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REECOL Ecological rehabilitation and long term
monitoring of post mining areas

Deliverable 6.1

Audit Catalogue

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1. Introduction

The REECOL project is a significant initiative focused on enhancing environmental sustainability in coal regions undergoing transition. This collaborative effort includes eleven partners from five European countries, encompassing research institutions and key industry stakeholders such as coal mining companies. The core aim of the project is to significantly improve post-mining ecological rehabilitation methods. By integrating a comprehensive understanding of ecosystem degradation, intended future land uses, and the economic viability.

The Audit Catalogue developed under WP6 – Task 6.1 of REECOL has been designed as a structured and systematic framework intended to support the identification, classification, evaluation, and monitoring of reclamation-related requirements. The catalogue serves as a centralized repository of audit controls, assessment criteria, and associated metadata, enabling consistent evaluation procedures across different operational and technical domains.

The structure of the catalogue has been carefully organized to ensure usability, traceability, scalability, and alignment with the tool development objectives of the project. The architecture follows a hierarchical and modular approach, allowing individual audit items to be grouped into broader thematic categories while maintaining detailed descriptions and evaluation parameters for each entry.

1.1. General Context and Project Rationale

The rehabilitation of areas that have suffered geomorphological, biological, or environmental degradation due to mining activities, is one of the most critical challenges facing modern environmental engineering. Traditional approaches often treated restoration as a static, ex post process, resulting in long-term failures such as soil instability, failure of vegetation establishment, and loss of resources. To eliminate these risks, a transition to Adaptive Management models is deemed necessary. This approach requires continuous, dynamic, and scientifically sound monitoring of the field so that technical decisions are based on actual and cross-verified data.

This technical report presents the development and structure of a specialized Evaluation Tool/ Framework for environmental rehabilitation projects. The essence of the tool lies in its ability to bridge environmental science with administrative decision-making, translating general regulatory obligations into specific, measurable technical milestones.

This tool was developed to address three key requirements:

- **Objectivity:** The elimination of subjective assessment (“the project is progressing smoothly”) through the introduction of a standardized compliance scale.
- **Holistic Approach:** A balanced examination of both quantitative parameters (laboratory soil/water analyses) and qualitative indicators (ecosystem functionality, social acceptance), which are used as tools to determine whether a process exists.
- **Early Warning:** The identification of operational weaknesses at an early stage, allowing for the immediate implementation of corrective actions before deviations become irreversible.

1.2. Role and Location within the REECOL Project

The Audit Catalogue is the foundational output of the project which aims to evaluate and certify ecological rehabilitation industry best practice of post-mining areas. While other results provide the technical and scientific value, such as ecosystem degradation classifications from WP3, innovative technical solutions from WP4, and monitoring indicators from WP5 - WP6 acts as the administrative and evaluative layer that integrates these findings into a standardized certification framework.

The catalogue serves as a tool that translates scientific outcomes into a format suitable for formal auditing, industry benchmarking, and long-term sustainability checks.

1.3. Intended Users and Stakeholders

This document and the associated toolset are designed for a wide range of actors involved in the mining and transition sectors:

- Mine Operators and Industrial Partners - specifically, partners such as Polska Grupa Górnicza (PGG), Public Power Corporation (PPC), and Premogovnik Velenje (PV) and other, who will use the Audit Catalogue as internal audit tool, to validate their rehabilitation progress and demonstrate compliance.
- Regulatory and Planning Authorities - local and national bodies can utilize the catalogue as a standardized protocol to review and approve mine closure and ecological restoration plans.
- External Auditors - independent verification bodies can use the structured criteria for third-party certification processes to ensure conformity with international best practices.
- Consultancy Agencies and NGOs - these groups can use the tool to evaluate the socio-ecological performance and economic viability of various rehabilitation options.

1.4. Operational Application: When to Use the Catalogue

The Audit Catalogue is not intended as a one-time final checklist; rather, it is a tool for adaptive management or stage-wise auditing tool that should be utilized throughout the entire project lifecycle. It is structured to provide value during five distinct operational phases:

1. Pre-rehabilitation assessment - to establish baselines and identify environmental risks.
2. Rehabilitation planning - to allocate resources and ensure legal compliance before work begins.
3. Implementation - to monitor active technical and biological reclamation tasks in real-time.
4. Monitoring and Evaluation - to evaluate the effectiveness of interventions and adjust strategies through stakeholder feedback.
5. Post-rehabilitation assessment - to confirm the long-term sustainability of the restored land and confirm that all objectives have been met.

1.5. Integration with other WP6 Deliverables

This Audit Catalogue is the first of three interconnected components developed under WP6 to modernize post-mining management:

- D6.1 Audit Catalogue - provides the qualitative and quantitative assessment criteria and the 1-to-5 scoring logic.
- D6.2 Visualization Tool (Dashboard) - a semi-automated digital software environment where data from the catalogue is entered to generate assessment reports and visualize progress through interactive graphics.
- D6.3 Guidance Document – a practical "how-to" manual specifically for the industry end-user, providing detailed instructions on how to interpret catalogue questions and execute the certification process in the field.

Through the structure of this specific work package, a comprehensive concept is implemented regarding how rehabilitation project should be monitored. It is important to note that this report presents the purpose, structure, and content of the Audit Catalogue. The main guide for conducting such an assessment is deliverable D6.3, which is a Guidance Document and will be explained in the upcoming deliverable. The user manual will provide detailed instructions on how to conduct this assessment itself, as well as which corresponding indicators should be measured to monitor each process separately, along with some application examples. This process can be monitored via the dashboard, which will also be presented in the next deliverable (D6.2) and will intergrade guidelines, audit criteria and different audits in one environment.

By integrating these three deliverables, as shown in Figure 1, REECOL provides a scalable system that allows for consistent evaluation procedures across different European mining and post-mining sites.

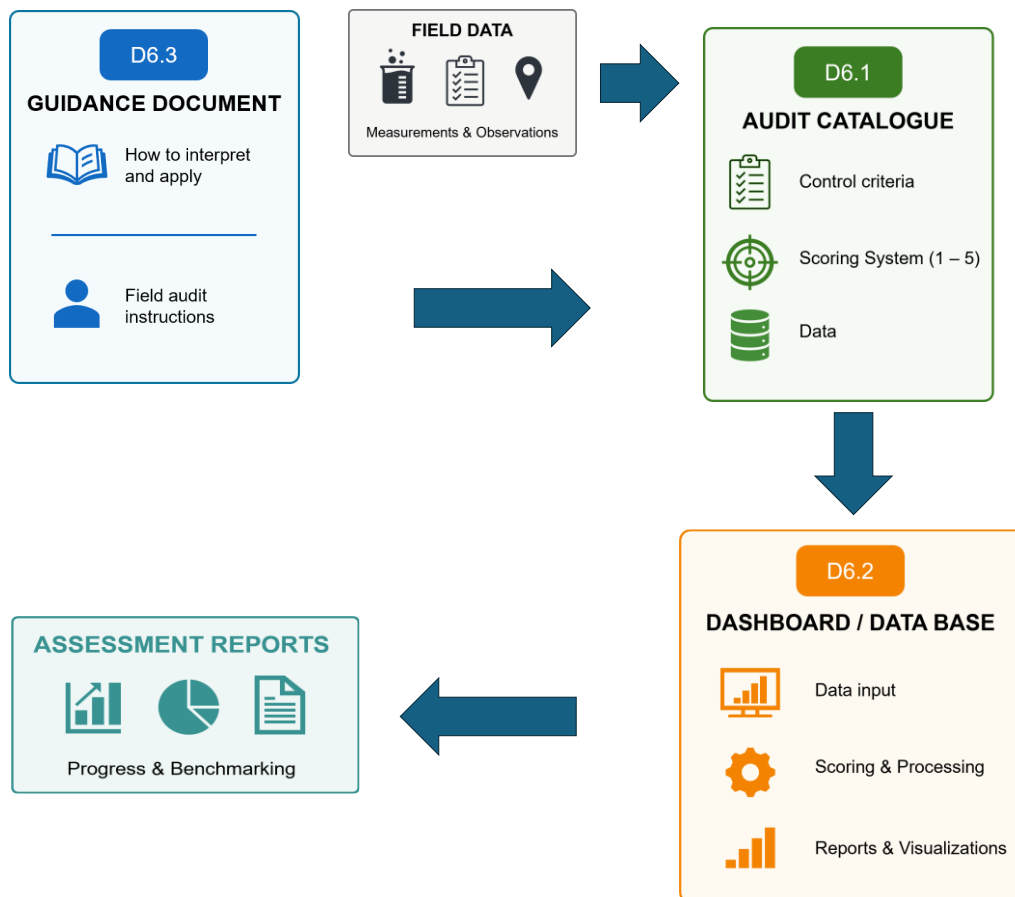


Fig. 1. WP6 Reasoning Flowchart – Audit Catalogue integration with deliverables D6.2, D6.3.

2. Methodology – The Audit Catalogue

2.1. Structure

The Audit Catalogue architecture follows a hierarchical approach, in which control information is organized across multiple levels, enabling both high-level strategic analysis and detailed operational assessment. This layered structure facilitates efficient navigation throughout the catalogue while ensuring that all audit components are aligned with the broader objectives of the REECOL program.

At the highest level, the list is divided into thematic areas that represent the main areas of operation and set the general plan for a rehabilitation project. These areas serve as general organizational units that are group-related to monitor activities according to their operational relevance and assessment objectives. An environmental rehabilitation project consists of a general assessment and monitoring plan that has five key areas:

1. Pre-rehabilitation assessment
2. Rehabilitation planning
3. Implementation
4. Monitoring and evaluation
5. Post-rehabilitation assessment

For each of the five key areas, the list is further subdivided into categories that represent more specialized areas and audit procedures. The categories provide greater detail and allow for the grouping of audit elements that share common characteristics, functional responsibilities, or evaluation methodologies. This classification mechanism ensures consistency in the evaluation process and enables a comparative analysis of the relevant audit controls.



Fig. 2. The five key stages of monitoring an environmental rehabilitation project

The initial and systematic process of gathering information before the start of a rehabilitation program is quite important, as it lays the foundation for the project's progress. A preliminary assessment must be conducted of both the physical and functional characteristics of the site and the extent to which the social context is integrated into the initial design. For that reason, the initial assessment process (**Pre-rehabilitation assessment**) of the degraded area prior to restoration consists of five specific categories:

- a) Identification of landscape and soil degradation areas
- b) Water and vegetation analysis
- c) Stakeholder consultation
- d) Baseline data collection
- e) Risk evaluation

The second key element that must be present and form an integral part of every program is the process of setting the objectives. The set goals are those who define the project planning and establish an implementation timeline. It is important to know the resources each company has at its disposal to implement such a project, as well as where interventions need to be carried out. The objectives of a well-structured project plan (**Rehabilitation planning**) are structured into four categories:

- a) Resource allocation for technical and biological reclamation
- b) Compliance with legislation
- c) Environmental risk mitigation strategies
- d) Future land use strategy

The third component of the evaluation process is the practical implementation of the rehabilitation program. This stage involves carrying out therapeutic interventions and supportive actions in accordance with the rehabilitation plan, with the aim of improving the functionality and quality of the rehabilitation area. A rehabilitation project on **implementation** stage is necessary to check:

- a) Technical reclamation phase
- b) Biological reclamation phase
- c) Monitoring soil toxicity and erosion
- d) Flexibility for plan adjustments

The implementation phase of these methods must be accompanied by continuous monitoring to ensure that the restoration methods are properly applied. This establishes a timeline for compliance that positively contributes to the project's functionality by facilitating the comparison of results through their evaluation. The continuous monitoring and evaluation process involves measuring results, assessing the effectiveness of interventions, and modifying the program when necessary. It consists of six monitoring and quality assurance elements, which are:

- a) Regular progress reporting
- b) Monitoring performance indicators

- c) Environmental impact tracking
- d) Stakeholder feedback mechanisms
- e) Risk and issue tracking
- f) Adaptive management

Finally, to complete the implementation and evaluation cycle of an environmental restoration project, there must be a plan that outlines how to assess the extent to which the project's objectives have been achieved. The operational improvement and overall effectiveness of the implementation plan, as well as the identification of potential future support needs, are processes that must be integrated into the collective planning of a project and constitute the post-rehabilitation assessment phase. This phase includes:

- a) Final outcome evaluation
- b) Post-rehabilitation risk assessment
- c) Sustainability of rehabilitation outcomes
- d) Long-term stakeholder satisfaction
- e) Long-term monitoring plan
- f) Adaptation for unexpected changes

2.2. Evaluation approach

The architecture of the proposed evaluation system is based on a multi-level analysis approach, which allows for a holistic assessment of the restoration project. To bridge the gap between strictly quantitative field measurements and broader environmental or social impacts, the mechanism is structured around two complementary axes: Descriptive Criteria and Qualitative Performance Indicators. The combination of these two axes ensures that the assessment is not limited to a static recording of data, but functions as a dynamic tool that captures the actual ecosystem resilience and the functional success of the interventions.

2.2.1. Descriptive criteria

Descriptive criteria form the core categories used to evaluate core project performance. They establish a structured baseline to measure both the physical restoration of the site and its broader impacts.

Geotechnical and Hydrological

- **Soil Stability and Quality:** The mechanical strength of the soil, its load-bearing capacity, compaction, and physicochemical properties (e.g., pH, organic matter, cation exchange capacity) are evaluated. The goal is to ensure a substrate capable of supporting higher forms of life.
- **Erosion Control Effectiveness:** The behavior of slopes and shaped topography is examined in relation to wind and water-induced erosion factors. The effectiveness of both engineering structures (e.g., terraces, geogrids) and natural protection methods is evaluated.
- **Water Quality and Hydrological Behavior:** Surface and subsurface runoff is monitored, local watersheds are restored, and measures are taken to ensure that water bodies are not burdened with sediments or pollutants (e.g., heavy metals, acidification) due to restoration work.

Ecological

- **Vegetation Recovery Rate and Biodiversity Enhancement:** The rate of flora establishment, vegetation cover, survival rate of planted species, and natural re-establishment of native fauna and microflora are recorded.
- **Visual and Landscape Integration:** The extent to which the intervention area harmonizes aesthetically and morphologically with the undisturbed natural landscape of the wider region is evaluated.

Regulatory and Safety

- **Compliance with Environmental Legislation:** The project's full alignment with approved Environmental Terms, national and European legislation, as well as any specific industry or international sustainability standards, is verified.

- **Reduction of Environmental Risk:** The elimination or drastic reduction of long-term risks, such as slope instability, toxic waste leakage, or the creation of pollution hotspots, is assessed.

Socioeconomic

- **Understanding and Suitability of Future Land Uses:** It is examined whether the restored area is safe and functional for the intended post-operational uses (e.g., recreation, agriculture, forestry, nature conservation areas).
- **Stakeholder Engagement and Satisfaction:** The degree to which the needs of the local community and relevant stakeholders have been incorporated is measured, ensuring the project's social acceptance (Social License to Operate).

2.2.2. Qualitative criteria

To provide a comprehensive assessment of phenomena that cannot be adequately captured by numerical or quantitative data alone, the tool incorporates qualitative indicators. These indicators are based on fieldwork, expert judgment, and feedback mechanisms.

Ecosystem Functionality Indicators Management and Adaptation Indicators

- **Degree and Quality of Vegetation Establishment:** In addition to the number of plants, the health of the plant population, the presence of natural regeneration (new shoots/seeds), and the absence of invasive species are assessed.
- **Level of Ecological Resilience:** The ability of the developing ecosystem to sustain itself and cope with external pressures or extreme events (e.g., droughts), without the need for continuous human support.

Management and Adaptation Indicators

- **Adequacy and Suitability of Technical Practices:** An assessment is made of whether the methods selected in the field (e.g., type of soil amendments, stabilization methods) yield the expected quality results or whether they require revision.
- **Long-Term Flexibility of the Strategy:** The management plan's ability to incorporate new data and adapt quickly (Adaptive Capacity) when field conditions change is measured.

Social Impact Indicators

- **Level of Social Acceptance:** This measures the local community's perception regarding improvements in quality of life, the restoration of natural beauty, and the elimination of health risks.
- **Effectiveness of Communication:** The transparency of information flow to stakeholders and the speed of the project management's response to complaints or suggestions are evaluated.

2.2.3. Scoring system

To convert heterogeneous field data (laboratory analyses, field observations, questionnaires) into a single, measurable value, the tool incorporates a Composite Scoring Mechanism. This mechanism allows project management to immediately recognize the status of restoration and identify which specific areas are lagging.

The scoring methodology is based on the evaluation of predefined criteria using a numerical rating scale. Each criterion is assigned a score according to the observed performance level and the extent to which rehabilitation objectives are achieved. The scoring process combines field observations, monitoring results, expert assessments, and stakeholder feedback to provide a comprehensive evaluation of rehabilitation success.

Because the indicators have different units of measurement (e.g., soil pH is a numerical value, erosion is measured in tons per hectare, while communication skills are a qualitative assessment), all data are converted to a common qualitative/quantitative scale from 1 to 5.

Table 1. The five-level scoring scale

Score	Performance Level	Description
1	Does not exist/ not developed	Complete failure to meet the criterion, posing an immediate environmental or operational risk
2	Significant improvement	Clear signs of deterioration or failure of the projects
3	Some improvement	Localized issues have been identified. Small-scale corrective actions are required
4	Minimal improvement	The indicators are positive, but close monitoring is required without immediate intervention
5	No improvement	The criterion has fully achieved the ultimate sustainability goal

Each descriptive criterion is evaluated independently. This scale provides a structured assessment of the rehabilitation stage by measuring the extent of corrective actions needed in the various individual procedures that contribute to the overall achievement of ecological restoration. The overall rehabilitation performance score is calculated through the aggregation of individual criterion scores. This allows the identification of strengths, weaknesses, and areas requiring improvement within the rehabilitation process. The scoring system also supports comparative analysis between different rehabilitation phases, project areas, or monitoring periods.

3. Implementation – Audit Catalogue

The Audit Catalogue is intended for ecological rehabilitation, and its objectives are to standardize processes, monitor progress, mitigate risks, ensure compliance with environmental laws, and address all critical ecological aspects like biodiversity and soil health, supporting sustainable rehabilitation efforts.

To implement the idea described above, it was necessary to establish a general plan consisting of five key stages. Each of these five stages is defined by a set of criteria (more specialized areas) that must be met in each of the five phases and are presented in Table 2.

Table 2. The five stages of a rehabilitation project and their specialized areas

GENERAL PLAN		SPECIALIZED AREAS
1.	Pre – rehabilitation assessment	(a) Identification of landscape and soil degradation areas (b) Water and vegetation analysis (c) Stakeholder consultation (d) Baseline data collection (e) Risk evaluation (f) Identification of landscape and soil degradation areas
2.	Rehabilitation planning	(a) Resource allocation for technical and biological reclamation (b) Compliance with legislation (c) Environmental risk mitigation strategies (d) Future land use strategy
3.	Implementation	(a) Technical reclamation phase (b) Biological reclamation phase (c) Monitoring soil toxicity and erosion (d) Flexibility for plan adjustments
4.	Monitoring & Evaluation	(a) Regular progress reporting (b) Monitoring performance indicators (c) Environmental impact tracking (d) Stakeholder feedback mechanisms (e) Risk and issue tracking (f) Adaptive management
5.	Post – rehabilitation assessment	(a) Final outcome evaluation (b) Post-rehabilitation risk assessment (c) Sustainability of rehabilitation outcomes (d) Long-term stakeholder satisfaction (e) Long-term monitoring plan

Each specialized area is then evaluated using a five-point scale (1–5), which while keeping the simplicity allows the end-users of the tool to perform a comparable assessment. It is designed to assess the degree to which the specialized area meets the highest possible standard. Each score represents the current status of the specific process under review, providing a description for each grade. This ultimately indicates whether corrective action is necessary or not. Thus, for each individual area, five descriptions were created that define each criterion and enable the evaluator to better determine the stage of progress of the specific process.

Consequently, a rehabilitation project is evaluated at a primary level across 5 phases, where each phase incorporates certain procedures (specialized areas) - numbering 25 in total - and ultimately each procedure is assessed through 5 descriptions. The proposed descriptions include techniques followed in an environmental restoration process and were developed based on the deliverables of the REECOL project (3.1, 3.2).

☞ The complete descriptions of the defined criteria are presented in **ANNEX 1**

The catalogue does not take the form of a standardized checklist, where assessment is based on specific questions; rather, it is more descriptive in nature so that it can be adapted to the specific circumstances and scale of any rehabilitation project.

Initially, the checklist was created as an Excel spreadsheet that was tested and reviewed by the REECOL consortium. It was subsequently implemented as an interactive web-based application which is available via the following link.

☞ Online version of the Audit Catalogue: [Ecological Rehabilitation Audit Tool](#)

To get through the online version use the following login credentials: **username:** REECOL
password: rehabilitation123

4. Conclusions

The development and implementation of Audit Catalogue serving as Assessment Framework and Rating Mechanism represents a decisive step toward modernizing the management of environmental restoration projects. The tool bridges the gap between theoretical environmental goals and practical fieldwork, transforming subjective assessments into objective, quantified data.

Through the standardized rating scale (1 to 5), which is directly linked to the level of improvement urgency, ambiguity is eliminated. Project management, auditors, and stakeholders now have access to a common, clear, and scientifically grounded language of communication.

Integrating the tool into the project lifecycle offers three (3) critical advantages:

- 1. Resource Optimization and Cost Reduction:** The timely identification of deviations (e.g., when a criterion drops to level 3 or 2) allows for targeted corrective actions to be taken before the failure becomes widespread and remediation becomes economically unfeasible.
- 2. Institutional Protection and Compliance:** Ensures the project's continuous and full alignment with strict environmental legislation and approved environmental conditions, eliminating the possibility of fines or work stoppages.
- 3. Strengthening Social Acceptance** (Social License to Operate): The incorporation of qualitative indicators regarding stakeholder opinion and satisfaction builds relationships of trust and transparency with the local community, ensuring the smooth progress of the project.

In conclusion, this tool demonstrates that environmental rehabilitation should not be treated as a static obligation at the end of a project's life cycle, but as a dynamic process of continuous improvement. At the same time, this tool is fully scalable and will eventually be digitized into a software environment (Dashboard), allowing for the direct entry of measurements from the field and the semi-automated generation of assessment reports.

ANNEX 1: AUDIT CATALOGUE

1) Pre-rehabilitation assessment		
a) Identification of landscape and soil degradation areas		
Score	Performance Level	Description
5	No improvement	The process for identifying landscape and soil degradation areas is fully comprehensive, with high precision. The application of indicators across different sites has excellent consistency. Advanced techniques such as remote sensing, GIS mapping, and on-ground assessments are utilized. The identification system provides high-resolution data and real-time analysis. All stakeholders are confident in the accuracy of degradation identification, and it fully aligns with regulatory and environmental standards.
4	Minimal improvement	The identification process for landscape and soil degradation is effective, covering most degraded areas with reliable methods. There are minor gaps in coverage that can be addressed to achieve a more comprehensive identification. The application of indicators across different sites has a good consistency. Precision from applied techniques has minor imperfections related to data analysis methods and software, minimizing efficiency. Most stakeholders are confident in the accuracy of degradation identification and align with regulatory and environmental standards.
3	Some improvement	The identification process for landscape and soil degradation is functional but has notable gaps. It covers primary areas of degradation but misses smaller or emerging zones. There is a combination of new and outdated technologies which influence the precision grade of the integration tools. Inconsistent Application of Indicators across different sites. Average stakeholders have uncertainties about the accuracy of degradation identification. Regulatory and environmental standards are completed with a low grade.
2	Significant improvement	There is an identification process for landscape and soil degradation, but significant gaps exist. Only major degraded areas are identified, missing smaller or less obvious sites. The techniques and tools used are outdated, and there is limited precision in identifying the severity or spread of degradation. The landscape and soil degradation indicators are inconsistently applied across different sites, leading to varied and unreliable results. Most of the stakeholders are uncertain about the identification of degradation. Regulatory and environmental standards are considered but have not been reached.
1	Does not exist/ not developed	There is no formal process for identifying landscape and soil degradation areas. Monitoring lacks techniques and tools for a structured data collection and analysis procedure. None of the indicators are applied across sites. All stakeholders are ignorant of the degradation identification process. There is no consideration of regulatory and environmental standards compliance. The development of a systematic process, including modern tools and defined protocols, is essential to monitoring and managing landscape and soil degradation effectively.

1) Pre-rehabilitation assessment		
b) Water and vegetation analysis		
Score	Performance Level	Description
5	No improvement	The water and vegetation analysis process is highly comprehensive, with up-to-date sampling techniques, advanced laboratory testing, and real-time monitoring capabilities. It includes chemical and biological assessments, ensuring accurate water quality tracking, vegetation health, and biodiversity. The analysis provides precise and reliable data, fully meeting regulatory and environmental standards, and is responsive to any fluctuations in water and vegetation health.
4	Minimal improvement	The water and vegetation analysis is well-executed, providing comprehensive insights into water distribution and vegetation coverage. The applied methodologies are appropriate, and the results are generally reliable and meet the expected standards. However, a few minor areas could benefit from slight refinement to enhance the overall quality of the analysis by expanding the frequency of testing, refining certain testing methodologies, or incorporating additional environmental indicators.
3	Some improvement	Water and vegetation assessments need to be more comprehensive in certain areas. The analysis exhibits some inconsistencies in both chemical and biological assessments, which affect their overall accuracy. The description of the analytical methods lacks a detailed explanation, making it difficult to fully assess the approach's robustness. Basic aspects of water and vegetation are covered but there is a lack of depth in exploring underlying patterns and implications. The analysis concludes with limited recommendations, offering minimal guidance for future actions or policymaking.
2	Significant improvement	There is a water and vegetation assessment but with significant gaps. The analysis does not adequately explain the relationships between indicators, leaving gaps in understanding what must be addressed. The data collection process appears insufficient or improperly implemented, affecting the accuracy of the analysis. There is also a need for more comprehensive and up-to-date data, especially in regions where water and vegetation dynamics are more complex.
1	Does not exist/ not developed	There is no structured process for water and vegetation analysis. Chemical and biological assessment is sporadic or non-existent, relying on visual inspections or occasional tests. Establishing a systematic water and vegetation analysis program with regular, scientifically rigorous testing is essential for effective environmental monitoring and rehabilitation.

1) Pre-rehabilitation assessment		
c) Stakeholder consultation		
Score	Performance Level	Description
5	No improvement	Consultation is executed flawlessly, meeting and exceeding expectations regarding scope, thoroughness, and engagement. The consultation process is inclusive, ensuring the participation of all relevant stakeholders and their inputs are carefully considered. This results in a comprehensive understanding of stakeholder perspectives, which are integrated effectively into the project's development.
4	Minimal improvement	Stakeholder engagement is well-organized and effectively captures the perspectives. The process is thorough, ensuring a diverse range of viewpoints are included, and the feedback is integrated appropriately into project development. The consultation provides valuable insights that are used to a relatively satisfactory degree to shape key decisions.
3	Some improvement	The consultation process provides useful insights, and feedback is considered when shaping the project. However, several areas need improvements to strengthen the process and ensure more comprehensive engagement. Stakeholders are not adequately represented, leading to gaps in the diversity of perspectives collected. Additionally, the follow-up process on the feedback provided is somewhat limited.
2	Significant improvement	Attempts are made to involve relevant stakeholders, but the process falls short in several key areas that significantly impact its effectiveness. Crucial feedback is overlooked, limiting the analysis and the value of the input gathered. Furthermore, collecting, analyzing, and integrating stakeholder feedback is not well-structured, leading to confusion and insufficient follow-up with participants.
1	Does not exist/ not developed	There is no evidence of a structured consultation process, and no stakeholder engagement has been documented or carried out. As a result, there is no feedback or input from relevant stakeholders to inform the project.

1) Pre-rehabilitation assessment		
d) Baseline data collection		
Score	Performance Level	Description
5	No improvement	Comprehensive baseline data collection is effectively executed, capturing all necessary ecological, geological, and hydrological variables before project initiation. It is executed to a high standard, meeting all requirements and expectations. The process is thorough, with comprehensive and accurate data gathered across all relevant parameters. The methodology used is appropriate and well-structured, ensuring that the data collected are reliable and representative of the study area.
4	Minimal improvement	The baseline data collection process is conducted effectively, with most data being accurate and well-documented. The methods used are appropriate, covering most of the required aspects. However, some data may benefit from additional verification or clarification to ensure complete accuracy. This may include increasing the frequency of data collection in specific areas or incorporating additional parameters that provide a more comprehensive view.
3	Some improvement	A reasonable amount of relevant information is provided, but several areas require improvement. The methods used are sufficient to gather basic data, but some aspects of the collection process were either inconsistent or incomplete, affecting the overall reliability of the data. Certain datasets lack in detail or require further verification to confirm their accuracy. Additionally, the process documentation could be improved, particularly in terms of transparency and organization, to make the data easier to interpret and apply.
2	Significant improvement	The data collection process is incomplete, leading to gaps in the data that limit its usefulness for future analysis. Inconsistencies in methodology and documentation further undermine the reliability of the data. Some critical datasets are either missing or insufficiently detailed, which reduces the collection's overall value. Additionally, the process lacks transparency, and key steps in data verification are not clearly followed.
1	Does not exist/ not developed	There is no formal baseline data collection in place. There is no reliable reference to measure changes over time. Implementing a comprehensive baseline data collection program is essential for establishing reference points for rehabilitation and monitoring processes.

1) Pre-rehabilitation assessment		
e) Risk assessment		
Score	Performance Level	Description
5	No improvement	Successfully assessed all potential environmental risks, including contamination, erosion, and thermal processes, as required before rehabilitation begins. The methodology used to identify, assess, and document risks is well-structured, comprehensive, ensuring high reliability and accuracy. The detailed evaluation provides clear insights into the risks and offers actionable recommendations for mitigating them. No gaps are identified in the analysis, and the documentation is well-organized and transparent, making it easy to follow and apply.
4	Minimal improvement	Key environmental risks such as contamination, erosion, and thermal processes are covered. The analysis is generally comprehensive and well-structured, providing useful insights and recommendations for mitigating identified risks. Some sections could benefit from additional detail or clarification, especially regarding how certain risks are prioritized.
3	Some improvement	A reasonable overview of the potential environmental risks is provided. However, several areas require improvement to ensure the evaluation is comprehensive and reliable. The methodology is sound but lacks depth in some areas, particularly when explaining the severity and likelihood of specific risks. Some important risks have not been fully explored or analyzed in enough detail, leaving gaps in the evaluation. Additionally, the documentation could be more transparent, with better organization and more straightforward explanations.
2	Significant improvement	The analysis lacks depth and thoroughness. Some critical risks, including contamination, erosion, and thermal processes, are overlooked or inadequately assessed, leaving substantial gaps in the evaluation. The methodology is inconsistent, and the data used for the assessment are outdated or incomplete. There is also a lack of clarity in prioritizing the risks, and the documentation is disorganized, making it difficult to follow or apply the findings effectively.
1	Does not exist/ not developed	There is no substantial evidence of an assessment of potential environmental risks. Without a proper risk evaluation, there is a high potential for unforeseen environmental impacts that could hinder the rehabilitation process.

2) Rehabilitation planning		
a) Resource allocation for technical and biological reclamation		
Score	Performance Level	Description
5	No improvement	All necessary equipment, materials, personnel, and financial resources have been fully secured, ensuring that both reclamation phases can be carried out without delays or shortages. The planning includes an adequate contingency budget to address unforeseen challenges, and all necessary expertise is in place to guarantee high-quality outcomes. The available resources are also managed efficiently, with transparent tracking systems to monitor spending, material usage, and personnel deployment. This ensures the project stays on schedule and within budget, without compromising quality.
4	Minimal improvement	Most necessary resources—such as equipment, materials, and personnel—have been allocated appropriately. However, there are a few areas where additional resources could help speed up specific tasks or handle unexpected issues more smoothly. While the current allocation is sufficient for project success, introducing a slight increase in contingency funding or hiring additional experts in specific areas would improve overall efficiency and ensure even better results.
3	Some improvement	There are notable areas where improvements are necessary. Basic resources such as equipment and personnel are in place and some critical gaps exist. The current budget does not cover unexpected costs or certain types of specialized equipment. The availability of key personnel or expertise (such as environmental engineers or biologists) may be insufficient to handle the complexities of the reclamation process. This can slow down progress and reduce the effectiveness of the project.
2	Significant improvement	Many essential resources, such as critical equipment, skilled personnel, and adequate funding, are either insufficient or unavailable. This has already led to delays in the project, with major tasks being postponed due to shortages of materials or a lack of expertise on-site. The current allocation does not cover key aspects of the reclamation, such as maintaining the biological components (e.g., replanting native vegetation or managing wildlife habitats), and technical aspects like drainage systems and land reshaping are also underfunded.
1	Does not exist/ not developed	There is no formal resource allocation for technical and biological reclamation, making the project unviable in its current state. Essential equipment, personnel, and budget are not planned or secured, and there are no clear strategies for obtaining the necessary resources.

2) Rehabilitation planning		
b) Compliance with legislation		
Score	Performance Level	Description
5	No improvement	The project fully complies with all applicable local, regional, and national legislation. All necessary permits have been obtained, and the project adheres strictly to environmental, safety, and land-use regulations. A well-documented process is in place to regularly review compliance, ensuring that all activities remain within the legal framework throughout the project's lifecycle.
4	Minimal improvement	Compliance with legislation is solid and the project adheres to most of the required legal frameworks on a local, regional and national scale. Necessary permits are in place, and the project operates within legal boundaries. However, there are minor areas where documentation or reporting could be more regular.
3	Some improvement	The project is mainly compliant with legislation, but several areas require attention. Some permits are still pending, or the current plan does not address specific regulatory requirements. There are gaps in the project's documentation or inconsistencies in aligning with environmental or safety laws. Improvements are needed in coordinating with regulatory bodies, ensuring all legal requirements are met before proceeding.
2	Significant improvement	Important permits or approvals are missing, or the project does not meet environmental protection regulations and safety standards. There is a lack of communication with relevant authorities, leading to misunderstandings or potential violations. Urgent action is required to comply with the project, including obtaining all necessary permits and addressing regulatory concerns.
1	Does not exist/ not developed	There is no compliance with legislation, and the project has not taken any steps to obtain necessary permits or follow legal regulations. No structure is in place to ensure adherence to environmental or safety standards. Immediate and extensive efforts are required to develop a compliance strategy, secure all necessary permits, and ensure the project adheres to all legal obligations.

2) Rehabilitation planning		
c) Environmental risk mitigation strategies		
Score	Performance Level	Description
5	No improvement	The environmental risk mitigation strategies are comprehensive , well-executed and fully protect the environment. The project has a robust plan in place to address all significant environmental risks. These strategies are informed by up-to-date scientific research and best practices, ensuring they are effective and sustainable. Risk mitigation measures are regularly monitored and adjusted to maintain environmental integrity throughout the project. There is a proactive approach to preventing potential issues before they escalate.
4	Minimal improvement	The environmental risk mitigation strategies are adequate and have a strong relationship with environmental protection. The project plan covers most of the critical risks. While the current strategies are effective, some minor improvements could be made to further enhance environmental protection. Risk mitigation measures are monitored and adjusted in a less frequent way and certain mitigation practices could be updated to reflect newer research.
3	Some improvement	Environmental risk mitigation strategies are in place but they need improvements in key areas. While the project addresses most risks, there are gaps in the strategy. There is no robust plan to address all significant environmental risks. Measures for preventing contamination or managing erosion are not sufficiently developed. The current monitoring schedule is not frequent enough to detect early warning signs of environmental degradation.
2	Significant improvement	The current environmental risk mitigation strategies are underdeveloped. Critical risks, such as contamination, erosion, or wildlife disruption, are either poorly managed or not addressed at all. There is little to no monitoring in place to track environmental impacts. Substantial changes are required, including the development of more effective strategies and the implementation of regular monitoring systems.
1	Does not exist/ not developed	There are no environmental risk mitigation strategies in place. There is no plan for how to manage these risks. Immediate and extensive efforts are required to develop and implement a comprehensive environmental risk mitigation plan.

2) Rehabilitation planning		
d) Future land use strategy		
Score	Performance Level	Description
5	No improvement	The future land use strategy is comprehensive, realistic, and fully aligned with community needs and environmental considerations. It includes clear plans for sustainable land use, such as reforestation, agricultural potential, and recreation areas, ensuring the post-mining landscape is well-integrated with surrounding land use. The strategy also includes long-term monitoring and adaptive management, allowing adjustments based on future developments and community feedback.
4	Minimal improvement	The future land use strategy is well-developed and addresses the most essential aspects, including ecological restoration and sustainable community needs. The strategy also includes monitoring procedures that do not completely enhance management adaptation. There is a need for better coordination across regions. Enhancing stakeholder engagement or refining regional coordination is needed.
3	Some improvement	The future land use strategy provides a general framework for land use, but some important components are missing or need strengthening. There is a lack in detailed plans for ecological restoration, or it does not fully consider the needs of local communities or stakeholders. The monitoring procedure is not frequent providing limited flexibility in the plan and reduced adaptability to future environmental or social changes. Moderate improvements are recommended to enhance the strategy's robustness and ensure it fully supports sustainable and community-centered land use.
2	Significant improvement	The future land use strategy is insufficient in its current form and requires significant development to address major gaps. Key elements, such as ecological restoration, community needs, or compliance with regional planning requirements, are inadequately addressed. Additionally, the strategy lacks flexibility, making it difficult to adjust to evolving conditions or community needs over time.
1	Does not exist/ not developed	There is no future land use strategy in place, leaving the post-mining landscape at risk of neglect or unsustainable practices. There is no plan for ecological restoration, community integration, or responsible land use. This lack of planning results in long-term environmental degradation, legal challenges, or missed opportunities for community and economic development.

3) Implementation		
a) Technical reclamation phase		
Score	Performance Level	Description
5	No improvement	The reshaping of the land is completed with precision, effectively addressing topographical issues while ensuring that drainage systems are fully restored and function as intended. Water management areas are isolated successfully, preventing any leakage or cross-contamination. The processes employed in reshaping, restoring, and isolating are methodical, based on thorough analysis, and followed industry best practices. All objectives are verified through consistent monitoring and post-reclamation checks.
4	Minimal improvement	The land reshaping and drainage system restoration is largely effective, and water management areas are appropriately isolated. However, there are minor areas where improvements could be made. For example, the drainage system, while functional, could benefit from additional monitoring to ensure long-term performance. Similarly, the reshaping of certain sections of the land needs slight adjustments to better account for erosion or natural water flow.
3	Some improvement	The reshaping of the land and the restoration of drainage systems are completed, but there are noticeable issues that need addressing. Some sections of the land show signs of poor stabilization, increasing the risk of erosion, while parts of the drainage system are not functioning optimally, leading to waterlogging or inefficient water flow. The isolation of water management areas was partially successful, but there are concerns about the long-term effectiveness of these barriers, particularly in areas prone to heavy rainfall or groundwater seepage.
2	Significant improvement	Significant improvements are required, especially in areas with complex topography. The reshaping of the land has not fully addressed topographical challenges, leading to instability in some areas and potential erosion risks. The drainage systems, though partially restored, are insufficient to manage water effectively, with several areas experiencing poor water flow or blockages. Water management areas have been isolated, but the measures taken are inadequate, leading to concerns about contamination and improper water handling.
1	Does not exist/ not developed	There is no evidence that land reshaping, drainage system restoration, or water management area isolation has been implemented. This absence leaves the post-mining area vulnerable to environmental risks such as erosion, poor water management, and contamination.

3) Implementation		
b) Biological reclamation phase		
Score	Performance Level	Description
5	No improvement	All aspects of biological reclamation, including soil preparation, vegetation planting, and biodiversity restoration, have been carried out according to best practices. The selected species for re-vegetation are well-adapted to the local environment and are thriving, leading to a strong recovery of the ecosystem. Overall, the biological restoration has created a stable and resilient ecosystem that aligns with the project's ecological goals.
4	Minimal improvement	Soil conditions have been restored effectively, and the planting of native vegetation has generally resulted in healthy growth. However, there are a few areas where plant establishment could be improved with additional soil amendments or slight adjustments to watering and maintenance schedules. Overall, the biodiversity targets have been largely met, but some species may need further support to ensure their long-term survival. Monitoring should continue to address these minor issues and ensure that the ecosystem remains resilient.
3	Some improvement	Soil restoration efforts have been somewhat effective, but some areas suffer from poor soil quality or erosion, which is impacting plant establishment. Certain sections of re-vegetation show inconsistent growth, with some species not adapting as well as expected. The selection of vegetation needs to be revised, and further efforts are required to enhance biodiversity. Monitoring is in place but could be more frequent to address emerging issues quickly.
2	Significant improvement	Soil restoration is insufficient, with many areas suffering from poor nutrient levels, erosion, and compaction. Vegetation establishment is inconsistent, with high mortality rates in some areas. The choice of plant species needs to be reconsidered, as many have failed to thrive in the rehabilitated area.
1	Does not exist/ not developed	There is no evidence of any soil restoration or re-vegetation efforts, and the post-mining area remains barren and vulnerable to erosion, invasive species, and environmental degradation. A comprehensive biological reclamation plan needs to be developed and implemented to begin restoring the area.

3) Implementation		
c) Monitoring soil toxicity and erosion		
Score	Performance Level	Description
5	No improvement	Regular soil toxicity assessments have consistently shown safe levels of contaminants, with no negative impacts detected on the newly restored ecosystem. There are no signs of significant erosion or soil toxicity, and the area remains stable and safe for ongoing rehabilitation. Protocols for erosion prove highly effective, capturing all relevant data and ensuring that erosion control measures are functioning as planned.
4	Minimal improvement	Soil toxicity levels are generally within safe thresholds, though occasional fluctuations suggest that increased monitoring in specific areas could be beneficial. The erosion control measures are largely working as intended, though small instances of soil movement may require closer attention. Data collection processes are robust, but slight enhancements in reporting frequency or additional monitoring stations in vulnerable areas could improve the overall effectiveness of the program.
3	Some improvement	While soil toxicity is being tracked, some contamination levels are close to or slightly above acceptable limits. Additional soil treatments may be necessary. Erosion control measures are reduced but do not fully prevent soil displacement in certain areas. Monitoring data is being collected, but more frequent testing or better analysis tools are needed to accurately assess the long-term risks of toxicity and erosion.
2	Significant improvement	Soil toxicity and erosion monitoring require better frameworks. High levels of soil toxicity are detected in multiple areas, posing a risk to both vegetation and wildlife. Erosion control measures are proving ineffective in many locations, leading to substantial soil loss and instability. The monitoring protocols themselves are insufficient, with too few data collection points and inadequate analysis tools to provide a full understanding of the ongoing issues.
1	Does not exist/ not developed	There is no evidence of any formal monitoring processes, leaving the site vulnerable to unchecked soil contamination and widespread erosion. Without regular monitoring, there is no way to assess or mitigate the risks posed by toxic elements in the soil or erosion-related soil loss.

3) Implementation		
d) Flexibility for plan adjustments		
Score	Performance Level	Description
5	No improvement	The system allows for rapid and effective adjustments to be made when needed, ensuring that the rehabilitation process is always aligned with real-time environmental feedback and changing site conditions. This flexibility is supported by a comprehensive monitoring system and a responsive team, making it easy to pivot strategies without causing delays or additional costs. The process for modifying plans is clear, well-structured, and has been used successfully to address emerging challenges. All adjustments are implemented smoothly, with no negative impacts on the overall goals of the rehabilitation project.
4	Minimal improvement	The system allows for necessary changes when environmental conditions or unforeseen issues arise, but in a few cases, the response time is slower than ideal regarding environmental impact and changing site conditions. While the process works well, adding more resources or streamlining internal communications could further improve responsiveness. Overall, adjustments are made effectively, and the project is adapted to changes with minimal disruption.
3	Some improvement	There is a framework in place to modify plans when necessary, but the process is slow or cumbersome. Delays in adapting to new information or changing conditions are recognised. In some cases, adjustments are reactive rather than proactive. Criteria used to trigger adjustments need to be revisited in order to ensure that potential issues are caught earlier.
2	Significant improvement	The current system for modifying plans is slow. In several cases, important environmental feedback or unforeseen challenges are not addressed quickly enough, causing setbacks and inefficiencies. Overhaul the plan adjustment process and make it more responsive and better integrated with real-time data.
1	Does not exist/ not developed	There is no formal system in place to modify rehabilitation plans in response to new information or changing site conditions. This lack of flexibility results in a rigid approach to reclamation, with no ability to adapt to unforeseen challenges or environmental feedback.

4) Monitoring & Evaluation		
a) Regular progress reporting		
Score	Performance Level	Description
5	No improvement	Reports are generated on a consistent schedule, with detailed information on key metrics and performance indicators. These reports are shared with relevant stakeholders and incorporate visual aids, such as charts and graphs, to clarify findings. They include actionable insights and recommendations, allowing stakeholders to make informed decisions for adaptive management. The process ensures transparency, accountability, and up-to-date communication across all parties.
4	Minimal improvement	The reporting system is generally effective and provides essential information on the rehabilitation project's progress. Reports are prepared and shared on schedule, and they cover all key indicators. Improvements could be made to increase clarity in certain sections or to provide a more visual representation of data. Overall, the system is reliable and well-executed, but minor enhancements could improve the accessibility and impact of the reports in decision-making for adaptive management.
3	Some improvement	There is an established reporting system where reports are produced, but this could be strengthened in various areas. Reports are occasionally delayed, lack detailed insights, or fail to cover certain metrics such as indicators comprehensively. There are also inconsistencies in how data is presented or interpreted.
2	Significant improvement	The progress reporting system is insufficient in its current form and does not provide adequate support for monitoring and evaluation. Reports are infrequent, lack critical information, or are poorly organized, limiting their usefulness. Significant improvements are needed to ensure reports include all key performance indicators, are shared on time, and are structured to communicate findings clearly.
1	Does not exist/ not developed	There is no formal system in place for regular progress reporting, which severely limits transparency, accountability, and the ability to track the rehabilitation project's progress. Without regular reports, stakeholders lack insight into project performance, risks, or potential issues that may require intervention.

4) Monitoring & Evaluation		
b) Monitoring performance indicators		
Score	Performance Level	Description
5	No improvement	The system for monitoring the performance of indicators is fully developed and effectively implemented. Key performance indicators (KPIs) are clearly defined, relevant to the project goals, and measured consistently. The data collection process is streamlined and reliable, providing real-time insights that can easily be used to guide decision-making and identify trends in the rehabilitation process.
4	Minimal improvement	The monitoring system for performance indicators is robust and largely effective in tracking project progress. Key indicators are well-defined and generally relevant, though some may benefit from minor refinements to improve alignment with project objectives. Data collection is timely and accurate, although occasional improvements in data visualization or analysis could enhance accessibility and identification of occurred trends in the rehabilitation process.
3	Some improvement	The monitoring system for performance indicators is in place but has some gaps that need addressing. While key performance indicators (KPIs) are not clearly defined, there are inconsistencies in how data is collected or reported. Some indicators do not fully reflect project goals or the reporting process lacks clarity, making it harder for stakeholders to interpret results accurately. Improvements could include refining indicators, increasing report frequency, or enhancing data analysis to provide clearer insights.
2	Significant improvement	Some KPIs are missing or incomplete. The monitoring system for performance indicators is underdeveloped, limiting its effectiveness in tracking the project's progress. KPIs are poorly defined, outdated, or lack relevance to the project's current goals. Data collection is sporadic or unreliable, resulting in limited or inconsistent reporting with limited standardizing data collection.
1	Does not exist/ not developed	There is no structured system for monitoring performance indicators in place. This absence creates a significant gap in the monitoring and evaluation framework, impeding effective project management and adaptation. Immediate action is needed to develop and implement a comprehensive system to monitor, analyze, and report on key performance indicators.

4) Monitoring & Evaluation		
c) Environmental impact tracking		
Score	Performance Level	Description
5	No improvement	The environmental impact tracking system is comprehensive and highly effective, covering all critical areas such as water quality, air quality, soil health and stability, and biodiversity. The system collects real-time data and provides detailed, accurate reports that allow for quick responses to any potential environmental risks. Indicators are relevant and aligned with regulatory requirements, project goals, and stakeholder expectations. The tracking process includes regular audits, transparent reporting, and seamless data accessibility for all involved parties. The environmental impact tracking system is fully optimized, delivering actionable insights and upholding high standards of environmental accountability.
4	Minimal improvement	The environmental impact tracking system is well-developed and effectively captures most of the essential data related to the project's environmental footprint. It includes robust monitoring of key indicators, though minor refinements are needed for the clarity of data presentation or frequency of updates. The system is aligned with regulatory standards, and stakeholder access to reports is generally good, though a slight increase in data transparency or visualization could further enhance understanding.
3	Some improvement	The environmental impact tracking system is functional but has some areas that need attention. Critical areas such as water quality, air quality, soil health, and biodiversity are almost covered. Major indicators are tracked, though a few critical metrics may be missing, or the frequency and consistency of data collection could be improved. While the system aligns with some regulatory standards, it falls short of transparency or timeliness. Reports lack detail, making it harder to interpret environmental impacts comprehensively.
2	Significant improvement	The environmental impact tracking system is in place but is significantly underdeveloped, with major gaps that reduce its effectiveness. Critical areas such as water quality, air quality, soil health, and biodiversity are not covered. Key environmental indicators are inconsistently monitored or lack clear definitions, resulting in unreliable or incomplete data. Substantial enhancements are required to create a functional and reliable environmental impact tracking framework.
1	Does not exist/ not developed	There is no system in place for tracking environmental impacts, which creates a significant oversight in the project's monitoring framework. The project's effects on the environment, assessing compliance with regulations, or responding to potential environmental risks are not measured. This lack of tracking prevents effective environmental management and undermines the project's accountability to stakeholders and regulatory bodies.

4) Monitoring & Evaluation		
d) Stakeholder feedback mechanisms		
Score	Performance Level	Description
5	No improvement	The stakeholder feedback mechanisms are fully optimized, providing an effective, transparent, and well-organized platform for stakeholders to share their feedback. Feedback is easy to submit, and stakeholders receive prompt acknowledgement and follow-up on their concerns. The system includes a variety of channels (e.g., surveys, regular meetings, online portals) to accommodate different stakeholder preferences. Overall, the feedback mechanisms meet high standards of engagement.
4	Minimal improvement	The stakeholder feedback mechanisms are well-implemented and generally effective, though they could benefit from small refinements. Feedback is regularly collected through multiple channels, and stakeholders generally feel heard and involved. However, minor improvements, such as adding more follow-up on feedback outcomes or enhancing communication frequency, could further strengthen the system. Minor adjustments are required to enhance communication effectiveness and increase stakeholders' confidence in the responsiveness of the process.
3	Some improvement	The stakeholder feedback mechanisms are functional but could use several improvements to ensure they meet the project's engagement goals. While feedback channels are available, they are not fully accessible or utilized, leading to occasional stakeholder dissatisfaction or feelings of being unheard. Feedback collection is not frequent or diverse enough to capture a wide range of perspectives.
2	Significant improvement	The stakeholder feedback mechanisms exist but are underdeveloped and lack effectiveness. Their input is not valued. The system lacks essential channels, such as structured surveys or scheduled meetings, and feedback response times are often delayed. There is also little evidence that feedback is actively integrated into project planning or management.
1	Does not exist/ not developed	There are currently no stakeholder feedback mechanisms in place, which represents a critical gap in the project's engagement strategy. Stakeholders have no formal way to provide input, voice concerns, or feel involved in the project's development. The establishment of a comprehensive stakeholder feedback system is urgently needed to support project transparency and community engagement.

4) Monitoring & Evaluation		
e) Risk and issue tracking		
Score	Performance Level	Description
5	No improvement	The risk and issue tracking system is fully developed and highly effective, ensuring that all risks and issues are consistently identified, monitored, and addressed in real-time. The system includes detailed risk assessments, categorization, and prioritization, allowing for proactive management. Risks and issues are documented with clear action plans and assigned ownership, and there is excellent transparency and accountability in tracking their progress. Regular updates are provided, and the system is flexible enough to adapt to new risks or issues as they emerge.
4	Minimal improvement	The risk and issue tracking system is well-established and mostly effective, though minor adjustments could enhance its performance. Risks are regularly reviewed, and issues are systematically documented, but slight improvements could be made in areas such as increasing the frequency of updates or providing more thorough documentation on low-priority risks. Overall, the system meets most needs effectively, with minimal refinements required to optimize performance.
3	Some improvement	The risk and issue tracking system is functional but has several areas that need improvement. While some risks and issues are tracked, there are inconsistencies in documentation, prioritization, or follow-up actions. The system could benefit from clearer risk classification and an improved escalation process for high-impact issues. Moderate improvements, such as adding a more systematic approach to risk assessment and regularly updating risk status, are absent, decreasing the system's effectiveness.
2	Significant improvement	The risk and issue tracking system exists but is underdeveloped, leading to gaps in risk identification, documentation, and response. Risks and issues are tracked inconsistently, with limited documentation or follow-up on mitigation actions. High-impact risks are not adequately prioritized, and the system lacks ownership assignment or accountability measures, causing delays in resolution.
1	Does not exist/ not developed	There is currently no risk and issue tracking system in place, which represents a major oversight in project management. Without a formal tracking system, risks and issues may go unidentified or unaddressed, leading to potential project delays or failures. The absence of a risk and issue tracking system is a critical gap that requires urgent attention.

4) Monitoring & Evaluation		
f) Adaptive management		
Score	Performance Level	Description
5	No improvement	The adaptive management approach is highly effective, allowing the project to respond flexibly to changing conditions and emerging challenges. The system includes a well-defined framework for continuously monitoring project outcomes and implementing iterative adjustments to strategies as needed. Stakeholder feedback, environmental data, and performance indicators are regularly reviewed and integrated into decision-making. The project team has a clear process for revisiting objectives and management actions, ensuring that adjustments are data-driven and timely.
4	Minimal improvement	The adaptive management framework is largely effective, enabling the project to make necessary adjustments based on monitoring results and changing conditions. The system includes periodic reviews and allows for some flexibility in response to new information. However, minor improvements could be made, such as increasing the frequency of reviews or enhancing data collection methods to inform adaptations. A few adjustments in stakeholder communication could also ensure that all involved parties are aligned with changes.
3	Some improvement	The adaptive management approach is functional but requires several improvements to ensure that it effectively supports responsive project management. While the system allows for some adjustments, there are inconsistencies in how often reviews are conducted or how changes are implemented. The framework may benefit from better-defined processes for gathering and analyzing data, as well as clearer guidelines on when and how to make strategic adjustments.
2	Significant improvement	The adaptive management approach is underdeveloped, with significant limitations in its ability to respond effectively to new information or unforeseen challenges. Reviews of project outcomes are infrequent, and there are limited mechanisms in place to guide responsive decision-making. Data collection is inconsistent or insufficient to support timely adjustments, and communication on adaptive actions may lack clarity. Major improvements are necessary, including establishing regular review cycles and creating a structured process for adapting strategies.
1	Does not exist/ not developed	There is currently no adaptive management framework in place, resulting in a static approach that does not allow for adjustments based on changing conditions or new information. Without a structured process for adaptation, the project is vulnerable to risks associated with unforeseen challenges or evolving environmental and social contexts. The absence of adaptive management also limits the project's ability to achieve optimal outcomes, as it cannot respond flexibly to feedback or performance data.

5) Post- rehabilitation assessment		
a) Final outcome evaluation		
Score	Performance Level	Description
5	No improvement	The final outcome evaluation comprehensively confirms that all rehabilitation objectives have been met. Environmental conditions are restored to or improved beyond pre-mining levels, with sustainable vegetation, stable soil, and minimal residual impacts. All data aligns with expected outcomes, and community satisfaction and compliance with regulatory requirements are high.
4	Minimal improvement	The final evaluation demonstrates that most objectives are met, with minor areas needing refinement. Environmental and community goals are largely achieved, but slight adjustments in monitoring or minor replanting in specific areas may enhance long-term sustainability. No major issues are present, and compliance is largely complete.
3	Some improvement	Outcomes largely align with goals, but moderate gaps exist in specific areas (e.g., uneven vegetation cover). The evaluation shows moderate success in achieving rehabilitation goals, with certain areas not fully restored. There are observable environmental concerns (e.g., partial soil erosion and sparse vegetation) that need further attention. Community and regulatory feedback indicate areas for improvement, and some rework in specific sections may be required.
2	Significant improvement	The final evaluation highlights significant gaps in meeting rehabilitation goals. Environmental conditions are only partially restored, with prominent issues in soil stability or vegetation cover. Community and regulatory concerns are evident, indicating the need for major corrective actions to achieve the intended outcomes.
1	Does not exist/ not developed	The final outcome evaluation process is incomplete or lacks sufficient data, preventing a reliable assessment. Rehabilitation objectives have not been met, with environmental conditions far from pre-mining baselines. Significant issues with soil, vegetation, or residual contamination remain, requiring a comprehensive re-evaluation and substantial effort to meet standards.

5) Post- rehabilitation assessment		
b) Post-rehabilitation risk assessment		
Score	Performance Level	Description
5	No improvement	The post-rehabilitation risk assessment thoroughly identifies, evaluates, and addresses all potential risks. The assessment confirms that the land is stable, safe, and meets environmental standards, with no significant hazards remaining. Monitoring protocols are in place to detect future risks, and all findings align with regulatory expectations, ensuring sustainability with no further improvements needed.
4	Minimal improvement	The risk assessment effectively identifies most potential risks, with only minor residual issues requiring attention. Monitoring systems are largely effective, though minor improvements (such as additional check-ups in certain areas) could enhance early risk detection. The land is considered stable and safe, with minimal adjustments needed for full confidence.
3	Some improvement	Most risks have been mitigated, but a few residual risks need addressing to ensure long-term stability. The assessment identifies key risks but misses some areas of potential concern. There are moderate issues, such as minor erosion or localized contamination, which need addressing. Monitoring systems are in place but require enhancement to cover all risk factors fully. Additional evaluation or minor corrective actions are recommended.
2	Significant improvement	The assessment is incomplete or lacks detail in addressing significant risks, such as erosion control or contamination, posing potential safety or environmental hazards. Major improvements are required to ensure land stability and long-term usability, and substantial corrective action are necessary to address ongoing risks.
1	Does not exist/ not developed	No comprehensive post-rehabilitation risk assessment is available, leaving potential environmental and safety risks unaddressed. Key issues such as erosion, contamination, or stability have not been evaluated, creating considerable risk for long-term land usability. Immediate development of a thorough risk assessment process is necessary to ensure compliance and safety.

5) Post- rehabilitation assessment		
c) Sustainability of rehabilitation outcomes		
Score	Performance Level	Description
5	No improvement	The rehabilitation outcomes are fully sustainable, with all environmental, structural, and biological aspects stabilized. The restored land meets or exceeds sustainability criteria, with thriving ecosystems and effective water management systems. Long-term monitoring has demonstrated no issues with erosion, contamination, or biodiversity loss. No further interventions are needed.
4	Minimal improvement	Sustainability mechanisms are mostly in place, but minor improvements could help maintain outcomes over time. The rehabilitation outcomes are largely sustainable, with only minor adjustments required for optimal long-term stability. Minor tweaks to vegetation management or water control could further strengthen sustainability. Overall, the area is stable and on track for long-term success, but only small adjustments are needed to ensure full resilience.
3	Some improvement	The rehabilitation outcomes are generally sustainable, but some aspects show potential long-term risks, such as minor erosion or initial signs of ecosystem imbalance. Improvements are needed, possibly in soil stability or plant diversity, to ensure the area's future resilience. Additional resources and corrective actions will enhance sustainability.
2	Significant improvement	The rehabilitation outcomes show limited sustainability, with signs of erosion, waterlogging, or vegetation loss that could jeopardize long-term stability. Major improvements, such as erosion control, additional planting, or water management infrastructure, are necessary to ensure sustainable outcomes. Substantial follow-up action is required to secure the land's viability.
1	Does not exist/ not developed	The rehabilitation outcomes are not sustainable, with serious ongoing environmental or structural issues. Key areas are degraded, risking contamination or habitat loss, and immediate corrective measures are essential. The site does not meet sustainability criteria, and a comprehensive reassessment and intervention plan are urgently required.

5) Post- rehabilitation assessment		
d) Long-term stakeholder satisfaction		
Score	Performance Level	Description
5	No improvement	Stakeholders are fully satisfied with the rehabilitation outcomes, meeting or exceeding all expectations. There is strong, ongoing support from local communities, regulatory agencies, and environmental organizations, with no significant concerns or complaints. The project has established a positive reputation and trust among stakeholders, demonstrating long-term benefits and alignment with stakeholder values.
4	Minimal improvement	Stakeholders are largely satisfied with the rehabilitation outcomes, though minor adjustments could further enhance satisfaction. Small changes in communication or specific environmental enhancements are needed to address minor feedback. Overall, stakeholders feel positively, with strong trust and support for the project outcomes, but see room for slight improvement.
3	Some improvement	Stakeholders show moderate satisfaction, but there are some areas of concern or unmet expectations. Specific improvements in environmental quality, transparency, or community engagement are needed to increase satisfaction. While there is general support, some stakeholders voice concerns or request additional actions to ensure their needs are fully met.
2	Significant improvement	Stakeholders express low satisfaction, with noticeable concerns regarding the outcomes. Significant improvements in areas such as communication, environmental quality, or social impact are necessary to meet stakeholder expectations. Stakeholders have reservations about the long-term benefits of the project, and there is a risk of eroding trust if key issues remain unaddressed.
1	Does not exist/ not developed	Stakeholders are very dissatisfied with the rehabilitation outcomes, with major concerns that require immediate attention. Key stakeholders feel that their needs and expectations are disregarded, leading to significant trust issues or even formal complaints. Urgent measures are needed to rebuild relationships, improve transparency, and address stakeholder concerns to prevent lasting damage to the project's reputation.

5) Post- rehabilitation assessment		
e) Long-term monitoring plan		
Score	Performance Level	Description
5	No improvement	The monitoring plan is highly robust, providing extensive, long-term data collection on environmental and social impacts. It covers all key indicators (e.g., soil quality, water resources, biodiversity, social impact) with clear schedules and stakeholder involvement. Data collection is fully funded and technologically supported, ensuring consistent monitoring over decades. There is a high level of confidence in its ability to detect any issues promptly, allowing for immediate intervention if necessary.
4	Minimal improvement	The monitoring plan is largely effective, with most key indicators included and a well-defined timeline. There are minor gaps in certain indicators or slight limitations in funding, but overall, it is reliable for the long term. Improvements could focus on expanding specific data collection areas or increasing engagement with stakeholders to further enhance monitoring effectiveness.
3	Some improvement	Monitoring plans are in place but lack comprehensive detail or resources for effective long-term tracking. The plan includes most essential indicators, but some are either under-monitored or lack clear timelines. There are moderate funding and resource limitations, which lead to occasional gaps in data collection. While adequate for basic monitoring, enhancements in technology, scope, and consistency would improve its reliability and usefulness for early detection of post-rehabilitation issues.
2	Significant improvement	The plan has significant limitations in coverage and consistency, with only a few key indicators regularly monitored. Resource constraints significantly affect data collection frequency and quality, reducing its usefulness for long-term impact assessment. There is a higher risk of delayed detection of issues, and stakeholders may lack confidence in monitoring outcomes.
1	Does not exist/ not developed	The monitoring plan is insufficient, lacking critical indicators and a clear schedule. Funding and resources are severely limited, making it nearly impossible to track rehabilitation outcomes effectively. There is a high likelihood that potential post-rehabilitation issues will go undetected until they escalate. Immediate restructuring and resource allocation are needed to ensure effective monitoring.

5) Post- rehabilitation assessment		
f) Adaptation for unexpected changes		
Score	Performance Level	Description
5	No improvement	The project demonstrates exceptional flexibility, with well-defined protocols for adapting to unexpected changes. There is a clear system for regular reassessment and resource reallocation, allowing for swift response to new challenges, whether environmental, social, or regulatory. This level also includes a strong framework for stakeholder feedback, which enables quick identification of emerging issues. The team is trained and prepared to modify plans seamlessly, ensuring long-term project success.
4	Minimal improvement	Adaptation strategies are mostly established, though slight improvements could further enhance adaptability. The project has a robust framework for adapting to unforeseen changes, covering most scenarios effectively. Some minor improvements could be made in specific areas, such as expanding contingency plans for extreme events or securing additional funding sources for adaptive responses.
3	Some improvement	The project has a basic framework for handling unexpected changes but could benefit from a more comprehensive approach. Key risks are addressed, but there is limited flexibility in funding, resource allocation, or decision-making. There are occasional reviews and stakeholder feedback loops, but these could be more frequent or in-depth.
2	Significant improvement	Adaptation capabilities are limited, with major gaps in planning and resource allocation for unexpected changes. Contingency plans are either underdeveloped or lack the necessary resources for effective implementation. Stakeholder involvement in decision-making is minimal, and there are few mechanisms for continuous improvement based on emerging risks. This level would benefit greatly from additional resources and structured adaptability frameworks.
1	Does not exist/ not developed	The project is highly rigid, with little or no capacity to respond to unforeseen changes. There is a lack of contingency planning, funding, and stakeholder input, making the project vulnerable to failure if unexpected challenges arise. Urgent restructuring is needed to build flexibility and adaptability, including developing specific contingency plans, securing adaptable funding sources, and establishing regular feedback mechanisms.