughly 5 km south-west of the Mtunzini town.

Importantly, the Heleza Moya project will be mined as a direct extension of the FBB orebody as previously described. What this means from a social perspective is that no new workforce requirements result from the project. Consequently, in terms of closure planning the measures in place within the overarching Fairbreeze social and Labour plan remain relevant in relation to workforce management and ultimate relinquishment.

6 SCREENING LEVEL RISK ASSESSMENT

6.1 METHODOLOGY

The Mine closure risk assessment process seeks to identify and estimate the lasting or significant changes of Project activities on the health, safety, community, environment, economy and security status of a defined risk issue by adopting a systematic approach to identifying different impacts, both positive and negative. Mine Closure Impact Assessment uses available and commissioned qualitative and quantitative evidence knowledge to support the assessment.

The objective of the impact assessment is to conduct an assessment of the potential project related impacts (direct and indirect) and to develop an evidence-based management and monitoring plan to maximise potential positive benefits to the community and the environment and avoid, prevent or mitigate any detrimental impacts that the Project may have on surrounding community and the environment.

It is important to note that the environmental risk assessment will be revised and updated on an annual basis to ensure that this FRDCP remains applicable to the actual and predicted environmental impacts and risks.

6.2 AREA OF INFLUENCE

The Project area of influence (AOI) in the mine closure context is largely limited to the Project site and the environment and communities adjacent to the project site.

6.3 RECEPTOR IMPORTANCE

Specific receptors (environment, health, community etc) within the context of the AOI and certain impact pathways may be more vulnerable to effects and impacts, while other impacts may affect all receptors within the general project area equally. Where relevant, receptor/s will be identified in the narrative evaluation of each impact.

6.4 MAGNITUDE OF IMPACT

The evaluation of project impacts relies on a narrative, which brings together the evaluation of the following four criteria to reach an impact significance for the overall impact:

6.4.1 THE DIRECTION OF THE IMPACT (NEGATIVE VS POSITIVE)

This considers whether the impact has an adverse or beneficial effect on the potentially effected receptor.

6.4.2 CONSEQUENCE OF THE IMPACT

This considers the intensity/severity of the impact on receptors as well as the ability of the receptor to adapt to the pre-impact level. In addition, the degree of stakeholder concern to the level or severity of the health effect is also considered. As impact effects can be detrimental or beneficial to the receptor this element evaluates how severe negative impacts might be, or how beneficial positive impacts maybe on a particular receptor. Determining the consequence for an impact, considers the following scale:

Table 6-1 - Consequence ratings

Rating	Comments
Negligible	Prevailing baseline
Low	Minor deterioration (nuisance, annoyance) harm to receptors. The receptors will adapt with ease to the influence of the determinant and maintain pre-impact levels of health.
Moderate	Moderate/measurable deterioration in harm to receptors. Acute conditions. The influence of the determinant will result in some difficulty in adapting to the impact effects and maintaining pre-impact levels of receptor will require support. Moderate stakeholder concern. Moderate exceedance of thresholds etc.
High	Substantial deterioration harm to receptors. The influence of the determinant will result in the inability to adapt to impact effects or to maintain a pre-impact level of impact. An identified threshold is often exceeded.

6.4.3 SPATIAL/GEOGRAPHICAL EXTENT OF THE IMPACT

This defines the physical extent of the impact. This is relevant to support the description of the consequence as the specific impact may influence different levels; from impacts being isolated within the project area; or even extend to influencing national and cross boundary effects.

Table 6-2: Geographical ratings

Rating	Comments
Localized	Site specific or confined to a sensitive receptor at the local scale/ project area.
Fairly extensive	This is localized to the study area as well as the broader project affected area. These can generally extend to influence an administration post or sub-district level.
Extensive	District and Provincial level,
National	National or influence across international borders.

6.4.4 DURATION OF THE IMPACT

This defines the consequence of the impact at various time scales, as an indication of the duration of the impact

Table 6-3: Duration ratings

Rating	Comments
Short term	Short term, < 1-4 years, low frequency
Medium term	Between 5 and 20 years
Long term	Between 20 and 40 years (generational) and from an individual human perspective permanent
Permanent	Over 40 years and resulting in a long term and lasting change

Significance of Impact

The significance of each impact will be categorised as follows:

Table 6-4: Significance ratings

Rating	Comments
Negligible	The impact magnitude is small and is within all limits and mitigation is not necessary. These impacts will result in either positive or negative short-term effects on health and well-being.
Minor	The impact significance is sufficiently small and is within acceptable limits and mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short-term effects on health and well-being.
Moderate	An important impact, which requires mitigation to levels as low as reasonably possible. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in either a positive or a negative medium to long-term impact on health and well-being. As residual impacts, these are of lower importance but warrant careful attention to conditions regarding mitigation and monitoring.
Major	A serious impact, if not mitigated, may prevent the implementation of the project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually a long-term change to health and well-being and may result in severe effects. As residual impacts, these should play a role in project development, and they require strict controls and monitoring. Beneficial impacts should be fully delivered.

Table 6-5 below, details the full closure and post closure risks assessment

Table 6-5 - Full closure and post closure risks assessment

Aspect	Impact	Pre-mitigation risk		Suggested Mitigation Measures	Post-mitigation risk (post-mitigation)		Closure Options/Actions
		Impact classification	Impact Significance		Classification (including mitigation)	Significance	
Surface Water	Water Quality Deterioration – Siltation of water resource.	Moderate	Major	Ensure that the surface profile is rehabilitated to promote natural runoff drainage and avoid ponding of water within the rehabilitated area; - Surface inspection should be continuously undertaken to allow runoff to drain onto the downstream drainage /rivers; and - All rehabilitated areas must be established with vegetation. - It is recommended that both berms and the drainage channels should be grass-lined to reduce erosion potential.	Moderate	Minor	Free draining closure/ final landform. Closure phase monitoring and inspection- erosion and vegetation growth. Clearly defined post closure land-use plan, including relevant slope gradients applicable to different land-capabilities.
	Alteration to surface runoff flow volumes.	Moderate	Moderate	No additional measures, apart from a fully compliant SWMP and water quality monitoring are proposed to mitigate this impact; and - Rehabilitation of all infrastructure will be implemented and will include re-vegetating, capping and shaping. As understood the opencast pit will be backfilled with overburden and topsoil dump material, shaped and rehabilitated to promote clean runoff.	Moderate	Minor	Develop a post-closure water balance and SWMP.
Air	Decline in air quality	Minor	Moderate	Implement concurrent rehabilitation and vegetation of mined area.	Low	Negligible	Limit disturbance to actual mining foot-print and Re-instatement of vegetative cover as far as possible.
Soils	Permanent loss of agricultural land	Moderate	Major	All recommendations in the rehabilitation plan must be adhered to.	Moderate	Minor	Clearly defined post closure land-use plan. Implementation of a topsoil management plan including guidelines for: stripping; storage and maintenance; placement; amelioration; long term maintenance.
	Loss of land capability	Moderate	Major	The rehabilitated area must be assessed once a year for compaction, fertility, and erosion. The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations can be implemented before the start of the wet season) as to correct any nutrient deficiencies; - Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated; - If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; - If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Only the designated access routes are to be used to reduce any unnecessary compaction; and - Areas of subsidence must be reported and remediated as soon as possible with the best practises at the time of occurrence.	Moderate	Minor	Site specific topsoil stripping guideline to be followed. Soil rehabilitation plan to be implemented. Limit on site vehicle movements (during post operational phases) to defined routes and designated farmland areas.
Biodiversity	Loss of certain areas regarded as having a Moderate Risk to Mining according to the Mining and Biodiversity Guidelines.	Minor	Moderate	Areas to be mined be specifically demarcated so that during the construction and operational phases, only the demarcated areas be impacted upon All disturbances must be within the mine footprint area. Any sensitive areas (very high and high) in the project area that will be mined through must be rehabilitated as soon as the mining has been concluded.	Low	Minor	Ensure protection of identified natural areas.

Aspect	Impact	Pre-mitigation risk		Suggested Mitigation Measures	Post-mitigation risk (post-mitigation)		Closure Options/Actions
		Impact classification	Impact Significance		Classification (including mitigation)	Significance	
	Habitat fragmentation	Minor	Moderate	Apart from the pit area to be mined, areas rated as “very high” sensitivity in the biodiversity report, should be declared as ‘no-go’ areas during all phases of the project and all efforts must be made to prevent access to this area from construction workers and machinery; and	Low	Minor	Ensure protection of identified natural areas.
	Erosion	Moderate	Major	Voids needs to be backfilled followed by topsoil following the natural topography and must be revegetated with indigenous vegetation; - Alien vegetation plan to be kept in place and implemented for rehabilitation to be successful; Rehabilitated areas needs to be demarcated to prevent trampling and access to the area and ultimately decrease the likelihood of erosion.	Low	Minor	Implement topsoil stripping, stockpiling and levelling plan. Develop and implement and alien invasive control and eradication management plan.
	Possible re-establishment of indigenous vegetation and return of faunal species	Minor	Moderate	Comprehensive rehabilitation plan, including a comprehensive alien vegetation management plan, be compiled and implemented for the project;	Low	Minor	Develop and implement and alien invasive control and eradication management plan. Develop and implement biodiversity monitoring and action plan
	Further impacts due to the continued spread and/or establishment of alien and/or invasive species	Moderate	Major	Compilation of and implementation of an alien vegetation management plan for the entire site	Low	Minor	Implementation of alien invasive plant management plan.
	Continued displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust and noise).	Moderate	Moderate	Faunal species should be given the chance to escape or move away from disturbances during construction. If any faunal species do not move off naturally then the ECO should be consulted to identify the correct course of action	Low	Minor	Limit on site vehicle movements (during post operational phases) to defined routes and designated farmland areas. Ensure free movement of small fauna into adjacent wetland/ riparian corridors. Livestock access control.
	Infringement by humans into the few remaining natural grassland and wetlands areas, with associated impacts such as poaching and litter.	Moderate	Moderate	Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during all the phases going forward. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited; and - All livestock must be kept out of the wetland and grassland areas in order to prevent overgrazing of potential SCC avifauna habitat.	Low	Negligible	Clearly defined post closure land-use plan, including relevant buffers to areas of biodiversity sensitivity. Livestock and pedestrian access control into wetland areas and associated buffers.
Wetlands	Impact on wetlands due to spills, leaks and dust precipitation (heavy vehicle)	Minor	Major	Clean surface water run-off water must be diverted and directed around working areas, and measures or structures created to manage the discharge to avoid scouring and erosion; - All affected water must be contained in control dams. - Employee training program should be implemented as part of the mine's induction programme to inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. A minimum of one toilet must be provided per 10 persons;	Minor	Negligible	Develop and implement SWMP. - Implementation of approved EMPr. - Compliance monitoring.
	Loss in re-charge to wetlands	Minor	Major		Moderate	Negligible	
	Impact on wetlands due to haulage of material	Minor	Moderate		Low	Negligible	
	Impact on wetlands due to poor waste management	Minor	Moderate		Low	Negligible	

Aspect	Impact	Pre-mitigation risk		Suggested Mitigation Measures	Post-mitigation risk (post-mitigation)		Closure Options/Actions
		Impact classification	Impact Significance		Classification (including mitigation)	Significance	
	Impact on wetlands due to spills, leaks and dust precipitation (light vehicle)	Moderate	Major	- The mine should supply sealable and properly marked waste collection bins and all solid waste collected shall be disposed of at a licensed waste disposal facility; - Where a registered waste site is not available close to the project area, the mine shall provide a method statement with regard to waste management. Under no circumstances may solid waste be burned on site; - Refuse bins will be emptied and secured; - Temporary storage of waste shall be in covered waste skips; and - Maximum waste storage period will be 10 days.	Low	Minor	
Socio-economic	Reduction in visual impacts	Minor	Moderate	General mining activities around the mine extension are unlikely to cause a major change in the current level of impact. Good housekeeping measures will all help to ensure that visual impacts are not exacerbated. These include: - Minimising the disturbed area (i.e. ensuring mining activities are localised or kept together as far as possible) so as to reduce the amount of areas with potential visual obstructions or impacts, - Retention of as much existing vegetation as possible, - Dust suppression, and - Progressive rehabilitation.	Low	Minor	Clearly defined post closure land-use plan, aiming to align with adjacent and regional land-uses.
	Increase in noise levels at surrounding receptors	Moderate	Moderate	All employees and contractors should receive induction that includes an environmental awareness component (noise). This is to allow employees and contractors to realize the potential noise risks that activities (especially night-time activities) pose to the surrounding environment. - Ensure a good working relationship between mine management and all potentially noise-sensitive receptors. Communication channels should be established to ensure prior notice to the sensitive receptor if work is to take place close to them (especially if work is to take place within 300 m from them at night). Information that should be provided to potentially sensitive receptor(s) includes: - Proposed working dates, the duration that work will take place in an area and working times; - The reason why the activity is taking place; - The construction methods that will be used; and - Contact details of a responsible person where any complaints can be lodged should there be an issue of concern. - Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised.	Low	Minor	Continuation of mechanisms for communication and engagement with local farmers/ landowner/ occupiers. Compliance with EMPr requirements.
	GDP and monetary impacts	Moderate	Major	No mitigation possible apart from implementing all measures listed in the Rehabilitation and Closure report included as part of the EMPr.	Moderate	Minor	Implementation of SLP actions.

Aspect	Impact	Pre-mitigation risk		Suggested Mitigation Measures	Post-mitigation risk (post-mitigation)		Closure Options/Actions
		Impact classification	Impact Significance		Classification (including mitigation)	Significance	
	Job and income loss	Moderate	Moderate	As per SLP requirements, develop mechanisms to assist employees, prior to retrenchment date, in the transition phase after closure of the operations. This includes offering portable skilled development programmes during the operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies, etc; and - Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other industries.	Moderate	Minor	Implementation of SLP commitments. Proactive planning in respect of returning land to active farming practices.
Water	Long term deterioration of cover through erosion and poor agricultural practice post mining phase.	Moderate	Moderate	Ensure that the surface profile is rehabilitated to promote natural runoff drainage and avoid ponding of water within the rehabilitated area; Surface inspection should be continuously undertaken to allow runoff to drain into the downstream drainage /rivers; and - All rehabilitated areas must be established with vegetation.	Low	Negligible	Design and implement a free draining post mine landform.
Soils and Land Capability		Moderate	Major	Maintenance of surface water management structures.			Develop and implement Post Closure Land Management and Monitoring Plan.

7 CLOSURE VISION, OBJECTIVE AND TARGETS

The project's closure vision, objective and targets for rehabilitation, decommissioning and mine closure, aim to reflect the local environmental and socio-economic context of the project, and to represent both the corporate requirements, the stakeholder expectations as well as the legislative framework and regulations.

7.1 CLOSURE VISION

With environmental context of the project and the feedback from the consultation process the vision for closure is as follows:

"To achieve a safe, stable, non-polluting and aesthetically acceptable post-mining landscape, supporting re-establishment of agricultural land, and the creation of sustainable rehabilitated areas that will deliver clean water to the local catchment, and provide productive land that is comparable to pre-mining land uses".

The key rehabilitation, decommissioning and closure objectives are required to support the achievement of this post closure vision 'Well developed rehabilitation objectives will allow assessment of the risks associated with achieving these objectives and guide the setting of suitable rehabilitation actions to be taken to mitigate these risks at every stage of the project's life. Rehabilitation objectives describe 'what' needs to be achieved to reach the mine's rehabilitation goals. These objectives should be aligned to site-specific characteristics that are within the mine's control. Rehabilitation objectives should be as specific, measurable, achievable and realistic as possible. They should also define a time period against which they can be measured' (LRSSA, 2019). The key closure objectives for the Heleza Moya Project extension are presented in Table 7-1 below.

Table 7-1 – Key closure objectives and relinquishment criteria

Aspect	Objective	Indicators	Target	Closure Relinquishment Criteria
Landform	▪ To integrate concurrent rehabilitation designs into life-of-mine plans, ▪ To encourage direct soil placement as part of rehabilitation activities, (where possible) ▪ To create a planned rehabilitated landscape that meets pre-defined land capabilities commitments: • Suitable slope profiles for the planned land use/s and that limit the potential for erosion • Adequate soil cover thickness ▪ To re-create a free-draining profile across the back-filled pits, having the correct gradient for the planned land capability to support the intended land use ▪ To provide long-term stabilisation of the geo-technical conditions of the disturbed mining areas ▪ To limit the need for long-term care-and-maintenance of recreated landforms or need for unplanned high intensity care and maintenance	▪ Mine closure landform design. ▪ Topsoil stripping and a register of- topsoil source, volume, depth, type, stockpile location, placement location ▪ Rehabilitated landscape slope (%). ▪ Erodibility factor of rehabilitated soils. ▪ Visual observations for erosion and ponding) ▪ Suitable rehabilitated areas slopes ▪ Rehabilitation practices aligning to current Fairbreeze mine standards (Maximum of three years of high intensity care post vegetation establishment, followed by low intensity care)	▪ Relevant and accurate landform design. ▪ Achieve steady state roll over rehabilitation as quick as possible. ▪ Attain current slopes at Fairbreeze mine on rehabilitated land ▪ Slope % x Erodibility factor (k) of new soil ≤ 2. ▪ Soil depth ≥300mm across all rehabilitated areas ▪ Limited erosion features (i.e. concentrated flows and unnecessary loss of topsoils). ▪ No unplanned ponding of water on rehabilitated surfaces ▪ Mine closure landform design to take into account: bulking factors; long term material settlement factors. ▪ Stable, vegetated landform slopes.	▪ Achievement of pre-mining land capability comparable to the current Fairbreeze mine ▪ Rehabilitated areas are free draining ▪ Limited erosion gullies or features. ▪ No unplanned ponding. ▪ No unrehabilitated melon holes.
Soils and land capability	Objectives for soil stripping:			Audited compliance with soil stripping and handling procedure

Aspect	Objective	Indicators	Target	Closure Relinquishment Criteria
	▪ To develop a comprehensive understanding of the site's soils to be able to compile an appropriate soil stripping and handling plan for the entire lifecycle of the mine. ▪ To strip demarcated usable soils according to a soil stripping and handling plan ▪ To live place as much of the stripped soil as possible, to minimise the quantity of usable soil needing to be stockpiled (where possible) ▪ To undertake soil stripping in a manner that limits soil loss and compaction and retains as much of the natural seed bank as possible.	▪ Pre-mining soil survey ▪ Topsoil management procedures (stripping and handling) updated, maintained and monitored. ▪ Topsoil stripping and placement register- topsoil source, soil moisture, volume stripped/ placed, depth, type, stockpile location, placement location (incl direct placement).	▪ Limit topsoil stripping and handling when soils are wet to reduce the risk of compaction ▪ Ensure correlation between available soil and stripped soil ▪ Compliance with soil stripping and handling plan	≥85% correlation between available soil and stripped soil
	Objective for soil stockpiling: ▪ To minimise the quantity of soil stockpiled. • To limit the time stripped soils are stockpiled. • To limit the number of times stripped soils are re-handled. • To stockpile soils by end-tipping (and increase stockpile height using shovel, if necessary), to minimise compaction. • To fertilise and revegetate stockpiled soils to maintain soil	▪ Mine closure landform design ▪ Soil stripping and handling procedure (maintained, updated and monitored) ▪ Topsoil stripping and placement register- topsoil source, soil moisture, volume stripped/ placed, depth, type, stockpile location, placement location (incl direct placement) ▪ Stockpile height monitored ▪ Stockpile vegetative cover and presence of invasive species ▪ Topsoil material balance	▪ No unnecessary of damage/ disruption to stockpiles ▪ Ensure correlation between stockpiled soil and soil available for rehabilitation ▪ Stockpile soils separately as defined in the soil management procedure. ▪ No domination of invasive species	Audited compliance with soil stripping and handling procedure

Aspect	Objective	Indicators	Target	Closure Relinquishment Criteria
	fertility and reduce soil loss via erosion		▪ Compliance with soil management procedure	
	Objectives for soil replacement: ▪ To minimise the loss of replaced soils • To minimise compaction during soil replacement • To replace soils of the right type, to the correct depth, to achieve planned land capability targets • To ensure sufficient soil is kept in stockpiles for longer term care-and-maintenance activities on rehabilitated land.	▪ Mine closure landform design. ▪ Topsoil management procedure is maintained, updated and monitored ▪ Topsoil material balance ▪ Topsoil stripping and placement register- topsoil source, soil moisture, volume stripped/ placed, depth, type, stockpile location, placement location (incl. direct placement). ▪ Level of rehabilitated soil compaction. ▪ Degree of differential settlement ▪ Quantity of retained topsoil for post rehabilitation repair ▪ Post mining soil survey	▪ Ensure correlation between stripped, stockpiled and replaced soil ▪ Avoid unnecessary mixing of topsoils and subsoils ▪ Handling of soils to be undertaken when soils are as dry as possible ▪ Compliance with mine closure landform design ▪ Use suitable equipment for topsoil placement and levelling (e.g. dump truck and dozers) ▪ Single topsoil placement and levelling-i.e. ensure accurate topsoil balance and planning	▪ Topsoils across rehabilitated pit area ▪ ≥85% correlation between available soil and stripped soil ▪ Bulk density: < 1.55g/cm3 ▪ Available rooting depth
	Objectives for soil amelioration: ▪ To optimise soil conditions conducive to improved soil structure. ▪ To optimise soil conditions that enhance germination, facilitate root development and vegetation growth ▪ To improve water and nutrient use efficiency of vegetation	▪ Good soil preparation to enhance germination and proper growth	▪ Alignment of soil condition with that required to meet the defined land capability commitments.	▪ Soil Physical parameters: - Rock content: as low as possible ▪ Bulk density: less than 1.55g/cm^3. - Available rooting depth: >300mm ▪ Soil Chemistry parameters: • pH (KCl): between 6 and 8.

Aspect	Objective	Indicators	Target	Closure Relinquishment Criteria
				• Salinity (as EC): <400mS/m • Exchangeable sodium percentage less than 15 • Fertility: P (Bray 1) and K: Target for P – 10mg/kg to 15 mg/kg; Target for K – 100 mg/kg • Organic Carbon: > 0.75% through depths of 250 mm • Major Cations: – Ca= between 200-3000mg/kg- recommended ~800mg/kg; – Mg= between 50-300mg/kg- recommended 150 mg/kg; – Na= between 50-200mg/kg- recommended <100 mg/kg).
Water resources	▪ To strive for minimal residual impact on natural water resources.	▪ Compliance to the resource water quality objectives for the catchment	▪ No contaminated water to local surface water resources.	▪ Updated numerical groundwater model and water liability assessment ▪ Updated mine water management plan (for residual and latent impacts) ▪ Compliance with GN704 ▪ Updated and secured financial provision for residual and latent impacts ▪ Comply with WUL requirements
Biodiversity	Objectives for revegetation: • To reduce soil loss to a minimum. • To optimise the efficient use of water within the rehabilitated landscape • To enable long-term functionality of the predefined land-use/s	Mine closure plan and landform design.		▪ Natural areas vegetation structure and species composition to align with local reference site ▪ Alien invasive plants not dominating and presence to align with, and improve on, surrounding local reference sites.

Aspect	Objective	Indicators	Target	Closure Relinquishment Criteria
	• To form the building-blocks for a resilient ecological system (with predefined natural coverage areas), so that successional processes lead to the predefined vegetation complex			
	To maintain a productive and sustainable vegetation cover within defined natural coverage areas that align with the surrounding references sites for grassland and wetland.	Vegetation structure and species composition.	Sustainable natural areas.	Natural areas vegetation structure and species composition to align with local reference site. Presence of alien invasive plants to align with and improve on surrounding local reference sites.
Infrastructure	Objectives for surface infrastructure: • To decommission, decontaminate (if necessary), dismantle and remove for safe disposal all identified surface infrastructure that has no beneficial post-mining re-use potential. Following removal of unwanted infrastructure, to rehabilitate cleared footprint areas. • To stabilise and re-purpose remaining surface infrastructure that has a beneficial post-mining re-use potential-if any • To identify public-private partnerships and/or new owners for the ongoing, long-term management and ownership of remaining surface infrastructure	▪ Mine closure plan and landform design. ▪ Status of rehabilitated land ▪ Land contamination assessments- if applicable. Conclusion of, and compliance with, post closure land-use agreements ▪ Conclusion of, and compliance with, post closure management and maintenance plan	▪ Remove all unnecessary infrastructure ▪ Compliance with defined land capability targets	▪ No remnant infrastructure or waste materials remaining on surface, unless transferred in writing in the signed agreements.

Aspect	Objective	Indicators	Target	Closure Relinquishment Criteria
	• To put in place formal agreements for the 'new owners' for the management and maintenance of remaining infrastructure			
Social and economic	▪ To protect public health ▪ Return majority of disturbed land to viable agricultural capability ▪ To facilitate a transition from mining to viable arable land use through effective agreements (lease/ co-operation/ sale) that promote to reinstatement of the land as a contributor to food crop production	▪ Public health and safety risk assessment ▪ Mine closure plan and landform design ▪ Conclusion of, and compliance with, post closure land-use agreements ▪ Conclusion of, and compliance with, post closure management and maintenance plan.	▪ Compliance with mine health and safety legislation. ▪ Compliance with defined land capability targets ▪ Compliance with defined land capability targets ▪ Reinstatement of the arable land to active farmland.	▪ Site is safe for human and animals ▪ Post closure land-use agreements (covering land use, rehabilitated land management and ongoing maintenance, including where relevant management of residual impacts).
Climate	▪ Ensure closure objectives and actions are climate change resilient ▪ Ensure assessment and consideration of long-term climate change predictions in the ongoing closure planning and implementation.	▪ Climate change predictive models ▪ Revised and updated closure risk assessment and planning.	▪ Obtain latest climate change predictions and ensure consideration in closure planning, risk assessments and financial provision reporting updates ▪ Regular groundwater model updates to include climate change scenarios.	Apply latest climate change prediction to assessment of residual and latent impacts- provision of reasonable and adequate contingency funding

8 ENVISAGED LAND USES

There are various alternative closure and post closure options available for the Fairbreeze mine extension project. The identification and consideration of the most suitable alternatives are driven by to the following:

- The ability of the selected alternative to adequately meet the specified closure vision and objectives
- The efficiency, viability, and practicality of the selected alternative, as well as the ability of selected alternative to complement other options
- The preference, where possible, for low maintenance and sustainable options
- Health Safety, Environment, Community, Security and Reputational Risk profile of the alternative options to Tronox
- The alignment with the local environmental and socio-economic context and associated opportunities and constraints

Possible alternatives identified for post closure land-use on Heleza Moya surface right from all the data collected include the following options:

- Leasing of land on a permanent basis

- Leasing for plantation establishment.
- Leasing the land to local farmers for grazing

- Agricultural development (specialist farming/small farming projects like aquaponics, hydroponics etc)
- Sell or transfer some property and/or infrastructure for industrial purposes

The above alternatives assume the following:

- That disturbed mine land is fully rehabilitated, and rehabilitation has proved to be sustainable
- The risks of rehabilitated land are low and the surface can be managed by suitable third party with suitable knowledge, training and experience
- Tronox is able to attain site relinquishment, after application of closure certificate or transfer of liabilities to third party

The preferred closure and post closure option is as follows:

The Heleza Moya Surface rights is fully rehabilitated in line with what is currently implemented at Fairbreeze mine, and rehabilitation design meets specifications, and the surface is maintained with appropriate agricultural practices for use by Tronox or third parties where possibility exist.

Table 8-1 provides a list and assessment of threats, opportunities and uncertainties related to the preferred closure option.

Table 8-1 – Threats, opportunities and uncertainties associated with the preferred closure option

Item	Description
Threats	▪ Rehabilitated land does not reach sustainable end state or self-sustaining phase due to issues related to mine disturbance e.g. compaction, alien plant invasion, overgrazing by community livestock, low or diminishing nutrient status, mis-management (frequent burning and distraction of rehabilitation infrastructure like fences)etc ▪ Actual differential settlement ad bulking of the rehabilitated spoils misaligned with the factors used in the landform analysis ▪ Long term climate change may result in threats (or in certain cases opportunities) for the long term closure planning.
Opportunities	▪ Fairbreeze mine has implemented successful rehabilitation on disturbed lands, and has personnel with correct experience, training and who are suitably qualified to implement successful rehabilitation at Heleza Moya extension project ▪ NEMA requires annual review of the rehabilitation and closure plans and associated financial provisions- this provides an ideal opportunity to ensure that the rehabilitation process is assessed for relevance on a continual basis ▪ Regular soil and vegetation surveys can assist in predicting and providing financially for the required soil amelioration ▪ Utilisation of a suitable cover crop and legumes followed by a establishment of grass vegetation on rehabilitated land could provide an opportunity for increased soil conditioning prior to closure ▪ Stakeholder expectations and commitments can be proactively managed throughout the project until mine closure as the project has not commenced ▪ ▪ Reuse some or all of the surface rights at Heleza Moya for mining infrastructure development if and when required by Tronox
Uncertainties	▪ Since this project has not commenced at Heleza Moya surface rights area, there are certain criteria, parameters and risks which will become clearer post mining implementation. Closure risks predictions and assessment will improve with time. Community related risks specifically relating to future unauthorized use of rehabilitated land for livestock grazing

8.1 FINAL POST CLOSURE LAND USE

The current land-use on the site is predominantly agriculture. It is also noted that the site is presently highly suitable and viable as a productive agricultural unit. It is on this basis that it is proposed that all reasonable efforts be taken to return the greater majority of the mine affected land, post closure, to viable and productive farmland.

9 CLOSURE ACTIONS AND MEASURES

The closure measures set out below in the closure plan are based on conceptual plans developed during the PFS, engineering designs that have been developed to date, a screening level risk assessment undertaken for the Project and the outcomes of the specialist impact assessments undertaken for the Project. The closure measures for the Project have been developed to support the closure vision, principles, and objectives.

The perceived knowledge maturity informing this closure plan is indicated in the series of tables that follow below as either non-existent, partial, adequate, or comprehensive. The closure plan will need to be updated regularly going forward to incorporate outcomes of studies that will be conducted in the FS phase, and also to include inputs from stakeholder engagement and monitoring data.

The closure measures are grouped in the following categories:

9.1 INFRASTRUCTURAL AREAS

- No surface infrastructure will be developed on the Heleza Moya Surface rights area.

9.2 MINING AREAS REHABILITATION

- Mine Open Pits

9.3 GENERAL SURFACE REHABILITATION

- Contaminated soils
- Promotion of ecosystem diversity

9.4 WATER MANAGEMENT

- Stormwater management infrastructure

10 IDENTIFIED CLOSURE ACTIONS

In order to align with the defined closure plan and final land use objective, the mine will need to implement a series of actions which addresses the mines rights area, as well as ongoing maintenance and management thereof.

These activities or components would specifically include the following:

- Rehabilitation of access roads
- Rehabilitation of mine voids/pits
- General surface rehabilitation
- Aftercare of the Mine area

The closure components which are applicable to the Heleza Moya mine extention include the following:

- Preparation and planning for closure- This includes all of the tasks leading up to the finalisation of the closure plan for implementation.
- Rehabilitation of access roads - the main haul road leading to the operations, as well as the access route to the soil stockpile areas. It is anticipated that certain of these access roads will be retained as smaller local access to the site to allow for controlled access during closure and post closure monitoring and maintenance.

- Rehabilitation of the pit areas. One of the key components of the rehabilitation of the pits is to ensure a suitable and sustainable final landform.
- Rehabilitation of the soil stockpile areas.
- General surface rehabilitation- including soil amelioration and planting of vegetative cover for the affected natural areas, and planting of crops on the defined arable land areas.
- Removal of fencing required during the mining operations. Fencing will need to be removed at closure to avoid unnecessary post closure maintenance and management costs.
  Maintenance and aftercare- Maintenance and aftercare is typically applied during the closure period (i.e. once active rehabilitation and closure is completed and ending once a closure certificate is obtained). Typically, aftercare and maintenance includes general maintenance activities including, soil amelioration (including fertilization), ongoing monitoring, control of alien invasive, and surface stability and settlement actions. It should be noted that for the purposes of this report and the associated financial provisions, that the relevant monitoring and maintenance/ aftercare actions are included in the other closure components listed above.

10.1 MONITORING, AUDITING, AND REPORTING REQUIREMENTS

Environmental compliance and rehabilitation performance monitoring will be conducted throughout operations. The monitoring plan presented here outlines the monitoring objectives, methods, network, reporting requirements, success criteria and envisaged corrective action that could be required. The closure plan will be updated routinely as the Project proceeds to ensure that it is accurate and sufficiently detailed to guide closure monitoring relative to established objectives.

Resource areas to be monitored over a period of at least 5 years include:

- Overall rehabilitation performance,
- Surface water quantity and quality (including sedimentation),
- Groundwater,
- Air quality,
- Biodiversity, including integrity of offset areas, and
- Socioeconomics, particularly with respect to success of alternative livelihood initiatives.

From these factors (and others), an assessment of the success of the closure of the site relative to established criteria will be completed and reported to the relevant Government Departments. The monitoring outcomes will also form the basis for the motivation Tronox to apply for to relinquishment the site from authorities.

The monitoring and management plan is presented in Table 11-1.

11 MONITORING, AND MANAGEMENT PLAN

Details the monitoring and maintenance recommendations are described below (Table 11-1):

Table 11-1 – Monitoring and maintenance Plan

Monitoring aspects	Monitoring objectives	Measuring network	Frequency and period of monitoring	Sampling analysis and parameters to be monitored	Reporting	Success / performance criteria / relinquishment criteria	Corrective action / adaptive management
Surface water							
Surface water quality	▪ Monitor surface water quality to track water quality changes over time ▪ To confirm that surface water quality in streams has stabilised and approximates pre-mining qualities for maintenance of aquatic life	▪ Review the operational monitoring network and modify if required for the post closure monitoring phase ▪ The network should include as a minimum flow sampling in all major streams draining the Project mining area (which includes upstream and downstream sampling sites in streams and drainage lines	▪ Surface water samples for quality analysis to be collected monthly ▪ Continue sampling for 5 years post closure, or until water quality in streams has stabilised	▪ Collect surface water samples for chemical analysis at an accredited water laboratory ▪ Do in-field measurements of pH and EC (as a minimum) when samples are collected (to allow for immediate corrective action if needed) ▪ Samples to be analysed for standard suit of physico-chemical and bacteriology parameters agreed ito of the water use licence	▪ Surface water quality to be reported monthly ▪ Monthly reports to be consolidated into an annual surface water quality report	▪ Water quality in streams approximates pre-mining water qualities ▪ Water quality for surface streams meets the WUL requirements ▪ Potable water consumed on site meets the SANS 241 drinking water standard	▪ If surface water quality does not meet water quality guidelines or pre-mining water qualities, the water management measures will need to be reviewed to correct the negative trends. ▪ If groundwater recharge through the pits results in contamination of surface water quality (when it discharges through springs), the in-pit water quality will need to be treated to improve the quality of recharge water ▪ Observations of in-pit water quality during the operational phase will indicate if and to what extent pit water may impact stream water quality requiring intervention
▪ Potable water	▪ Monitor portable water quality after treatment to determine that it is safe for human consumption	▪ Monitor potable water quality for those water purification plants retained at closure	▪ Sample the potable water supply monthly ▪ Continue sampling until the potable water treatment plant is decommissioned	▪ Collect potable supply water samples for analysis at an accredited water laboratory ▪ Samples to be analysed for standard physico-chemical and bacteriology parameters applicable to potable water supply (WHO drinking water standard)	▪ Monthly reporting ▪ Monthly reports to be consolidated in an annual report	▪ Potable water meets the SANS 241 drinking water quality standard for the duration for which potable water is supplied on site	▪ If the potable water supply does not meet the WHO standard for drinking water, an alternative supply of water or treatment technology would be needed in the short term until the potable water supply quality is brought back within specifications
Groundwater							
Groundwater levels	▪ Measure the piezometric (water table) levels in key boreholes around the pits to monitor the height (mamsl) of the water table ▪ To confirm that the water table below the pits remains at the same level as before mining and that modelled recharge rates from the mined pits is accurate, resulting in replenishment of the groundwater resource (to maintain flow in streams)	▪ Review the operational groundwater monitoring network and retain sufficient perimeter groundwater monitoring boreholes for the post closure monitoring phase ▪ Install monitoring boreholes as required	▪ Groundwater levels should be monitored on a quarterly basis as a minimum ▪ Monitoring to continue throughout the post closure monitoring period (minimum 5 years)	▪ The groundwater level is measured with a suitable dip meter (with sufficient cable length)	▪ Groundwater (water table) levels will be compiled into a quarterly groundwater report ▪ Quarterly reports to be consolidated into an annual report	▪ The water table stabilises in time to the level predicted in the pre-mining geohydrological model ▪ Rate of recharge of mine water corresponds with modelled predictions of the recharge rate ▪ Mine water levels stabilise at predicted levels and do not enhance predicted seepage/decant rates	▪ If groundwater levels post closure do not stabilise at levels predicted in the groundwater model, the model inputs will need to be revised ▪ If groundwater levels are too low to maintain strong flow in springs and adequate stream flow for aquatic life, supplemental water from the pits may need to be piped to the impacted streams

Monitoring aspects	Monitoring objectives	Measuring network	Frequency and period of monitoring	Sampling analysis and parameters to be monitored	Reporting	Success / performance criteria / relinquishment criteria	Corrective action / adaptive management
						▪ Water levels are controlled by de-watering to a pre-determined management elevation (to prevent decant and to control the inter-mine flow regime as needed)	
Groundwater quality	▪ Monitor groundwater quality to track water quality changes over time ▪ To provide assurance that the groundwater resource in lowlands and on the mountain has not been contaminated by mining related activities and that it has the desired quality so as not to impact aquatic life in spring-fed streams	▪ Review the operational groundwater monitoring network and retain sufficient perimeter groundwater monitoring boreholes for the post closure monitoring phase ▪ Install monitoring boreholes as required	▪ Groundwater samples for quality analysis to be collected quarterly ▪ Continue sampling for 5 years post closure, or until groundwater quality is stable	▪ Collect groundwater samples for chemical analysis at an accredited water laboratory ▪ Samples to be analysed for standard suit of physico-chemical parameters agreed ito of the water ▪ use licence	▪ Groundwater quality results to be compiled into a quarterly groundwater report ▪ Quarterly reports to be consolidated into an annual report	▪ Water quality in streams approximates pre-mining water qualities ▪ Water quality for surface streams meets the IFC water quality guidelines for key parameters ▪ Potable water consumed on site meets the WHO drinking water standard	▪ If surface water quality does not meet water quality guidelines the water feeding the streams will need to be treated before release to streams ▪ If groundwater recharge through the pits results in contamination of surface water quality (when it discharges through springs), the in-pit water quality will need to be treated to improve the quality of recharge water ▪ Observations of in-pit water quality during the operational phase will indicate if and to what extent pit water may impact stream water quality requiring intervention
Surface rehabilitation							
Surface erosion	▪ Continue to monitor all surface rehabilitation areas across the mine areas ▪ To confirm that revegetated soils/substrates are stable and resilient against rainfall runoff erosion ▪ Inspect sediment containment ponds to ensure they have sufficient capacity to contain contaminated runoff and clarify this before release to the environment	▪ All rehabilitated areas disturbed by mining activities and infrastructure ▪ All sediment containment across the mine (mining areas and infrastructure areas)	▪ For newly rehabilitated areas (closure rehabilitation), monthly monitoring is required for the first year ▪ Annually thereafter for 5 years or until rehabilitated areas are stable ▪ Include additional inspections of rehabilitated areas after each significant rainfall event (1:10 y return period) ▪ Erosion inspections should always include inspection of sedimentation ponds	▪ Visual inspections of newly rehabilitated areas should be conducted over all rehabilitated areas, recording areas with sheet, rill or gully erosion and what needs repairing ▪ Sediment depth within the sediment ponds must be recorded and when storage reaches a minimum threshold (to be decided), the ponds must be desilted (the latter is likely to be needed several times annually in areas that have recently been rehabilitated	▪ Findings will be reported in an internal erosion monitoring and rehabilitation report after each inspection	▪ No new erosion seen on rehabilitated areas after 5 years ▪ The rate of sediment collection in sedimentation ponds is substantially reduced requiring annual maintenance only for 5 years after which longer maintenance timeframes need to be set	▪ Eroded areas will be stabilised by infilling and reshaping, and by establishing vegetation on the repaired areas/ bare patches, as required. ▪ Silt removed from sediment ponds must be placed in deposition areas where it will not be remobilised. Consideration should be given to blending the fine silt with other soil and organic materials to create a growth medium that is in short supply for resoiling activities on pit benches
Soil fertility	▪ To achieve basal soil fertility levels that will support a self-	▪ All areas disturbed by mining activities and	▪ Annually for the first 3 years, and every 3 years	▪ Determine the fertility level in rehabilitated soils by collecting	▪ Findings will be reported in a soil fertility report, after each assessment	▪ Rehabilitated soils are regarded as having	▪ Implement the site-specific soil amelioration specifications

Monitoring aspects	Monitoring objectives	Measuring network	Frequency and period of monitoring	Sampling analysis and parameters to be monitored	Reporting	Success / performance criteria / relinquishment criteria	Corrective action / adaptive management
	sustaining vegetation cover (within 5 – 10 years of completion of rehabilitation)	land reinstated by rehabilitation activities	thereafter until fertility targets are met	representative soil samples for laboratory analysis ▪ Submit soil samples to an accredited soil laboratory to analyse for: ▪ pH (KCl) ▪ Salinity (as electrical conductivity in mS/cm or resistance in Ω) ▪ Fertility: P as Bray 1 and K ▪ Organic carbon (Walkley Black) ▪ Major cations: Ca, Mg and Na ▪ Cation exchange capacity (CEC) ▪ Other Micro elements (B, Mn, Cu, Fe and Zn)		adequate fertility when fertility analyses show: ▪ pH is >pH5, ▪ resistance is >300 Ω, ▪ P is >20mg/kg, ▪ and ▪ K is >100mg/kg ▪ Soils on rehabilitated areas have sufficient levels of fertility to support a sustainable vegetation cover	developed for the rehabilitated open pit areas ▪ Apply adequate soil amelioration (physical and chemical) to provide a sustainable vegetation cover in support of the next land use
Vegetation establishment	▪ To establish sustainable revegetation disturbed lands ▪ To ensure that vegetation seeded on rehabilitated areas establish to give a canopy and basal cover that stabilises the soils and provide a level of greenery that noticeably diminishes the visual impact of mining	▪ Include all rehabilitated areas in the monitoring network to track progress of rehabilitated areas ▪ Concurrent rehabilitation is desired and if implemented as an integral part of mining the monitoring network and programme should continue throughout the LoM ▪ Permanent quadrats should be set up in selected areas within the pits for ongoing / long term monitoring – to complement the monitoring stations outside of the pit footprint and where monitoring has already commenced	▪ Monitoring of vegetation establishment, species composition and basal cover will be done annually for the first 3 years, and then every 3 years thereafter ▪ Visually inspect rehabilitated pastures annually ▪ In year 3 and then every three years thereafter, assess species composition, abundance and cover at fixed point survey sites	▪ Regular visual inspections will be made on rehabilitated land to ensure that seed establishment has been successful and any germination or establishment failures (through poor seed quality, seed application, drought etc.) are noted ▪ Successional changes in pasture species composition and abundance will be recorded visually for 3 years ▪ In year 3, fixed point vegetation monitoring sites will be established (one every 50 ha as a minimum), and the line transect or quadrat method will be used to determine species composition, species abundance and plant basal cover	▪ Findings will be reported in a rehabilitation report after each assessment	▪ Pastures have at least 15% basal cover one-third of which is provided by perennial species ▪ Pastures on rehabilitated land contain at least 3 perennial species, one of which has a creeping habit ▪ Ongoing monitoring shows that target pasture species persist and that undesirable species that affect the intended land use do not dominate (e.g. Increaser I and II species do not replace higher value grazing species)	▪ Over seed any areas where seed germination has failed (and where soil conditions have proved to be suitable) ▪ Apply appropriate adaptive management strategies to correct any deterioration in the pasture species composition and abundance (e.g. review defoliation / fertilisation practices and modify according
Alien and Invasive species (AIS)	▪ To develop an AIS monitoring and control programme that is effective in controlling declared AIS on land own or managed by Tronox	▪ All areas managed by Tronox, including all mining disturbed areas and in particular newly rehabilitated areas.	▪ At least twice a year for rehabilitated areas, for the first 3 years after establishment of seeded or planted species on rehabilitated land, and then	▪ Conduct visual inspections for invasive species over the site focussing on disturbed areas weeds are more likely to emerge. AIS	▪ A detailed record should be kept of all weeds observed, where the occurred and how they were controlled destroyed	▪ Regular alien invasive species inspections demonstrate that control measures have effectively eradicated invasive species, or that for	▪ If required, review eradication / control measures and modify to improve effectiveness of controls

Monitoring aspects	Monitoring objectives	Measuring network	Frequency and period of monitoring	Sampling analysis and parameters to be monitored	Reporting	Success / performance criteria / relinquishment criteria	Corrective action / adaptive management
	▪ To minimise the threat posed by the spread of AIS to both indigenous flora as well as to newly revegetated areas on rehabilitated lands ▪ To prevent AIS from affecting the recovery of successional processes and ecological functioning of desirable vegetation on rehabilitated areas so that these will develop a biodiverse flora in time		annually for the duration of the project	should be controlled by plucking young plants when soils and before they flower or set seed, or plants may be slashed if larger. ▪ Any plants in flower or with ripening seed should be bagged ad take to a suitable spot for incineration. ▪ It is always important to revisit areas where large stands of a declared weed have been removed because seed in the soil bank may germinate in subsequent seasons and will require eradication	▪ An AIS control report should be produced after each biannual inspection	species with long lived seed that annual maintenance measures are preventing re-infestation	
Air quality	▪ To monitor reduction of fallout dust generated by the mining operations and infrastructure area following the successful establishment of vegetation on rehabilitated areas.	▪ Review operational air quality monitoring plan and programme and revise to meet post-mining monitoring needs on areas disturbed by mining activities and land reinstated by rehabilitation activities	▪ Monthly for 5 years, or until target reached (dust) Monthly until re-processing has been completed	▪ Use will be made of single dust buckets to monitor dust fallout, and where indicated bi-directional buckets will be installed to monitor imported and exported dust	▪ Findings will be reported annually in an air quality assessment report	▪ No dust buckets exceed a fallout dust load above 600 mg/m^2/d on the perimeter of the property	▪ Improve vegetation cover on rehabilitated areas by either improving soil fertility, by over-seeding where cover is low, and by providing interim wind control measures (wind nets), where required, until the desired vegetation cover is achieved that reduces dust load to below threshold levels.

12 ORGANISATIONAL CAPACITY

It is critical that roles and responsibilities for the effective planning, implementation, monitoring and revision of the closure process are clearly defined and provided for. Heleza Moya extension project is ultimately responsible for ensuring compliance with relevant legal requirements. Tronox, as the holder of the mining rights must ensure knowledge and understanding of the applicable legislation, guidelines and industry best practices. The following organisational capacity is required:

Internal Closure champion:

A suitably qualified person(s) who will be accountable for the following:

- Driving the ongoing development, refinement and implementation of the closure plan;
- Resourcing and implementing the plan;
- Ongoing management and monitoring requirements to support the closure plan;
- To ensure the integration of the rehabilitation and closure activities with general operational activities; and
- Ensure legal compliance and deliver on commitments.

Internal Social champion:

A suitably qualified person(s) who will be accountable for the following:

- Develop and implement training strategies for internal training;
- Develop and implement effective communication with all stakeholders;
- Develop and implement a stakeholder forum to promote information and idea sharing regarding closure related aspects and/or ensuring meaningful contributions to existing forums; and
- Continually develop the relationship with I&APs, to promote the social licence to operate and close and decommission.

Independent Environmental Assessment Practitioner:

This individual will be appointed to ensure compliance with the requirements of the mine closure plan and specifically to undertake the following tasks:

- Undertake the prescribed independent auditing; and
- Undertake period review and assessment of accumulated monitoring data and provide recommendations for review and amendment of the closure planning where applicable.

Internal or external specialists: The monitoring of the implementation of the closure process and the subsequent revisions, adjustments and alterations will in many cases need to be conducted by suitably qualified specialists (e.g. soils and agricultural specialist, biodiversity and wetland specialist, ground and surface water specialists, engineering and landform design specialists). Relevant specialists should be identified, and budgets provided for the scope of work to align with the obligations presented in this closure plan.

Furthermore, education, training and capacity building is critical to ensure that the production activities align with evolving internally accepted best practice and research. In this regard, Tronox should ensure that regular review of international best practice is undertaken and where applicable implemented throughout the project programme. It is recommended that the internal resource responsible for managing and implementing the closure and rehabilitation activities join available peer networks, affiliations and organisations. It needs to be recognised that closure planning needs to start early within the project lifecycle and continued as an integral component of the operations.

13 PART A4: CLOSURE COST ASSESSMENT

13.1 METHODOLOGY

The total projected closure cost (TPC) for closure was undertaken in September 2023. This section describes the approach and methodology followed with the execution closure liability estimation for the Project. Assumptions regarding specific aspects or considerations that are expected to directly influence the closure liability estimation are documented under Section 13.2. The following steps were followed in deriving the closure cost estimate:

- Gather relevant project background information to inform the 2023 closure costing assessment
- Verify and update the unit rates for surface rehabilitation, and related aspects in consultation with contractors and demolition practitioners
- Confirm and verify planned battery limits for the project, based on the outcomes of the document review and verification of the mining right boundary using the Google Earth information
- Update the infrastructure line items in the WSP closure cost model, by comparing the most recent Google Earth aerial imagery (2023) with the 2023 closure costs
- Conduct a risk assessment of direct, indirect and combined impacts to the receiving physical, biological or social environment, which may require mitigation or management to be considered
- Obtain unit rates for planned infrastructure dismantling/demolition, water management, decontamination, general surface rehabilitation, monitoring and maintenance and other related mine infrastructure, and related aspects in consultation with contractors and demolition practitioners
- Apply the verified battery items in the WSP closure cost model
- Calculate the closure costs for the scheduled, by including the confirmed closure measures in WSP's costing model (including demolition of all infrastructure, rehabilitation of mining landforms, general surface rehabilitation, and post-closure monitoring)
- Review and update allowances for specific specialist studies and other assessments
- Review and allow for specific provisions for post-closure monitoring and aftercare-related matters
- Update and include additional narratives for the assumptions and qualifications made for each cost item based on the above

13.2 ASSUMPTIONS

The following assumptions have been developed for the Project:

- All mining pump stations and associated pipes will be removed from site for re-use to other mine sections, and were not included in the cost assessment
- Partial rehabilitation will be undertaken during active mining phase as part of Tronox's concurrent rehabilitation process. In this case, some of the material mined will be returned to active pits, and levelled up to a point where only topsoiling will be required for final rehabilitation. Costs associated with partial rehabilitation is excluded from the closure costs assessment, as they will be covered as part of mining costs.
- Unit costs used in the cost estimates are based on the South African demolition and rehabilitation expert rates and were verified by WSP mine closure specialists.
- Any hydrocarbon-contaminated soil from spill incidents will be immediately dealt with during operations in line with project's operational procedures and the contaminated soil will be phyto-remediated. Therefore, it is assumed that there will be no oil-contaminated soil to deal with in the

event of unplanned closure, but any residual contaminated soil will be excavated and phyto-remediated if necessary

- All access roads not required for the ongoing environmental monitoring activities will be rehabilitated. Mine haul roads required for monitoring purposes will be narrowed for light vehicle access allowing the unused portions (at least half of the haul road) to be rehabilitated.
- Unit costs used in the cost estimates are based on the South African demolition and rehabilitation expert rates and were verified by WSP mine closure specialists.
- No allowances for severance packages (human resources costs) have been included in the closure costs
- In terms of generally accepted accounting practices, no cost off-sets due to possible salvage of infrastructure was considered and merely gross rehabilitation and closure costs are reported

13.3 CLOSURE COST SUMMARY

The estimated cost for closure of the Project, as at September 2023, is approximately R 27 863 847.82, as summarised in Table 13-1. The detailed costing is provided in Appendix A.

Table 13-1 – Closure cost summary

	Closure Component	Scheduled closure
1	Infrastructural Aspects	-
2	Mining Areas	18 924 750.00
3	General Surface Rehabilitation	2 287 938.02
4	Surface Runoff Measures	-
	Sub-Total 1	**21 212 688.02**
5	Post Closure Aspects	
5.1	Surface water quality monitoring	106 233.60
5.2	Groundwater quality monitoring	145 555.20
5.3	Rehabilitation monitoring	164 424.00
5.4	Care and maintenance - low intensity	931 775.00
5.5	Care and maintenance - high intensity	-
	Sub-Total 2	**1 347 987.80**
6	Additional Allowances	-
6.1	Preliminary and General	R3 181 903.20
6.2	Contingencies	R2 121 268.80
6.3	Provisional amount for Closure Related Social Aspects	-
6.4	Additional studies	-
	Sub-Total 3	**5 303 172.00**
7	Residual and Latent Aspects	-
	Sub-Total 4	**-**
	Grand Total Excl. VAT. (Sub-total 1 + 2 + 3 + 4)	**27 863 847.82**

14 CONCLUSIONS AND RECOMMENDATIONS

Closure planning is a dynamic process that is to be aligned and integrated with overall mine planning and mine operations, requiring regular review and development to consider changes in legal obligations, corporate requirements, community expectations, technical knowledge, as well as in terms of advancements in the mine closure discipline. To ensure that closure planning remains consistent and integrated, a Closure Steering Committee should be established after the commencement of operations. This committee will, at minimum, have the following responsibilities:

- Implementing the closure strategy and integrating closure planning into the overall project and mine planning
- Ensuring that the Closure Mine Plan is developed, resourced, implemented and revised as necessary
- Ensuring suitable focus is given in the closure planning process to rehabilitation research, socio-economic and community development and to stakeholder consultation.

If mine and closure planning can be proactively undertaken, this will not only facilitate seamless transfer from operations to closure, but also has the potential to yield substantial benefits to the communities in terms of community development programs aimed to facilitate self-sustaining livelihoods and related services for community functioning post mine closure, and the re-skilling and training of mine employees to pursue alternative employment or career opportunities during the closure period in preparation for closure.

If capacity building and jointly agreed assistance programmes have been agreed to from the start, and if the sustainability prospects or aspects of social interventions have been carefully considered, then when the challenges emerge at closure there should be few unpleasant surprises and a well-established working relationship between the project and the community will be in place to address these as they arise.

Appendix A

DETAILED CLOSURE COST SPREADSHEETS

41106390 Tronox Sands Heleza Moya Closure Costing, as at September 2023

	Heleza Moya Rehabilitation	Scheduled closure								
	Closure Component	**Applicable**	**Unit Rate Code**	**Quantity**	**Unit**	**Unit Rate**	**Total Cost (Real)**	**Total Cost (Nominal)**	**Total Cost NPV**	**Notes**
1	**Infrastructural Areas**									
1.1	**Dismantling of plant, buildings and related structures**									
	Not Applicable									
	Sub-total for Dismantling of plant, buildings and related structures						**R -**	**R -**	**R -**	
1.2	**Demolition of steel buildings**									
	Not Applicable									
	Sub-total for Demolition of steel buildings						**R -**	**R -**	**R -**	
1.3	**Demolition of other buildings and structures**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Demolition of other buildings and structures						**R -**	**R -**	**R -**	
1.4	**Rehabilitation of roads and paved surfaces**									
1.4.1	Not Applicable	Yes	E1	-	/m²	R 78.81	R -	R -	R -	
	Sub-total for Rehabilitation of roads and paved surfaces						**R -**	**R -**	**R -**	
1.5	**Demolition and rehabilitation of railway lines**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Demolition and rehabilitation of railway lines						**R -**	**R -**	**R -**	
1.6	**River Diversions**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for River Diversions						**R -**	**R -**	**R -**	
1.7	**Fencing**									
1.7.1	Not Applicable	No	I2.1	3 020.00	/m	R 45.00	R -	R -	R -	
	Sub-total for Fencing						**R -**	**R -**	**R -**	
1.8	**Disposal of Other linear infrastructure**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Disposal of Other linear infrastructure						**R -**	**R -**	**R -**	
1.9	**Disposal and Handling of Waste**									
1.9.1	Not Applicable	No	N1	-	/sum	R 14 642.81	R -	R -	R -	
	Sub-total for Disposal and Handling of Waste						**R -**	**R -**	**R -**	
1.10	**Making good of infrastructure**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Making good of infrastructure						**R -**	**R -**	**R -**	
	Sub-total for Infrastructural Areas						**R -**	**R -**	**R -**	
2	**Mining Areas**									
2.1	**Shafts, adits and inclines/declines**									
2.1.1	**Open pits**									
2.1.1.1	Import Topsoil	Yes	G1.5	65.00	/ha	R 243 800.00	R 15 847 000	R -	R -	Import cover material and spread (500 mm) less than 2 km from the topsoil and laydown area
2.1.1.2	Profiling	Yes	G1.6	325 000.00	/m³	R 9.47	R 3 077 750	R -	R -	Shaping and levelling of cover material
2.1.2	**Adits**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
2.1.3	**Inclines/Declines**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Shafts, adits and inclines/declines						**R 18 924 750**	**R -**	**R -**	
2.2	**Rehabilitation of overburden and spoils**									
2.2.1	Not Applicable	No	G2.2.7	10.26	/ha	R 58 097.20	R -	R -	R -	Establish vegetation on the dump
	Sub-total for Rehabilitation of overburden and spoils						**R -**	**R -**	**R -**	
2.3	**Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)**	No								
	Not Applicable									

41106390 Tronox Sands Heleza Moya Closure Costing, as at September 2023

	Heleza Moya Rehabilitation	Scheduled closure								
	Closure Component	**Applicable**	**Unit Rate Code**	**Quantity**	**Unit**	**Unit Rate**	**Total Cost (Real)**	**Total Cost (Nominal)**	**Total Cost NPV**	**Notes**
	Sub-total for Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)						**R -**	**R -**	**R -**	
2.4	**Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)						**R -**	**R -**	**R -**	
2.5	**Rehabilitation of subsided areas**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Rehabilitation of subsided areas						**R -**	**R -**	**R -**	
	Sub-total for Mining Areas						**R 18 924 750**	**R -**	**R -**	
3	**General Surface Rehabilitation**									
3.1	**General Surface Rehabilitation**							R -	R -	
3.1.1	Vegetation Establishment	Yes	G2.1.5	65.00	/ha	R 29 273.28	R 1 902 763	R -	R -	Establishment of vegetation (general) flat areas and slopes of less than 1:5, > 50 ha
3.1.2	Vegetation Establishment	Yes	G2.1.1	10.00	/ha	R 38 517.48	R 385 175	R -	R -	Establishment of vegetation (general) flat areas and slopes of less than 1:5, on topsoil laydown area
3.1.2	**Other surface disturbances**							R -	R -	
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for General Surface Rehabilitation General Surface Rehabilitation						**R 2 287 938**	**R -**	**R -**	
	Sub-total for General Surface Rehabilitation						**R 2 287 938**	**R -**	**R -**	
4	**Surface Runoff Measures**									
4.1	**Surface Runoff Measures**									
	Reinstatement of drainage lines	No	G3.1		/ha	R 6 354.56	R -	R -	R -	
	Sub-total for Surface Runoff Measures						**R -**	**R -**	**R -**	
	Sub-total for Surface Runoff Measures						**R -**	**R -**	**R -**	
	Sub-Total 1 (for infrastructure and related aspects)						**R 21 212 688**	**R -**	**R -**	
5	**Pre-Site Relinquishment Aspects**									
5.1	Post-closure monitoring: Surface water	Yes	K1	2.00	/yr	R 53 116.80	106 233.60	R -	R -	Monthly surface water quality monitoring - 10 years
5.2	Post-closure monitoring: Groundwater	Yes	K2	2.00	/yr	R 72 777.60	145 555.20	R -	R -	Quarterly groundwater quality monitoring - 10 years
5.3	Rehabilitation monitoring	Yes	J1	65.00	ha/10yrs	R 2 529.60	164 424.00	R -	R -	All rehabilitated areas
5.4	Care and maintenance - low intensity	Yes	J3	65.00	ha/10yrs	R 14 335.00	931 775.00	R -	R -	All rehabilitated areas. This includes repairing of areas affected by erosion, weeds and alien plants eradication and adding of fertilizers
5.5	Care and maintenance - high intensity	No	J2	-	ha/10yrs	R 37 170.00	R -	R -	R -	
	Sub-total for Pre-Site Relinquishment Aspects						**R 1 347 988**	**R -**	**R -**	
6	**P&Gs, Contingencies and Additional Allowances**									
6.1	**Preliminary and general**									
6.1.1	Preliminaries and general	Yes	L2	15%	/sum		R 3 181 903	R -	R -	Assumed 15 % of Sub-total 1
6.1.2	Additional studies									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Preliminary and general						**R 3 181 903**	**R -**	**R -**	
6.2	**Contingencies**									
6.2.1	Contingencies	Yes		10%			R 2 121 269	R -	R -	
	Sub-total for Contingencies						**R 2 121 269**	**R -**	**R -**	
6.3	**Provisional Amount for Closure Related Social Aspects**									
6.3.1	Provisional amount for closure related social aspects	No		0%			R -	R -	R -	
	Sub-total for Provisional Amount for Closure Related Social Aspects						**R -**	**R -**	**R -**	

41106390 Tronox Sands Heleza Moya Closure Costing, as at September 2023

Heleza Moya Rehabilitation		Scheduled closure								
	Closure Component	Applicable	Unit Rate Code	Quantity	Unit	Unit Rate	Total Cost (Real)	Total Cost (Nominal)	Total Cost NPV	Notes
	Sub-total for P&Gs, Contingencies and Additional Allowances						**R 6 651 160**	**R -**	**R -**	
	Sub-Total 2 (for P&Gs, Contingencies and Additional Allowances)						**R 6 651 160**	**R -**	**R -**	
7	**Post-Closure Aspects**									
7.1	**Post Closure Aspects**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Post Closure Aspects						**R -**	**R -**	**R -**	
7.2	**Contingencies on Post Closure**									
	Not Applicable	No	L1	-	N/A		R -	R -	R -	
	Sub-total for Contingencies on Post Closure						**R -**	**R -**	**R -**	
	Sub-total for Post-Closure Aspects	**No**					**R -**	**R -**	**R -**	
	Sub-Total 3 (for Post-Closure Aspects)	**No**					**R -**	**R -**	**R -**	
	Grand Total Excl. VAT. (for Sub-total 1 + 2 + 3)						**R 27 863 848**	**R -**	**R -**	

Building 1, Maxwell Office Park
Magwa Crescent West, Waterfall City
Midrand, 1685
South Africa

wsp.com