Booysendal North
Battery Energy Storage System Project

Final Rehabilitation, Decommissioning and Mine Closure Plan: BN BESS

2026/03/09

Anja Van Deventer

Executive summary

This Final Rehabilitation, Decommissioning, and Mine Closure Plan (FRDCP) outlines the strategic framework and financial requirements for the environmental restoration of the Battery Energy Storage System (BESS) located at Booysendal North (BN) Mine. The primary objective of this plan is to ensure that the proposed Project site is returned to a safe, stable, and non-polluting state that is compatible with the surrounding land use and long-term environmental goals of the region.

The BN BESS Project involves critical infrastructure, including substations, transformers, steel and concrete structures, and access roads. This report provides a detailed itemisation of the decommissioning activities required, ranging from the dismantling of specialised electrical components to the demolition of reinforced concrete slabs and the rehabilitation of disturbed surfaces.

Key highlights of this plan include:

- Regulatory Compliance: The plan is developed in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the Financial Provisioning Regulations (Government Notice Regulation 1147) (GNR1147), and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).
- Rehabilitation Strategy: The strategy focuses on the complete removal of all BN BESS related infrastructure, remediation of affected soils where necessary, and the re-establishment of indigenous vegetation to prevent erosion and support local biodiversity.
- Financial Provision: Based on current calculations, the Immediate Closure Cost (should the proposed project cease operations today) is estimated at **R 1 581 888.33** (One Million Five Hundred and Eighty-One Thousand, Eight Hundred and Eighty-Eight Rand and Thirty-Three Cent).
- P&G is included at 12% and Contingency at 10% in alignment with the DMR guideline.
- No allowance has been made for management fees.
- Post-Closure Management: A mandatory two- to three-year maintenance and aftercare period is factored into the plan to ensure the success of revegetation efforts and the long-term stability of the site.

Ultimately, this document serves as a living roadmap, ensuring that BN fulfils its legal and ethical obligations to minimise its environmental footprint and avoid leaving residual environmental liability for Government (in this case the DMRE) or surrounding communities.

Booysendal North BESS:

Department of Mineral Resources Format Closure Cost Summary

SUM of Closure Components			R1,025,003.77
SUB TOTAL 1 (DMRE Weighting Factor 2)		1.1	**R1,127,504.15**
12%	Preliminary and General		R135,300.50
10%	Contingency		R112,750.42
SUB-TOTAL 2 (Preliminary and General + Contingency)			R248,050.91
SUB TOTAL 3 (Excluding VAT)			R1,375,555.07
15%	VAT @15%		R206,333.26
GRAND TOTAL			**R1,581,888.33**

Abbreviations

BN	Booysendal North
BESS	Battery Energy Storage System
BOQ	Bill of Quantities
DMRE	Department of Mineral Resources and Energy
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
FRDCP	Final Rehabilitation, Decommissioning and Closure Plan
GN	Government Notice
GNR	Government Notice Regulation
LoM	Life of Mine
LoP	Life of Project
MR	Mining Right
MPRDA	Mineral and Petroleum Resources Development Act (Act 28 of 2002)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
OEM	Original Equipment Manufacturer
PCS	Power Conversion System
SANS	South African National Standard
WUL	Water Use Licence

Definitions

Annual Rehabilitation Plan	Means a plan contemplated in Regulations 6(a) and 11 (1)(a) of the Financial Provisioning Regulations of 2015, GNR1147.
Decommissioning	Means the shutdown of an operation with the removal of buildings and the withdrawal from service of equipment, plant and machinery used in relation to an operation regulated in terms of the Mineral and Petroleum Resources Development Act.
Environmental Impact Assessment Regulations	Means the Regulations published in terms of sections 24(5) and 44 of the Act.
Final Rehabilitation, decommissioning and mine closure plan	Means a plan contemplated in regulation 6(b) and 11(1) (b) of the Financial Provisioning Regulations of 2015, GNR1147.
Holder	Means the holder of- (a) an environmental authorisation for an activity for which the Minister has issued an exemption in terms of section 106(1) of the Mineral and Petroleum Resources Development Act; and (b) an old order right, permission, permit and right issued in terms of the Mineral and Petroleum.
Independent	In relation to a specialist or auditor conducting tasks identified in these Regulations, (a) such specialist or auditor has no business, financial, personal or other interest in undertaking such tasks excluding normal and fair remuneration for work performed in connection with such tasks; or (b) there are no circumstances that may compromise the objectivity of that specialist or auditor in performing such tasks; and (c) in the case of the oil and gas sector, such specialist or specialist team may be from a parent or affiliate company.
Low Risk Commodities	Means minerals which pose a low latent environmental risk when mined and are: (a) clay, (b) aggregate, (c) slate, (d) pebbles, (e) diamond, (f) sand, but excludes - (i) base metals; and (ii) minerals identified in (a) to (f) mined through underground mining methods.
Market Related	Means the total cost of delivering goods or services to a customer, exclusive of VAT;
Master Rate	Means the prescribed rate applied to specific mitigation and rehabilitation activities for an operation identified in regulation 7, to be undertaken progressively, at decommissioning and closure and post-closure to manage post-closure impacts.
Mitigate	Means to alleviate, reduce or make less severe.
Post-closure	Means the period after a closure certificate is issued in terms of the Mineral and Petroleum Resources Development Act.
Progressive Rehabilitation	Involves the staged mitigation and rehabilitation of disturbed areas throughout the life of the operation, as opposed to the large-scale works at the end of the operation.
Risk Profiling	Means to provide a non-subjective understanding of risks posed by a prospecting operation which includes the removal and disposal of a mineral and a mining, exploration or production operation by assigning numerical values to variables representing different types of environmental risks and the dangers they pose.
Specialists	Means a team of professionals who are qualified by virtue of their demonstrable knowledge, qualifications, skills or expertise in the mining, environmental science, water management and treatment, resource economy, engineering and quantity surveying.
Sustainable End State	Is the site-specific situation for land, water and air at the time of reaching the risk threshold.

Disclaimer

This Final Decommissioning, Closure, and Rehabilitation Report (the "Report") has been prepared by Natural Evolution Group (NEG) for the exclusive use of Booysendal Platinum Proprietary Limited ("the Client"), a subsidiary of Northam Platinum Limited, specifically regarding the Battery Energy Storage System (BESS) located within the Booysendal North (BN) Mining Right (LP 30/5/1/3/2/1 (188) MR).

In compiling this Report, NEG has relied extensively on technical data, site assessments, and project specifications provided by GCS Environment South Africa (Pty) Ltd (GCS) (the Main Contractor) and other third-party stakeholders.

While NEG has exercised professional judgment in reviewing the provided data, it has not independently or exhaustive verified the accuracy or completeness of information supplied by GCS or the Client.

NEG assumes no responsibility for any inaccuracies, omissions, or misinterpretations arising from data supplied by others.

The findings, conclusions, and rehabilitation recommendations contained herein are based on:

- *The current preliminary design of the proposed BN BESS infrastructure as of 13 February 2026.*
- *Existing environmental legislation within South Africa and the Fetakgomo Tubatse Local Municipality and the Limpopo Province.*
- *The specific physical and geographical conditions of the site at the time of assessment.*

Rehabilitation requirements and closure costs are subject to change due to evolving legislative frameworks, market fluctuations in Platinum Group Metals mining, or unforeseen environmental shifts.

This report is based on the Department of Mineral Resources Guideline (GNR1147) as published in 2005 and is intended for submission to the regulator for the purpose of obtaining authorisation for the proposed Project.

The opinions expressed in this report are made in good faith and represent the professional judgment of NEG. However, no warranty, expressed or implied, is made as to the professional advice included in this Report.

Anja van Deventer - Director
Pri. Sci. Nat 145156

Table of Contents

1 Introduction

Natural Evolution Group (NEG) was requested by GCS Environment South Africa (Pty) Ltd (GCS) to prepare a desktop-based closure report for the Booysendal North (BN) Battery Energy Storage System (BESS) Project on behalf of Booysendal Platinum Proprietary Limited, a subsidiary of Northam Platinum Limited.

Booysendal is located approximately 33 kilometres (km) west of Mashishing (Lydenburg), 40 km south-southwest of Steelpoort, 32 km north of Dullstroom, and 21 km northeast of Roossenekal (refer to **Figure 1-1**). Booysendal operates under two mining rights, namely the BN mining right (Department of Mineral Resources and Energy (DMRE) reference number: LP 30/5/1/3/2/1 (188) MR) and the Booysendal South MR (DMRE reference number: MP 30/5/1/2/3/2/1 (127) (10333) MR).

The northern section of the BN MR, within which the proposed Project will be located, falls within the jurisdiction of the Fetakgomo Tubatse Local Municipality, within the Sekhukhune District Municipality in the Limpopo Province.

A BESS is a large-scale system, typically using lithium-ion batteries, designed to store electrical energy. This energy can originate directly from a solar farm (or other renewable energy sources such as wind) or from the main electricity grid during off-peak periods.

Typical closure-related environmental impacts of BESS facilities are primarily associated with end-of-life battery waste management, which is arguably the most significant long-term environmental challenge. The large volume of batteries reaching the end of their operational life (typically 10–20 years) will generate a substantial quantity of hazardous electronic waste that must be managed and disposed of responsibly. Battery degradation and decomposition may result in the leaching of toxic substances if not properly managed.

Although thermal runaway and fire incidents are typically well managed through design controls and operational safety measures, they remain an environmental risk factor, particularly in the event of a battery fire that could result in the release of hazardous substances.

All hazardous waste generated during any phase of the Project lifecycle will be stored, handled, transported, and disposed of by appropriately licensed service providers at authorised waste management facilities, in compliance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA), its associated regulations, and recognised industry best practice standards.

The proposed BESS facilities will be located within areas that have already been impacted by existing mining activities. This approach limits additional disturbance and ensures that the development remains compatible with the current mining land use, thereby reducing potential long-term environmental legacy impacts.

1.1. Purpose of the Final Rehabilitation, Decommissioning and Closure Plan

As the proposed Project is located within an existing mining right area, the financial provisioning assessment contained in this report is based on the closure liability requirements applicable to mining operations, as outlined in **section 1.2** below.

This document defines the end-of-project rehabilitation parameters that form the basis for the calculation of the financial liability associated with the proposed development. The FRDCP is regarded as a living document and should therefore be updated periodically as new technologies, improved rehabilitation methodologies, and legislative amendments emerge. Practices that represent best practice at present may become outdated in the future as more effective and efficient rehabilitation approaches are developed.

Taking this into consideration, this document has been prepared with due regard to applicable statutory requirements and recognised international best practice. NEG further adopts a holistic approach to rehabilitation, decommissioning, and closure, ensuring that environmental, technical, and long-term sustainability considerations are integrated into the closure planning process.

The objectives of this document are as follows:

- Provide the vision, objectives, targets, and closure criteria for the FRDCP.
- Outline the design principles applicable to closure and rehabilitation.
- Explain the risk assessment approach and outcomes, including linking closure activities to identified rehabilitation risks.
- Detail the closure actions that will be implemented to mitigate and/or manage identified risks and describe the nature of any residual risks that will require monitoring and management during the post-closure phase.
- Commit to a schedule, budget, and clearly defined roles and responsibilities for rehabilitation, decommissioning, and closure of each relevant activity or item of infrastructure.
- Identify knowledge gaps and outline how these will be addressed or resolved over time.
- Detail the current estimated closure costs for the proposed Project.
- Provide life-of-project closure cost estimates with increasing levels of accuracy as the Project develops and approaches closure, in alignment with the proposed final land use.
- Outline the monitoring, auditing, and reporting requirements associated with rehabilitation, decommissioning, and closure activities.

1.2. Legal Context of Closure Liability Calculations

This document aligns with the MPRDA closure cost reporting structure, based on the Department of Mineral Resources and Energy (DMRE) closure guidelines published in 2005. It is important to note that the technology employed in the proposed Project was not widely implemented at the time these guidelines were developed. It was therefore necessary to include site specific cost items within the 2005 DMRE Master Rates Table (escalated by the Consumer Price Index (CPI)), with certain items costed using actual market related rates in accordance with the legislative framework set out below.

Regulation 54(1) of the Mineral and Petroleum Resources Development Regulations, 2004, states:

"The quantum of financial provision shall include a detailed itemisation of all actual costs required for: (a) premature closure; (b) decommissioning and final closure; and (c) post-closure management of residual and latent environmental impacts."

While the regulation refers to "actual costs", the DMRE historically provided a Master Rates Table to simplify cost estimation for commonly occurring closure activities.

The Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (issued in 2005 under the authority of Regulation 54(1)) follows a standardised approach based on the published Master Rates. However, the guideline clarifies that:

- For items listed in the Master Rates Table, applicants may use the published rates, escalated annually using CPI.
- For items not listed in the Master Rates Table, or where the published rates are outdated, applicants must provide a detailed itemisation of actual costs based on specialist studies, contractor quotations, or project-specific estimates.

As of February 2026, the legislative framework governing financial provision for mine closure in South Africa remains in a transitional phase. The primary regulations currently in force are the Financial Provisioning Regulations, 2015, promulgated under NEMA. However, its full implementation has been delayed through several amendments and extensions.

In preparation for the full implementation of the NEMA Financial Provisioning Regulations (Government Notice Regulation (GNR 1147)) applicable to prospecting, exploration, mining, and production operations in South Africa, and specifically Appendix 3 of GNR 1147, this document provides a structured framework for mine closure planning and for the development of Annual Rehabilitation Plans.

The latest regulations and current legal status are summarised below.

1.2.1 The Primary Legislation: Financial Provisioning Regulations, 2015

Promulgated under NEMA, these regulations replaced the previous financial provisioning requirements contained within the MPRDA regulatory framework. The regulations are designed to ensure that the “polluter pays” principle is implemented and that mining operations maintain adequate ring-fenced financial provision for rehabilitation, decommissioning, and post-closure management.

1.2.2 The Latest Promulgated Update (February 2024)

The most significant recent regulatory update occurred on 1 February 2024, when the Minister of Forestry, Fisheries and Environment (DFFE) published an amendment to the transitional arrangements.

- Previous position: Existing holders (those who applied for mining rights before 20 November 2015) were required to comply with the 2015 Financial Provisioning Regulations by a specific deadline.
- Amendment: The February 2024 amendment introduced an indefinite extension for these existing rights holders.
- Current legal status: These rights holders are only required to comply with the 2015 Regulations by a future date to be published in the Government Gazette. Until such date is determined, they must continue to comply with the financial provisioning arrangements approved under their original MPRDA authorisations.

1.2.3 The "Replacement" of the Financial Provisioning Regulations, 2015 (Draft Status)

The DFFE has been developing a replacement set of Financial Provisioning Regulations for several years, including draft regulations published in 2021 and 2022.

As of early 2026, these regulations have not yet been promulgated into law. The proposed replacement regulations aim to:

- Simplify the financial provisioning calculation methodology.
- Address industry concerns regarding double funding of concurrent rehabilitation activities; and
- Introduce a risk-based approach for certain mining operations.

The Programme Final FRDCP will form a component of the Environmental Management (EMPr) submitted in terms of Section 24N of NEMA and the Environmental Impact Assessment Regulations, 2014. As such, the FRDCP will be subject to the same requirements applicable to the EMPr, including opportunities for stakeholder review and comment and independent auditing.

1.2.4 Site Specific Legal Obligations

The existing BN mining right and associated water use licence each carry their own legally binding closure obligations. Accordingly, both the mining right area and the authorised water use activities must comply with their respective closure and rehabilitation requirements.

The closure objectives presented in this document have been derived from the applicable authorisations and supporting documentation and are incorporated into the closure planning framework discussed herein.

The financial closure liability calculation contained in this document is based on the "existing mining right" methodology, using escalated DMRE Master Rates. Where new technologies or infrastructure components are not included within the Master Rates Table, actual demolition and rehabilitation costs have been applied in the calculation.

2. Administrative Information

Details of the compiler of the Report	Natural Evolution Group 106 Oak Avenue Cullinan 1000
Anja van Deventer (Pr.Sci.Nat.)	• 5 years' experience as an Environmental consultant. • 18 years mining experience. • Mine closure planning for South Africa and Tanzanian operations. • President of the Land Rehabilitation Society of Southern Africa 2018 to 2019 and still a Director of the NPO.
Willam Macdonald (Pr.Sci.Nat.)	• 26 years' mining experience. • 16 years' experience in mine closure and costing. • 11 years as a 3,1*(a)* appointment. • Metal Detecting and Historical Arms Collectors Association of South Africa. • Mine closure planning and implementation for De Beers Namaqualand Mines (7 operations).
Professional registration of compilers	Anja van Deventer: **Pri Sci Nat 145156** (Environmental Science) William Macdonald: **Pri Sci Nat 400286/06** (Geological Science)
Applicant	Booysendal Platinum Proprietary Limited
Right reference number	LP 30/5/1/3/2/1 (188) MR
Commodity type	Platinum
Competent authority	Department of Mineral and Petroleum Resources

3. Description of Battery Energy Storage System

This section is written in accordance with the project description (GCS, 2025)

3.1. Project Overview and Location

Booysendal Platinum Proprietary Limited (hereafter referred to as the Applicant) a subsidiary of Northam Platinum Limited (hereafter referred to as Northam) proposes the development of the Booysendal North (BN) Battery Energy Storage System (BESS) Project at the existing Booysendal Platinum Mine (the Mine) in the Limpopo Province of South Africa.

The proposed Project entails the construction, operation and eventual decommissioning of a utility-scale, behind-the-meter BESS with an installed capacity of up to 25 megawatts (MW) and an energy storage capacity of 50 megawatt-hours (MWh). The BN BESS Project will store electrical energy during periods of lower electricity demand and release stored energy during periods of peak demand or grid instability.

The proposed BN BESS Project is intended to enhance electricity supply reliability and operational resilience at the BN Mine, while reducing reliance on, and pressure upon, the national electricity grid. The development will be located entirely within the existing mining footprint and will connect directly to established electrical infrastructure associated with the BN Mine.

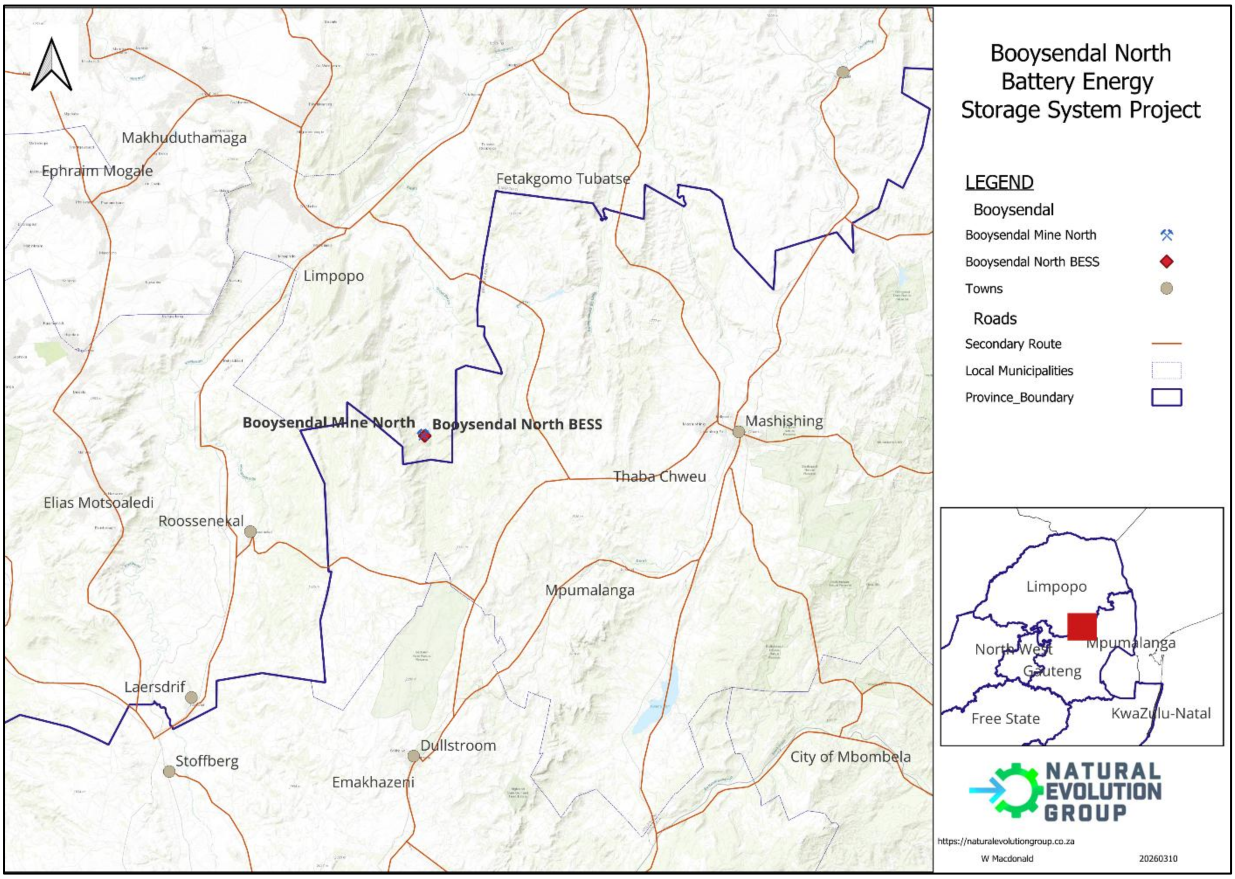

Figure 1: Project locality map

The proposed BN BESS Project is located on Portion 0 of Farm Booysendal No. 43JT, within the Fetakgomo Tubatse Local Municipality, which falls under the Sekhukhune District Municipality in the Limpopo Province. The proposed Project site lies approximately 35 kilometres (km) west of Mashishing and is accessed via the R577 regional road, followed by established Mine access roads.

South Africa's electricity sector has experienced persistent challenges over the past decade, including limited generation capacity, ageing infrastructure, increasing electricity demand and ongoing constraints within the national transmission network. These factors have contributed to reduced grid reliability, frequent electricity supply interruptions and sustained escalation in electricity tariffs.

For energy-intensive industries such as mining, electricity supply instability presents significant operational, safety and financial risks. Interruptions to power supply can adversely affect production continuity, equipment integrity and worker safety, while rising electricity costs place increasing pressure on long-term operational viability.

In response to these challenges, the Applicant has adopted a long-term energy resilience strategy aimed at improving the reliability and security of electricity supply across its operations. This strategy focuses on diversifying energy supply options, enhancing on-site energy management capabilities and reducing exposure to grid-related disruptions, while supporting Northam's broader sustainability and emissions-reduction objectives.

The proposed BN BESS Project forms an integral component of this strategy. By introducing on-site electricity storage capacity, the Project will enable improved load management, peak demand support and backup power availability at the Mine.

The need for the proposed BN BESS Project arises from a combination of national energy sector challenges and site-specific operational requirements associated with electricity-intensive mining activities.

At a national level, South Africa continues to experience structural electricity supply constraints driven by limited generation capacity, ageing infrastructure and increasing demand. These challenges have resulted in reduced grid reliability, frequent load shedding and growing pressure on the national electricity system. Within this context, battery energy storage systems are widely recognised as enabling infrastructure for improving grid resilience, facilitating peak load management, supporting demand-side response initiatives and enabling the effective integration of renewable energy technologies.

BESS is further identified as a key component of South Africa's long-term energy transition, supporting national objectives aimed at reducing greenhouse gas emissions, diversifying the energy mix and improving overall system flexibility. The development of utility-scale energy storage capacity is therefore aligned with national energy planning frameworks and climate change mitigation commitments.

At a local and site-specific level, the Mine is highly dependent on continuous and reliable electricity supply to support safe and efficient operations. Electricity supply interruptions and grid instability present material risks to production continuity, equipment performance and occupational safety.

The proposed BN BESS Project will provide on-site energy storage capacity, enabling improved load management, peak demand support and backup power availability during periods of grid disturbance.

The Project will enhance operational resilience at the BN Mine, reduce vulnerability to load shedding and support sustained mining operations, thereby contributing to employment security and economic stability within the Sekhukhune District Municipality, a region characterised by limited economic diversification and a high dependence on mining-related activities.

The proposed BN BESS Project is therefore considered desirable as it supports national energy security objectives, contributes to the stability of critical industrial operations, promotes socio-economic sustainability at a local level and aligns with South Africa's broader development, energy and climate policy priorities

3.2. Technical Infrastructure and Components

The proposed BN BESS Project comprises the development of a containerised battery energy storage facility located within the existing operational footprint of the Mine. The facility will occupy a total fenced development area of approximately 2 500 square metres (m^2) and has been designed to integrate fully with the Mine's established electrical and operational infrastructure.

The proposed BN BESS Facility will operate as a behind-the-meter energy storage installation, providing electrical storage capacity for exclusive on-site use. Stored electrical energy will be discharged directly to Mine infrastructure through a dedicated medium-voltage electrical connection to the existing BN consumer substation.

No export of electricity to the national grid is proposed, and the facility will operate independently of external power dispatch arrangements.

The Project has been purposefully designed to minimise environmental disturbance using modular, containerised infrastructure and by situating the development entirely within an established industrial mining area. This approach limits additional land transformation, avoids encroachment into undeveloped or environmentally sensitive areas, and enables efficient construction, operation and eventual decommissioning of the facility.

The proposed Project will have an installed power capacity of up to 25 MW and an energy storage capacity of up to 50 MWh.

The BESS will supply electricity during peak demand periods to reduce the Mine's reliance on expensive Eskom peak Time-of-Use tariffs. In addition, the system will manage short-term load fluctuations and provide reliable backup capacity during periods of grid instability or electricity supply interruption.

The proposed BN BESS Project will utilise Lithium Iron Phosphate (LFP) battery technology. This battery chemistry has been selected based on its proven performance, operational reliability and enhanced safety characteristics when compared with alternative lithium-ion technologies.

LFP batteries are characterised by high thermal stability and a significantly reduced risk of thermal runaway, which is a critical consideration for large-scale stationary energy storage applications. The chemistry exhibits strong resistance to overheating and fire propagation, thereby reducing potential safety risks to personnel, infrastructure and the surrounding environment.

In addition to its safety advantages, LFP technology offers a longer operational cycle life, high charge–discharge efficiency and stable performance under frequent cycling conditions. These attributes make LFP batteries particularly suitable for behind-the-meter industrial applications where daily load shifting, peak shaving and backup power functions are required.

LFP battery systems are widely deployed internationally in utility-scale and industrial energy storage facilities, including mining operations, due to their durability, predictable performance characteristics and reduced environmental risk profile over the Project lifecycle.

3.2.1 Battery Containers

The BESS facility will comprise containerised battery storage units. The modular containerised configuration allows for efficient installation, operational flexibility and simplified maintenance throughout the life of the Project.

Each battery container will have approximate external dimensions of:

- Length: 6.058 meters (m)
- Width: 2.438 m
- Height: 2.896 m

The containers will be purpose-designed for stationary energy storage applications and will house battery modules, thermal management systems, fire detection and suppression equipment, and internal monitoring and protection systems.

All battery containers will be installed on dedicated reinforced concrete plinths engineered to accommodate operational loads, wind loading, seismic considerations and site-specific environmental conditions. The plinths will also provide adequate separation from ground surfaces to protect equipment integrity, facilitate drainage and support long-term structural stability.

The containerised design enables controlled factory assembly, reduced on-site construction requirements and simplified decommissioning at the end of the Project lifespan, thereby minimising environmental disturbance across the full lifecycle of the facility.

Electrical power conversion for the proposed BN BESS Project will be undertaken through dedicated medium-voltage Power Conversion System (PCS) units. The PCS enables the conversion of direct current electricity stored within the battery units into alternating current electricity suitable for distribution within the Mine’s electrical network.

The PCS infrastructure will comprise containerised units of varying capacity. These units will regulate voltage, frequency and power quality to ensure stable and reliable integration of stored energy with existing Mine electrical systems. The PCS will also enable controlled charging and discharging of the battery units in response to operational demand, grid conditions and system protection requirements.

Step-up transformers will be integrated within the PCS skids, eliminating the need for separate transformer bays or standalone transformer infrastructure. This integrated design reduces the overall spatial footprint of the facility, minimises additional civil works and improves operational efficiency while maintaining compliance with applicable electrical safety standards.

Electrical connection between the proposed BN BESS Facility and the existing BN consumer substation will be achieved via approximately 100 m of 11 kilovolt (kV) medium-voltage electrical cabling.

Where practicable, electrical cables will be installed on elevated cable racks to allow for ease of inspection, maintenance access and improved protection against mechanical damage. In areas where cable racking is not feasible due to layout constraints, cabling will be installed underground or within reinforced concrete culverts in accordance with mine engineering specifications, electrical design standards and safety requirements.

All cabling will be appropriately rated for medium-voltage operation and designed to withstand site-specific environmental conditions, including temperature variations, dust exposure and operational loading.

3.2.2 Civil Infrastructure

The civil infrastructure associated with the proposed BN BESS Project has been designed to support the safe installation, operation and long-term stability of all battery storage and electrical components, while minimising additional land disturbance within the existing mining area. Civil works will be limited and will comprise foundations, hardstand areas and access infrastructure required for construction, routine maintenance and emergency response. All civil design will be undertaken in accordance with applicable engineering standards, mine specifications and site-specific environmental conditions.

All BESS containers, PCS units and associated electrical equipment will be supported on reinforced concrete foundations and plinths engineered to accommodate operational loads, dynamic loading conditions and long-term structural performance requirements. Foundation design will be informed by site-specific geotechnical conditions, including soil characteristics, bearing capacity and drainage considerations, and will ensure structural stability under operational conditions such as wind loading, vibration and thermal expansion. Preliminary foundation layouts and structural details are provided in the civil engineering drawings prepared for the proposed Project. Final foundation designs will be confirmed during the detailed design phase prior to construction.

Existing Mine access roads will be utilised to the greatest extent possible. Where required, minor upgrades or strengthening works may be undertaken to accommodate heavy vehicle movements during construction, including delivery of battery containers and electrical equipment. Hardstand areas will be constructed adjacent to the BESS containers and electrical infrastructure to provide stable working surfaces for maintenance activities, equipment replacement and emergency response access, and will be designed to support vehicular loading and safe personnel movement under all weather conditions.

3.2.3 Cooling and Thermal Management

Thermal management of the battery cells will be achieved through a closed-loop liquid cooling system designed to maintain optimal operating temperatures and prevent overheating. The cooling system will operate without routine water discharge, thereby minimising operational water demand. Heating, Ventilation and Air Conditioning systems will be designed in accordance with the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), specifically South African National Standard (SANS) 10400: The Application of the National Building Regulations – Part O: Lighting and Ventilation.

3.2.4 Fire Detection, Suppression and Safety Systems

Fire detection and suppression systems will be designed in accordance with recognised national and international standards, including SANS 10139: Fire Detection and Alarm Systems for Buildings, SANS 369: Fire Alarm Control and Indicating Equipment, National Fire Protection Association Standard 855: Standard for the Installation of Stationary Energy Storage Systems, and Underwriters Laboratories 9540A large-scale fire testing protocols. Fire suppression systems will consist of either aerosol-based or water-mist systems, selected based on the final battery technology and system configuration, and supported by manufacturer certification and test data demonstrating effective thermal runaway mitigation and fire propagation control. All fire detection, alarm and suppression systems will be integrated with the BESS Supervisory Control and Data Acquisition system and monitored from the Mine’s central control facilities to enable early detection, automated response and coordinated emergency management.

3.3. Operational Life and Decommissioning

Construction of the proposed BN BESS Project will comprise site establishment and preparation, earthworks, construction of reinforced concrete foundations and plinths, delivery and placement of containerised battery and electrical equipment, installation of electrical and control systems, and final commissioning and testing. Construction is anticipated to occur over approximately 12 months, subject to final engineering design and sequencing. At peak construction, a workforce of approximately 50 personnel is expected, comprising skilled and semi-skilled labour, including civil, electrical and commissioning teams. Existing Mine laydown areas, access roads and storage facilities will be utilised to the greatest extent possible, and construction activities will be undertaken in accordance with approved environmental management procedures, health and safety requirements and site-specific method statements.

The operational lifespan of the proposed BN BESS Project is anticipated to be approximately 15 years, subject to equipment performance, technological advancements and operational requirements. The facility will operate as an unmanned installation with automated control, monitoring and protection systems. Routine inspections, preventative maintenance and performance monitoring will be undertaken at scheduled intervals by trained and authorised personnel in accordance with approved operational procedures and Original Equipment Manufacturer (OEM) specifications. Operational activities will be limited in scale and frequency, with no continuous staffing, process water use or wastewater generation anticipated during normal operation.

Water will be required during the construction phase primarily for dust suppression, concrete batching and general construction activities. Total construction phase water consumption is estimated at approximately 500 m^3 over the construction period. All construction water will be sourced from existing Mine water supplies, and no new water abstraction infrastructure is proposed. Water use will be managed in accordance with the Mine’s approved procedures to ensure efficient utilisation and prevent wastage. No routine water consumption is anticipated during the operational phase, as the BESS will operate as a closed system with no process water requirements and no wastewater generation during normal operation.

Waste generated during construction will primarily comprise general construction waste, including packaging materials, scrap metal, construction off-cuts and minor quantities of hazardous waste such as fuels, oils, lubricants and contaminated materials. These waste streams will be managed in accordance with the Mine’s approved waste management procedures. During operation, waste generation is expected to be minimal and largely limited to maintenance-related waste streams, including small quantities of general and hazardous waste. At decommissioning, waste is anticipated to include dismantled infrastructure, scrap metal, concrete material and end-of-life battery units. All hazardous waste generated during any phase of the Project lifecycle will be stored, handled, transported and disposed of by appropriately licensed service providers at authorised waste management facilities, in compliance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA), its associated regulations, and recognised industry best practice standards.

Battery handling, storage, operation and maintenance will be undertaken in accordance with applicable occupational health and safety legislation, hazardous substances requirements and recognised industry best practice. Battery installation, inspection and maintenance activities will be performed by suitably trained, competent and authorised personnel in accordance with approved site procedures, OEM technical manuals and emergency response protocols. The OEM will retain responsibility for the removal, repair, refurbishment and replacement of battery components during the operational life of the facility in terms of applicable warranties and service agreements. At end-of-life, battery units and associated hazardous materials will be removed by the OEM or an authorised service provider and transported to appropriately licensed facilities for recycling or compliant disposal, in accordance with NEMWA and relevant hazardous waste management standards.

The modular, containerised design of the BESS facility is intended to facilitate simplified dismantling and efficient decommissioning at the end of the Project life.

The decommissioning and rehabilitation methodology is based on the following industry best practice principles:

- During the decommissioning phase, perimeter fencing will be removed, and a temporary laydown area will be established for the storage of dismantled materials. While certain materials may have potential salvage value, no salvage offsets have been applied in this document, in accordance with applicable legislative requirements.
- All steel infrastructure will be dismantled and placed within a demarcated area for recycling or disposal. No financial deductions for salvageable materials have been included in the cost calculations.
- Battery units will be disconnected and returned to the supplier in accordance with the relevant Project agreements. Consequently, no decommissioning or disposal costs associated with the batteries have been included in the closure cost calculations. (GCS, 2025)
- The containerised units housing the infrastructure will be removed. Costing includes the hire of cranes, transport vehicles, and labour required for the safe removal and transportation of these units.
- All concrete infrastructure, including plinths, concrete platforms, paving, and kerbing, will be demolished and removed. Cost estimates are based on mechanical demolition and the transportation of concrete and masonry rubble to a licensed disposal facility.
- All compacted areas associated with roads, parking areas, and infrastructure platforms will be ripped to a minimum depth of 600 millimetres (mm) to restore natural soil structure and re-establish natural soil bulk density.
- The rehabilitated area will be covered with a minimum of 150 mm of topsoil, sourced from the Mine's approved topsoil stockpiles or from an alternative suitable growth medium that has been appropriately ameliorated.
- Soil testing will be undertaken and fertilisation applied in accordance with laboratory analysis recommendations to support vegetation establishment, in alignment with the post-closure land use objectives defined in the approved EMPr.

4. Closure Vision and Post-closure Land Use

According to the 2010 Booysendal Environmental Management Programme (IVUZI Environmental Consultants, 2009), the Mine is committed to recovering all saleable infrastructure, ripping all compacted areas, and thereafter ameliorating and re-vegetating the disturbed land. All buildings and structures will be demolished as part of the closure process. A key component of the rehabilitation commitment is the post-closure maintenance of vegetation and the implementation of ongoing weed management.

One of the specialist studies supporting the EMPr, regarding soil and land capability and agricultural potential (Scientific Aquatic Servises, 2009), prescribes that soil amelioration should involve restoring the site to pre-mining contours and aspect, as well as ripping the disturbed footprint to alleviate compaction. The ripped footprint must subsequently be covered with topsoil sourced from stockpiled material. The achievable soil depth following rehabilitation will determine the potential vegetative cover and the resulting land capability.

The most recent Site Sensitivity Verification Report for the agricultural theme, conducted by The Biodiversity Company (The Biodiversity Company, 2026), indicates that the soils within the BN BESS site are predominantly Mispah soil form, characterised by a very shallow usable soil layer with limited agricultural potential. The site has already been significantly impacted by historical mining activities, which reduces the risk of additional agricultural loss and supports the feasibility of rehabilitating the area to conditions similar to the surrounding post-mining landscape.

Taking that into account as well as the geohydrological information contained in the Hydropedology statement (The Biodiversity Company, 2026) surface rehabilitation will be sufficient and will not have detrimental impacts on the underground aquafers.

5. Closure Risk Assessment

NEG has adopted the GCS impact methodology to assess the closure risks for the proposed Project to carry out a holistic FDCRP.

5.1. Methodology for Assessing Impacts

The impacts of the proposed Project will be assessed and rated according to the methodology described below and which was developed to align with the requirements of Appendix 3 of the EIA Regulations, 2014. The assessment process will follow a structured approach comprising four key activities:

- Identification and assessment of potential impacts likely to result from the proposed Project closure, decommissioning and rehabilitation activities.
- Prediction of the nature, magnitude, extent, and duration of these impacts, with specific focus on those that may be significant.
- Identification of appropriate mitigation measures to reduce, avoid, or manage the severity or significance of the potential impacts.
- Evaluation of residual impacts to determine the significance of the impact after implementation of mitigation measures.

The assessment of significance was guided by a set of criteria, including:

- Cumulative impacts in the broader environmental and social context.
- Nature of the impact, i.e., whether it is positive, negative, direct, or indirect.
- Extent of the impact, ranging from localised to regional or national scale.

- Probability of occurrence of the impact.
- Reversibility of the impact, i.e., whether it can be restored to pre-impact conditions.
- Irreplaceability of affected resources, considering whether resources lost can be substituted or recovered.
- Potential for mitigation, i.e., the extent to which the impact can be avoided, minimised, or offset.

The evaluation of significance followed a consequence–probability approach:

Consequence (Duration + Extent + Irreplaceability of resource) × Severity

The overall significance of an impact was then determined using the formula:

Significance (Consequence × Probability)

A summary of the criteria used to assess the significance of impacts is provided in **Table 1**, with detailed explanations presented in **Table 2**.

Table 1:Significance and impact table

Criteria	Rating Scales	Notes
Nature	Positive (+)	An evaluation of the effect of the impact related to the proposed development.
	Negative (-)	
Duration	Temporary (1)	The duration of the activity associated with the impact will last 0 - 6 months.
	Short-term (2)	The duration of the activity associated with the impact will last 6-18 months.
	Medium-term (3)	The duration of the activity associated with the impact will last 18 months - 5 years.
	Long-term (4)	The duration of the activity associated with the impact will last more than 5 years.
Extent	Footprint (1)	The impact only affects the area in which the proposed activity will occur.
	Site (2)	The impact will affect only the development area.
	Local (3)	The impact affects the development area and adjacent properties.
	Regional (4)	The effect of the impact extends beyond municipal boundaries.
	National (5)	The effect of the impact extends beyond more than 2 regional/ provincial boundaries.
	International (6)	The effect of the impact extends beyond country borders.
Severity	Low (1)	Where the impact affects the environment in such a way that natural, cultural, and social functions and processes are minimally affected.
	Moderate (2)	Where the affected environment is altered but natural, cultural, and social functions and processes continue albeit, in a modified way, and valued, important, sensitive, or vulnerable systems or communities are negatively affected.
	High (3)	Where natural, cultural, or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease, and valued, important, sensitive, or vulnerable systems or communities are substantially affected.
	No (0)	No irreplaceable resources will be impacted.

Criteria	Rating Scales	Notes
Potential for impact on irreplaceable resources	Yes (1)	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental (-25 to -33)	A combination of extent, duration, intensity, and the potential for impact on irreplaceable resources.
	Highly detrimental (-19 to -24)	
	Moderately detrimental (-13 to -18)	
	Slightly detrimental (-7 to -12)	
	Negligible (-6 to 0)	
	Slightly beneficial (0 to 6)	
	Moderately beneficial (13 to 18)	
	Highly beneficial (19 to 24)	
	Extremely beneficial (25 to 33)	
Probability (the likelihood of the impact occurring)	Improbable (0)	It is highly unlikely or less than 50% likely that an impact will occur.
	Probable (1)	It is between 50 and 70% certain that the impact will occur.
	Definite (2)	It is more than 75% certain that the impact will occur or the impact will occur.
Significance	Very high – negative (-49 to -66)	A function of Consequence and Probability.
	High – negative (-37 to -48)	
	Moderate – negative (-25 to -36)	
	Low – negative (-13 to -24)	
	Neutral - Very low (0 to -12)	
	Low positive (0 to 12)	
	Moderate–positive (13 to 24)	
	High–positive (37 to 48)	
	Very high – positive (49 to 66)	

Table 2: Explanation of assessment criteria

Criteria	Explanation
Nature	This is an evaluation of the type of effect the construction, operation, and management of the proposed development would have on the affected environment. Will the impact of change on the environment be positive, negative, or neutral?
Extent or Scale	This refers to the spatial scale at which the impact will occur. The extent of the impact is described as footprint (affecting only the footprint of the development), site (limited to the site), and regional (limited to the immediate surroundings and closest towns to the site). The extent of scale refers to the actual physical footprint of the impact, not to the spatial significance. It is acknowledged that some impacts, even though they may be of a small extent, are of very high importance, e.g., impacts on species of very restricted range. To avoid "double counting," specialists have been requested to indicate spatial significance under "intensity" or "impact on irreplaceable resources" but not under "extent" as well.
Duration	The lifespan of the impact is indicated as temporary, short, medium, and long-term.
Severity	This is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Does the activity destroy the impacted environment, alter its functioning, or render it slightly altered?
Impact on irreplaceable resources	This refers to the potential for an environmental resource to be replaced should it be impacted. A resource could be replaced by natural processes (e.g., by natural colonisation from surrounding areas), through artificial means (e.g., by reseeding disturbed areas or replanting rescued species) or by providing a substitute resource, in certain cases. In natural systems, providing substitute resources is usually not possible, but in social systems, substitutes are often possible (e.g., by constructing new social facilities for those who are lost). Should it not be possible to replace a resource, the resource is essentially irreplaceable, e.g., red data species that are restricted to a particular site or habitat to a very limited extent.

Criteria	Explanation
Consequence	The consequence of the potential impacts is a summation of the above criteria, namely the extent, duration, intensity, and impact on irreplaceable resources.
Probability of occurrence	The probability of the impact occurring is based on the professional experience of the specialist with environments of a similar nature to the site and/or with similar projects. It is important to distinguish between the probability of the impact occurring and the probability that the activity causing a potential impact will occur. Probability is defined as the probability of the impact occurring, not as the probability of the activities that may result in the impact.
Significance	Impact significance is defined to be a combination of the consequence (as described below) and the probability of the impact occurring. The relationship between consequence and probability highlights that the impact (or impact significance) must be evaluated in terms of the seriousness (consequence) of the impact, weighted by the probability of the impact occurring. In simple terms, if the consequence and probability of an impact are high, then the impact will have a high significance. The significance defines the level to which the impact will influence the proposed development and/or environment. It determines whether mitigation measures need to be identified and implemented and whether the impact is important for decision-making.
Degree of confidence in predictions	Specialists and the environmental team were required to indicate the degree of confidence (low, medium, or high) that there is in the predictions made for each impact based on the available information and their level of knowledge and expertise. The degree of confidence is not considered in the determination of consequence or probability.
Mitigation measures	Mitigation measures are designed to reduce the consequence or probability of an impact or to reduce both consequence and probability. The significance of impacts has been assessed both with mitigation and without mitigation.

Cumulative impact, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.”

The cumulative impact assessment will be undertaken using a structured, qualitative methodology, supported by quantitative indicators where feasible. The assessment will evaluate the contribution of the proposed Project in combination with existing developments and reasonably foreseeable future activities occurring within the surrounding landscape.

Cumulative impacts will be clearly defined and, where practicable, quantified, including but not limited to:

- Cumulative land transformation (expressed in hectares).
- Loss and fragmentation of natural and semi-natural habitats.
- Reduction in ecological connectivity.
- Cumulative pressure on aquatic systems and wetlands.
- Cumulative visual and landscape character change.
- Additive disturbance to biodiversity and ecosystem processes.

The identified cumulative impacts will be assessed and rated using the same significance rating methodology applied to project-specific impacts.

5.2. Cumulative Spatial Context

This report considers all available information to assess the potential impacts associated with the closure, decommissioning, and rehabilitation of the proposed Project.

The relatively small footprint of the proposed Project, together with its modular design, ensures that the overall environmental disturbance is limited. The most significant short-term impact during closure will likely be dust generation associated with the dismantling of infrastructure, ripping of compacted areas, and general rehabilitation activities. The primary mitigation measure will involve careful scheduling of rehabilitation activities to avoid periods of strong winds, thereby reducing the potential for dust emissions.

Vegetation establishment should ideally take place at the beginning of the rainy season to support plant growth and assist with the stabilisation of soils, thereby reducing the risks of soil erosion and dust generation.

A positive outcome of the rehabilitation process is the potential improvement in soil condition and an increase in local biodiversity as natural vegetation is re-established across the disturbed footprint.

A potential latent impact is the establishment and spread of alien invasive plant species, which commonly colonise recently disturbed soils. The likelihood of invasive species establishment is therefore considered relatively high following disturbance. To address this risk, an alien invasive plant management and eradication programme should be implemented for a period of at least five years and up to twenty-five years, depending on the persistence of invasive species seed banks and the effectiveness of control measures.

5.3. Risk Assessment Tables

The full risk assessment can be found in **Annexure 1** of this document. The summary of the risk assessment is based on the information obtained from the specialist reports as well as the closure methodology.

A summary of the risk assessment is contained in **Table 3**.

Table 3: Risk assessment table summary

Component Being Impacted On	Activity Which May Cause the Impact	Activity	Pre- Mitigation	Recommended Mitigation Measures	Post-Mitigation
			Significance		Significance
Air Quality during decommissioning	Removal of containers, batteries and other infrastructure on platforms- dust and fumes	Impact in isolation	-4	Hose down said infrastructure to remove excessive dust	-2
		Cumulative impact	-4	Hose down said infrastructure to remove excessive dust	-2
Air Quality during decommissioning	Removing of platforms and culverts- dust and fumes	Impact in isolation	-8	Minimise undertaking this activity in the windy seasons to minimise windblown dust	-4
		Cumulative impact	-8	Minimise undertaking this activity in the windy seasons to minimise windblown dust	-4
Air Quality during rehabilitation activities	Ripping the compacted areas- dust and fumes	Impact in isolation	-4	Minimise undertaking this activity in the windy seasons to minimise windblown dust	-4
		Cumulative impact	-4	Minimise undertaking this activity in the windy seasons to minimise windblown dust	-4
Air Quality during rehabilitation activities	Revegetation -dust and fumes	Impact in isolation	-18	Where possible, conduct revegetation efforts in the wet season to ensure rapid vegetation establishment	-10
		Cumulative impact	-14	Where possible, conduct revegetation efforts in the wet season to ensure rapid vegetation establishment	-10
Aesthetics during the decommissioning phase	Removal of containers, batteries and other infrastructure on platforms as well as platforms - open space might be seen as something negative	Impact in isolation	0	Stakeholder engagement	0
		Cumulative impact	0	Stakeholder engagement	0
Aesthetics during the rehabilitation phase	Ripping the compacted areas resulting in dust clouds	Impact in isolation	-6	Minimise undertaking this activity in the windy seasons to minimise windblown dust	-4
		Cumulative impact	-6	Minimise undertaking this activity in the windy seasons to minimise windblown dust	-4
Aesthetics during the rehabilitation phase	Ripping, earth works, soil amelioration and seeding	Impact in isolation	+14	Where possible, conduct revegetation efforts in the wet season to ensure rapid vegetation establishment	+16
		Cumulative impact	+18	Where possible, conduct revegetation efforts in the wet season to ensure rapid vegetation establishment	+20
Noise during decommissioning	Noise generated by equipment movement and dismantling of structures	Impact in isolation	-2	Adhere to noise restrictions of the Mine	-2
		Cumulative impact	-4	Adhere to noise restrictions of the Mine	-2
Noise during rehabilitation	Noise generated by equipment movement during rehabilitation activities	Impact in isolation	-2	Adhere to noise restrictions of the Mine	-2
		Cumulative impact	-2	Adhere to noise restrictions of the Mine	-2
Surface Water quality during decommissioning	Potential increase in turbidity in surface water sources	Impact in isolation	-6	Ensure storm water drains downstream of the proposed Project are functioning	-4
		Cumulative impact	-8	Ensure storm water drains downstream of the proposed Project are functioning	-5
Surface Water quality during rehabilitation activities	Decreased sedimentation and turbidity in surface water sources	Impact in isolation	+16	Vegetation maintenance will ensure erosion prevention	+18
		Cumulative impact	+20	Vegetation maintenance will ensure erosion prevention	+22
		Impact in isolation	+16	Vegetation maintenance will ensure increase biodiversity	+18

Component Being Impacted On	Activity Which May Cause the Impact	Activity	Pre- Mitigation	Recommended Mitigation Measures	Post-Mitigation
			Significance		Significance
Biodiversity implication of rehabilitation	Increased biodiversity and natural vegetation	Cumulative impact	+20	Vegetation maintenance will ensure increase biodiversity	+24
Biodiversity implication of rehabilitation	Decrease in biodiversity due to alien invasive vegetation	Impact in isolation	-16	Alien eradication management to prevent vegetation	-5
		Cumulative impact	-32	Alien eradication management to prevent vegetation	-16
Soil land capability and agricultural potential	Compaction during the decommissioning phase	Impact in isolation	-6	Planned removal to minimise repetitive traffic movement	-6
		Cumulative impact	-6	Planned removal to minimise repetitive traffic movement	-5
Soil land capability and agricultural potential	Potential hydrocarbon spillage during the decommissioning phase	Impact in isolation	-1	Adherence to the Mine procedure for spillage management	0
		Cumulative impact	-1	Adherence to the Mine procedure for spillage management	0
Soil land capability and agricultural potential	Increased bulk density, microbes and carbon cycling during rehabilitation	Impact in isolation	+14	Additional ameliorants	+28
		Cumulative impact	+14	Additional ameliorants	+32
Soil land capability and agricultural potential	Soil erosion due to ripping and revegetation	Impact in isolation	-24	Ripping along the contour of the escarpment and using erosion prevention berms or mulch mattresses	-6
		Cumulative impact	-20	Ripping along the contour of the escarpment and using erosion prevention berms or mulch mattresses	-10
Increase in waste in the decommissioning phase	Increase in recyclable materials to dispose	Impact in isolation	-4	Adherence to the Mine waste management procedure	-4
		Cumulative impact	-4	Adherence to the Mine waste management procedure	-4
Increase in waste in the decommissioning phase	Increase in general waste	Impact in isolation	-6	Adherence to the Mine waste management procedure	-4
		Cumulative impact	-6	Adherence to the Mine waste management procedure	-4
Increase in waste in the decommissioning phase	Increase in hazardous waste	Impact in isolation	-6	Adherence to the Mine waste management procedure	-4
		Cumulative impact	-6	Adherence to the Mine waste management procedure	-4
Increase in waste in the rehabilitation phase	Increase in general waste	Impact in isolation	-2	Adherence to the Mine waste management procedure	-4
		Cumulative impact	-2	Adherence to the Mine waste management procedure	-4
Heritage site preservation during decommissioning	Potential impact on heritage resources by vehicles	Impact in isolation	-20	Adhere to demarcation of heritage site and the chance find procedure	0
		Cumulative impact	-20	Adhere to demarcation of heritage site and the chance find procedure	0
Heritage site preservation during rehabilitation	Potential impact on heritage resources by vehicles	Impact in isolation	-20	Adhere to demarcation of heritage site and the chance find procedure	0
		Cumulative impact	-20	Adhere to demarcation of heritage site and the chance find procedure	0
Hydropedology during decommissioning	Potential reduction in water to the catchment	Impact in isolation	-14	Correct soil placement and amelioration	0
		Cumulative impact	0	Correct soil placement and amelioration	0
Hydropedology during rehabilitation	Increase water into the catchment recharge zone	Impact in isolation	0	Correct rehabilitation and ripping depth	0
		Cumulative impact	0	Correct rehabilitation and ripping depth	0
Terrestrial sensitivity during decommissioning	Potential impact on terrestrial landform-machine noise scaring away animals	Impact in isolation	0	Adhere to noise restrictions of the Mine	0
		Cumulative impact	0	Adhere to noise restrictions of the Mine	0
Terrestrial sensitivity during rehabilitation	Increase in impact on terrestrial biodiversity - increased habitat	Impact in isolation	0	Endemic vegetation used in rehabilitation	+12
		Cumulative impact	0	Endemic vegetation used in rehabilitation	+12
Aquatic biodiversity impact during decommissioning	Potential impact on wetland features	Impact in isolation	0	No wetland sensitivity was found in the area	0
		Cumulative impact	0		0
Aquatic biodiversity impact during rehabilitation	Potential impact on wetland features	Impact in isolation	0	No wetland sensitivity was found in the area	0
		Cumulative impact	0		0

Component Being Impacted On	Activity Which May Cause the Impact	Activity	Pre- Mitigation	Recommended Mitigation Measures	Post-Mitigation
			Significance		Significance
Avifauna impacts during decommissioning	Reduction of avifauna during decommissioning activities	Impact in isolation	-12	Adhere to noise restrictions of the Mine	-12
		Cumulative impact	-12	Adhere to noise restrictions of the Mine	-12
Avifauna impacts during rehabilitation	Increase in avifauna after rehabilitation activities	Impact in isolation	+6	Increase in habitat	+24
		Cumulative impact	+6	Increase in habitat	+24

5.4. Risk Assessment Conclusion

Based on the closure risk assessment for the proposed BN BESS Project, the following conclusions summarise the most significant impacts identified during the decommissioning and rehabilitation phases.

Overall Impact Assessment

The environmental and social impacts associated with the decommissioning and rehabilitation of the proposed BN BESS Project are generally low to moderate in significance, provided that the recommended mitigation measures are implemented effectively.

Most Significant Negative Impacts

Prior to mitigation, several activities present potential environmental risks that require active management:

- Biodiversity (Alien Invasive Vegetation): The most significant cumulative negative impact identified is the potential reduction in biodiversity resulting from the establishment and spread of alien invasive plant species. This impact is rated as moderate negative (-32).
- Soil Erosion: Rehabilitation activities such as ripping and revegetation present a low negative (-24) risk of soil erosion due to the local topography. However, this risk can be significantly reduced through mitigation measures such as contour ripping and the application of mulch.
- Heritage Resources: Potential impacts on heritage resources associated with vehicle movement during decommissioning activities were initially rated as low negative (-20). This risk is mitigated to a neutral level through strict demarcation of sensitive areas and controlled site access.

Most Significant Positive Impacts

The successful rehabilitation of the site is expected to result in several moderate–positive environmental outcomes, including the following:

- Soil and Land Capability: The use of soil ameliorants and appropriate rehabilitation practices is expected to result in a moderate–positive (+32) cumulative impact through improvements in soil bulk density and carbon cycling.
- Biodiversity and Habitat Restoration: The re-establishment of natural and endemic vegetation is expected to enhance local biodiversity and provide improved habitat for avifauna, both reaching moderate–positive (+24) significance levels following mitigation.
- Surface Water Quality: Improved vegetation cover will reduce soil erosion and sedimentation, resulting in a moderate–positive (+22) impact on long-term surface water quality.

Conclusion

Although decommissioning activities inherently introduce short-term physical and ecological risks, the long-term rehabilitation strategy is designed to ensure that the proposed Project area is restored to a stable, self-sustaining condition that improves upon the existing disturbed mining footprint.

All financial liability costs associated with these activities have been calculated in accordance with the MPRDA financial provisioning requirements to ensure that the proposed mitigation and rehabilitation measures are adequately funded.

6. Financial Liability Calculation

The proposed BN BESS Project involves the development of a utility-scale, behind-the-metre battery energy storage facility at the existing Booysendal Platinum Mine in the Limpopo Province. The proposed Project will have an installed capacity of up to 25 megawatts (MW) and an energy storage capacity of 50 megawatt-hours (MWh), utilising lithium iron phosphate (LFP) battery technology for enhanced safety and improved thermal stability. The facility is intended to improve electricity supply reliability, support peak demand management, and provide backup power for critical mining operations. (Zutari, 2025)

The proposed Project will be located entirely within the existing mining footprint on Portion 0 of Farm Booysendal No. 43JT. In accordance with South African environmental legislation, the financial liability costs associated with the proposed Project have been calculated in terms of the MPRDA. This approach ensures that sufficient financial provision is made for the systematic decommissioning of the modular containerised infrastructure and the full rehabilitation of the approximately 3,510 m^2 development footprint at the end of the facility's operational lifespan, which is expected to align with the life of the Mine.

As part of this commitment, all end-of-life battery units will be managed by the OEM, or an authorised service provider, to ensure compliant recycling or disposal in accordance with applicable environmental legislation and industry best practice. (GCS, 2025)

6.1. Project Description for Decommissioning and Closure

The BN BESS decommissioning phase will involve the dismantling and removal of all constructed infrastructure within the facility footprint. Following the removal of infrastructure, compacted areas will be ripped and the site rehabilitated to reinstate indigenous vegetation as far as reasonably practicable.

Decommissioning activities will commence with the systematic dismantling of all infrastructure within the BN BESS development footprint. Infrastructure components will either be returned to the OEM in accordance with the applicable supplier agreements or recycled where feasible. Any remaining waste materials will be transported to licensed waste management facilities, in accordance with the relevant waste classification requirements.

Any hydrocarbon spillages associated with dismantling equipment or infrastructure will be managed in accordance with the Mine's waste and spill management procedures. This will include the immediate containment and clean-up of the affected area and the disposal of contaminated materials at an appropriately licensed waste management facility.

All concrete infrastructure, including platforms, paving blocks, culverts, and associated access roads, will be mechanically demolished and removed to a licensed disposal or recycling facility.

All compacted areas associated with the development footprint will be ripped to a depth of 600 mm to alleviate compaction resulting from the original construction activities. Ripping will be undertaken along contour lines to reduce the potential for erosion and surface water runoff.

Additional erosion control measures, including the use of biodegradable erosion prevention technologies, will be implemented where required.

The rehabilitated surface will be covered with ameliorated soil and topsoil sourced from the Mine's approved topsoil stockpiles to support vegetation establishment. Rehabilitation efforts will aim to restore vegetation cover as close as possible to the surrounding natural vegetation.

The rehabilitated area will be maintained for a period of five years, during which the site will be assessed annually to evaluate the success of the rehabilitation measures. Provision has also been made for reseeding of the rehabilitated areas during the first two years, should vegetation establishment be insufficient.

6.2. Cost Breakdown

Table 4 below presents the estimated closure cost breakdown for the BN BESS facility. This high-level cost estimate has been prepared based on the available information relating to the preliminary design methodology. (Zutari, 2025)

It should be noted that detailed specifications for all equipment were not available at the time of preparing this report, and certain infrastructure dimensions were derived from comparable installations and industry references. The cost calculations are primarily based on the Master Rates published by the DMRE. Where new technologies or infrastructure components were not included within the Master Rates framework, demolition and removal costs were applied based on comparable industry projects.

The estimated costs were further benchmarked against historical costs from similar decommissioning and rehabilitation activities and escalated using applicable inflation indices.

Based on the level of design information currently available, the closure cost estimate presented in this report is considered to have an accuracy level of approximately ±30% (equivalent to a 70% confidence level).

Table 4: Cost breakdown table of the Booysendal North Battery Energy Storage Facility

No.	Description	Unit	A Qty	B Master Rate	COST
1	Dismantling of processing plant and related structures	m3	0	21.62	R0.00
1 (A)	Dismantling of substations and transformers	No.	0	18,885.25	R0.00
2(A)	Demolition of steel buildings and structures	m2	447	301.20	R134,615.34
2(B1)	Demolition of reinforced concrete buildings and structures	m2	430	443.88	R190,826.89
2(B2)	Demolition of Light concrete slab and structures	m2	141	236.07	R33,168.46
3	Rehabilitation of access roads	m2	360	53.90	R19,403.72
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	523.14	R0.00
4(B)	Demolition and rehabilitation of non-electrified railway lines	m	0	285.35	R0.00
5	Demolition of housing and/or administration facilities	m2	0	602.40	R0.00
6	Opencast rehabilitation including final voids and ramps (Enviroberm)	m	0	306,591.46	R0.00
7	Sealing of shafts, adits and inclines	m3	0	161.70	R0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	210,524.02	R0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds	ha	0	262,203.86	R0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	761,564.31	R0.00
8(D)	Hazardous Transport Logistics (LFP320 tons)	Ton/km	46,800	5.00	R234,000.00
8(E)	Hazardous waste disposal	ton	180	1,200.00	R216,000.00
8(F)	Transportation of non-hazardous waste	Ton/km	3,348	3.50	R11,718.00
8(G)	Non-Hazardous waste disposal	ton	62	300.92	R18,657.04
9	Rehabilitation of subsided areas	ha	0	176,282.16	R0.00
10	General surface rehabilitation	ha	0.3150	166,770.54	R52,532.72
11	River diversions	ha	0	166,770.54	R0.00
12	Fencing	m	178	190.23	R33,861.39
13	Water management (Mine Budget)	Sum	0	63,410.85	R0.00
14	Two to Three years of maintenance and aftercare	ha	0.351	22,193.80	R7,790.02
15(A)	Specialist study	Sum	1	72,430.19	R72,430.19
15(B)	Specialist studies (soil remediation)	Sum	0	72,430.19	R0.00
SUM of Closure Components					R1,025,003.77
SUB TOTAL 1 (DMRE Weighting Factor 2)		1.1			**R1,127,504.15**
12%	Preliminary and General				R135,300.50
10%	Contingency				R112,750.42
SUB-TOTAL 2 (Preliminary and General + Contingency)					R248,050.91
SUB TOTAL 3 (Excluding VAT)					R1,375,555,07
15%	VAT @15%				R206,333.26
GRAND TOTAL					**R1,581,888.33**

7. Conclusion

The Final FRDCP for the BN BESS Project provides a comprehensive and transparent assessment of the technical and financial requirements necessary to achieve responsible closure. By identifying specific decommissioning activities, such as the dismantling of transformers and the removal of concrete footings, the plan ensures that the physical footprint of the BESS facility will be fully rehabilitated and stabilised at the end of its operational life.

The financial provision calculated in this report reflects a realistic estimate of the actual closure costs, including allowances for specialist assessments and post-closure monitoring. This approach ensures that sufficient financial resources are available to implement the rehabilitation strategy effectively, thereby preventing the externalisation of environmental costs to the public or the State.

In conclusion, the successful implementation of this plan will result in a site that is physically stable, chemically non-contaminating, and capable of supporting sustainable vegetation cover. Periodic review and updating of this plan will be required to account for inflationary adjustments to the DMRE Master Rates, as well as any potential changes to the operational scope of the proposed Project.

Provided that the mitigation measures and monitoring protocols outlined in this report are implemented as specified, the proposed Project is expected to achieve a sustainable lifecycle approach, ensuring that closure outcomes align with South African environmental legislation and recognised international best practice in mine rehabilitation and closure planning.

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