

# Closure disclosure—mine closure planning and reporting through an ESG lens

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## Abstract

*ESG (Environment, Social, Governance) is fundamentally a tool to measure business risk and opportunity. Companies that understand how ESG factors can impact or influence their business are generally more attractive to those that want to invest in an ethical manner than companies that do not have this insight. Most mining companies with shareholders and investors routinely consider and report on ESG factors in relation to mining operations, but it is not as common to consider mine closure through an ESG lens.*

*The term 'ESG' relates to a framework of indicators that can be used to measure the sustainability and ethical impact of a company or investment as a way of mitigating business risks and identifying new business opportunities. Mining companies are progressively seeking alignment with key ESG values, and investors are increasingly prioritising ESG in their investment appraisals. However, investors can only reward solid ESG performance if they can access the right information to inform due diligence assessments and investment decisions. Investors usually refer to corporate sustainability reports during such assessments, but these often contain only data on rehabilitation footprints. By comparison, many ESG disclosure frameworks require mine closure information, but many mining companies do not consider mine closure risks as material and therefore do not include this the information in their disclosures and associated reporting.*

*This paper discusses how selected sustainability and ESG disclosure frameworks address mine closure. These comprise the Global Reporting Initiative's Sustainability Reporting Standards, the Sustainability Accounting Standards Board's Sustainability Standards, the Task Force on Climate-related Financial Disclosures, the Carbon Disclosure Project and the International Council on Mining and Metals' Sustainable Development Framework, along with the recently adopted Post-2020 Global Biodiversity Framework. The way in which 12 mining and mineral processing companies have addressed mine closure under these frameworks in their sustainability and ESG reports is also discussed, along with observations on mine closure planning, implementation and reporting through an ESG lens including promotion of closure credentials when reporting to investor-recognised frameworks.*

**Keywords:** *ESG, sustainability reporting, mine closure, disclosure frameworks, climate-related financial disclosures, biodiversity, nature-positive*

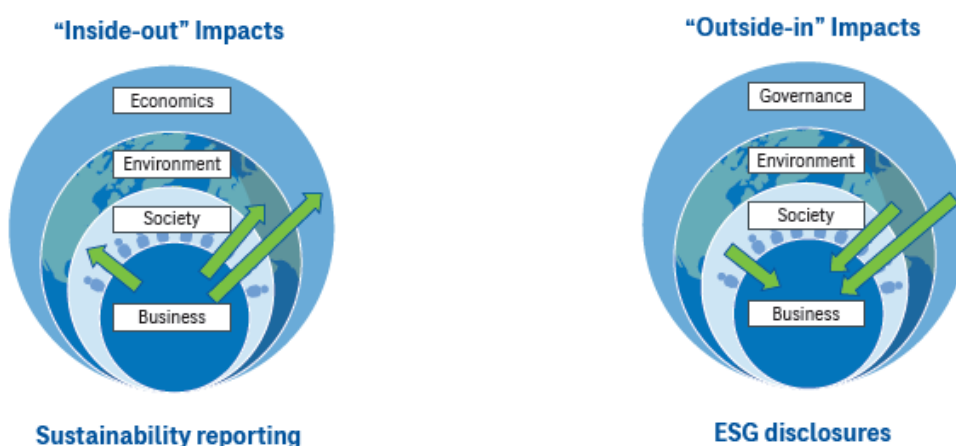
## 1 Introduction

It has become increasingly common to use the terms 'sustainability' and 'Environment, Social, Governance' (ESG) interchangeably, particularly as the rise of ESG in recent years has somewhat overshadowed sustainability itself (Pollard & Bebbington 2022). Sustainability and ESG are related concepts, but have different focus and somewhat varied scopes (Table 1). Sustainability is the practice of operating a business in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development 1990). Sustainability is based on three fundamental pillars: environment, society and economics. By comparison, ESG considers indicators for ethical investment and assesses the level to which a company addresses environmental, social and governance (rather than economic) factors, and how these factors affect its risk profile and value as an investment.

**Table 1 Comparison of sustainability and ESG**

Aspect	Sustainability	ESG
Focus	Impacts <i>of</i> a business or operation	Impacts <i>to</i> a business or operation
Audience	Non-Government Organisations, communities, employees, suppliers and clients	Investors, analysts and regulators
Indicators	Environmental Social Economic	Environmental Social Governance
Metrics	Metrics relevant to environmental, social and economic impacts of an organisation’s activities such as pollution, waste, discharges to water bodies, habitat clearing, heritage impacts and greenhouse gas emissions (i.e., ‘inside out’ impacts)	Metrics relevant to financial stakeholders such as climate resiliency, workforce diversity and inclusiveness, decision making, transparency, board diversity, supply chain practices and regulatory compliance (i.e., ‘outside in’ impacts)
Reporting and disclosure	Identifies and assesses those environmental, social and economic impacts and benefits resulting from a company’s practices, performance and outcomes.	Identifies and assesses those factors that could adversely affect or benefit a company’s practices, performance and outcomes, and make it an attractive (or otherwise) investment

Perhaps the simplest way to distinguish between sustainability and ESG is to consider impact: sustainability focuses on how a company (or investment) impacts the world, whereas ESG looks at how the world impacts a company or investment (Brightest Inc 2023). In other words, sustainability focuses on ‘inside-out’ impacts while ESG focuses on ‘outside-in’ impacts (Figure 1).



**Figure 1 Sustainability focuses on inside-out impacts while ESG focuses on outside-in impacts. Modified from Willard (2022)**

With sustainability, a broad range of external stakeholders want to know whether there is potential for a company’s activities to cause environmental, social and economic impacts (both positive and adverse), while with ESG, what lenders and investors want to know is whether a company is at risk from environmental, social and/or governance impacts on the business. In other words, ESG is essentially a tool to measure

business risk and opportunity. If the company is at risk, investors are likely to be more cautious about providing capital to that company (Willard 2022). However, companies that understand how ESG factors can affect or influence their business are generally more attractive to those that want to invest in an ethical manner than companies that do not have this insight. For example, a survey of 325 global investors conducted by PricewaterhouseCoopers (PwC) in September 2021 found that nearly 80% of those surveyed considered ESG to be an important factor in their investment decision-making (Chalmers et al. 2021). Similarly, a survey of 1,130 global investors conducted by Capital Group in early 2022 found that 89% of those surveyed were ESG users (up from 84% in 2021).

ESG has been growing in prominence in the past few years and was identified as the key business risk for mining and metals in 2022 (Ernst & Young [EY] 2021, Campbell & Tivey 2022), and again in 2023 (EY 2022). This focus is being fuelled by client expectations or demands, reputational concerns, ESG visibility in the media (which keeps issues such as climate change at the forefront of investors' minds) and concerns about greenwashing (Capital Group 2022). Capital costs can also be higher for mining companies with lower ESG scores, with a recent report by McKinsey suggesting that the cost of capital could be up to 25% higher for those organisations with the lowest ESG scores (Legge et al. 2021). Further, mining companies with better ESG performance have delivered materially higher shareholder returns in recent years than the wider market (PwC 2021, Davies et al. 2023). However, investors can only reward solid ESG performance if they can access the right information to inform due diligence assessments.

ESG reporting is the disclosure of ESG performance to stakeholders including investors, employees, regulators and customers, and addresses an organisation's 'outside-in' impacts (i.e., the way in which environmental, social and governance factors can affect business performance and other aspects). ESG disclosure is voluntary, but has become a standard requirement for investors and other stakeholders amid growing pressure to improve ESG reporting and transparency (Mitchell 2022, HSBC 2023). ESG frameworks include the Task Force on Climate-related Financial Disclosures (TCFD), which is one of the most widely used and recognised.

In addition to ESG reports and disclosures, investors often also refer to corporate sustainability reports even though these are intended for other stakeholders such as Non-Government Organisations (NGOs) (Patel 2022) as they address an organisation's 'inside-out' impacts. Sustainability reporting frameworks include the Global Reporting Initiative (GRI) which is another widely used and recognised reporting framework, along with the International Council on Mining and Metals (ICMM) Sustainable Development Framework.

Numerous reporting frameworks exist and are used by the mining and mineral processing industry. Six frameworks are discussed in this paper: the GRI Sustainability Reporting Standards, the Sustainability Accounting Standards Board (SASB) Standards, the ICMM Sustainable Development Framework, the TCFD, the Climate Disclosure Project (CDP) and the recently adopted Post-2020 Global Biodiversity Framework (GBF). The intent of these frameworks and the way in which they address mine closure is discussed in Section 2. Ways in which mining companies have addressed mine closure under these frameworks are discussed in Section 3 along with observations on mine closure planning, implementation and reporting through an ESG lens.

## 2 Selected reporting frameworks

### 2.1 GRI sustainability reporting standards

The GRI was founded in Boston in the United States of America in 1997 after the public outcry that followed the Exxon Valdez oil spill in 1989. The GRI's aim was to develop the first accountability mechanism to ensure that companies take responsibility for their impacts and to establish a global and common language through which organisations can communicate those impacts which in turn enables informed dialogue and decision-making regarding those impacts (GRI 2023a). The GRI Standards are currently the most comprehensive and

widely accepted of sustainability reporting standards and allow organisations to understand and publicly report on the impacts of their activities on the economy, environment and community in a structured manner. Use of the GRI Standards facilitates public reporting in a comparable and credible way, which in turn increases transparency on an organisation's contribution to sustainable development.

There are three categories of GRI Standards: Universal Standards which apply to all organisations and provide general information about the purpose and application of the standards including how to determine the topics most relevant to an organisation's impacts; Sector Standards which increase the quality, completeness and consistency of reporting by organisations on sector-specific impacts; and Topic Standards which list disclosures relevant to a particular topic (GRI 2023b). The Sector Standard for mining is still in development but the draft released for public comment identifies 25 topics as likely to be material for mining organisations, including closure and rehabilitation (Topic 14.8). Under the draft standard, if an organisation determines closure and rehabilitation to be a material topic then it is required to disclose information on whether a closure and rehabilitation plan is in place for each mine site, whether the sites are undergoing closure and rehabilitation activities, and whether the sites have been closed and rehabilitated.

Despite the Sector Standard for mining being in preparation, GRI standards are currently used to disclose information on the intended closure outcomes, strategies for land rehabilitation and reclamation, and timelines for closure activities. GRI standards also emphasise stakeholder engagement with companies using these guidelines to report on their engagement efforts during mine closure including how they have involved local communities, Indigenous groups and other relevant stakeholders in the closure planning process, thereby demonstrating their commitment to inclusive decision-making, fostering trust and collaboration with local communities. GRI standards also facilitate reporting on the environmental impacts of mining activities and the measures taken for rehabilitation. Companies often report on aspects such as soil erosion control, water management, biodiversity recovery and the use of sustainable practices during closure efforts.

## 2.2 ICMM Sustainable Development Framework

In 2003, the ICMM published its 10 Principles for Sustainable Development to set a standard for ethical performance for its member organisations. These principles define good practice ESG requirements for members and relate to ethical business, decision making, human rights, risk management, health and safety, environmental performance, conservation of biodiversity, responsible production, social performance and stakeholder engagement. These principles have been updated and enhanced over time and currently comprise 39 performance expectations supported by eight position statements. Further, the ICMM has defined assurance and validation requirements (ICMM 2023).

The ICMM addresses mine closure through its 10 Principles, providing guidance and best practices for member companies, specifically in the mining industry. The ICMM is explicit that responsible mine closure is a critical component of sustainable mining practices, promoting the importance of effective closure planning, stakeholder engagement and long-term site management. In particular, Principle 6 (Environmental Performance) requires that member organisations 'plan and design for closure in consultation with relevant authorities and other stakeholders, implement measures to address closure-related environmental and social aspects, and make financial provision to enable agreed closure and post-closure commitments to be realised' (ICMM 2022a).

The ICMM's Sustainable Development Framework emphasises the need for comprehensive mine closure plans that are developed and implemented throughout a mine's lifecycle. It encourages companies to proactively assess closure risks and impacts, develop closure objectives and strategies, and establish appropriate closure milestones and targets. Further, the ICMM recognises the significance of engaging with stakeholders throughout the mine closure process. It encourages companies to consult and involve local and Indigenous communities, government authorities and other relevant stakeholders to ensure their perspectives and concerns are considered. In addition, the development of financial mechanisms is encouraged to ensure that sufficient funds are set aside to cover closure costs and post-closure monitoring

and maintenance, with guidance provided on estimating closure costs, establishing financial instruments and integrating financial planning into closure strategies (ICMM 2019).

Despite being a forerunner in mine closure and sustainable development, some opportunities do exist to strengthen the effectiveness of the ICMM's Sustainable Development Framework by providing additional guidance on incorporating adaptive management and progressive rehabilitation as well as standardised metrics. Notwithstanding the nuanced approaches to mine closure, metrics could be developed to aid the assessment and effectiveness of a company's rehabilitation activities to benchmark its performance against industry peers. Standardised metrics would facilitate comparability and transparency in reporting, enabling stakeholders to evaluate and monitor companies' progressive rehabilitation performance. The ICMM could also consider enhancing its guidance on meaningful participation, capacity-building and the incorporation of traditional knowledge in closure decision-making processes. Additionally, clearer recommendations on financial assurance and governance mechanisms would enhance industry-wide consistency and promote transparency in financial planning for closure.

In addition to Sustainable Development Framework, it is worth mentioning that in 2022, the ICMM released its framework and guidance for social and economic reporting. The goal of this framework, which builds on existing frameworks including GRI, is to ensure that all ICMM members report consistently on their social and economic activities and contributions. It is anticipated that through these disclosures, members will be able to 'assess and strengthen the delivery of the social and economic contribution in their communities and provide consistent information to stakeholders' (ICMM 2022b). Although this framework appears to focus mainly on social and economic contributions made during site operations, it could also be applied to the closure and post-closure phases. This would help address concerns that little is known about the social and economic liabilities that accompany mine closures including demographic changes, economic dependence and impacts on sustainable livelihoods despite the way in which these legacies will invariably influence mine closure outcomes (Bainton & Holcombe 2018).

### 2.3 SASB standards

The SASB was established to help businesses and investors develop a common language regarding the financial impacts of sustainability which means that it would more appropriately fall under the banner of ESG rather than sustainability. The standards were developed to connect business and investors on the financial impacts of sustainability by guiding the disclosure of financially-material sustainability information by companies to their investors (SASB 2023). They identify those sustainability-related risks and opportunities most likely to affect a company's financial condition (i.e., its balance sheet), risk profile (i.e., its market evaluation and cost of capital) and operating performance (i.e., its income statement) (Nemeth 2021).

The SASB Standards identify the minimum set of sustainability issues most likely to impact the operating performance or financial condition of a typical company within 77 industries. In this context, the SASB uses the term 'sustainability' to refer to corporate activities that maintain or enhance the ability of the company to create value over the long term. The SASB also refers to sustainability as ESG though corporate governance issues such as board composition are not included (SASB 2021a). As the standards are industry-based rather than issue-based, there is no specific standard relating to closure requirements and disclosures. Instead, closure is addressed in the relevant industry-specific standards. For example, both the Metals & Mining Sustainability Accounting Standard (SASB 2021a) and the Coal Operations Sustainability Accounting Standard (2021b) require that a company describe the implementation of plans to manage biodiversity impacts at active sites for all relevant life cycle stages including closure, decommissioning and restoration.

The International Sustainability Standards Board (ISSB), an initiative by the IFRS Foundation, has now been established so that a global sustainability reporting standard can be developed. The goal is to build on existing standards and frameworks (such as SASB's industry-specific standards) to create a unified and coherent set of global sustainability reporting standards. The ISSB's objective is to establish a framework that provides consistent, comparable and reliable information on sustainability performance and impacts which can be

used by companies, investors, and other stakeholders globally. The integration of SASB into the ISSB is expected to bring industry-specific expertise and knowledge into the development of the global sustainability reporting standards. This collaboration aims to harmonise existing standards and frameworks, promote standardisation and facilitate the disclosure of financially-material sustainability information (SASB 2023).

## 2.4 Task force on climate-related financial disclosures

The TCFD was established by the Financial Stability Board (FSB), an international body that monitors and makes recommendations about the global financial system, and primarily focuses on the disclosure of climate-related risks and opportunities for companies. The mandate of the TCFD is to develop recommendations for consistent and comparable climate-related financial disclosures by companies to support lenders, investors and insurance underwriters in appropriately assessing and pricing risks related to climate change (TCFD 2023).

The TCFD's recommendations were released in June 2017 and cover a wide range of industries and sectors. The TCFD operates under the guidance of the FSB and aims to help companies, investors and other stakeholders make informed decisions by enhancing the transparency of climate-related risks and opportunities. By providing guidance on reporting frameworks, metrics, and methodologies, the TCFD aims to improve the quality, consistency and comparability of climate-related disclosures. The voluntary nature of the recommendations allows companies to determine how best to integrate climate-related financial disclosures into their existing reporting frameworks. The TCFD actively engages with stakeholders, monitors market developments, and provide ongoing support and guidance for the implementation of its recommendations (TCFD 2017a, TCFD 2017b).

The TCFD's recommendations are structured around four core elements relating to how organisations operate: Governance, Strategy, Risk Management and Metrics and Targets (TCFD 2017a). Although none of these recommendations specifically refer to closure, the TCFD may indirectly influence mine closure. For example, the TCFD's Governance requirement emphasises the integration of climate-related considerations into strategic decision-making. By incorporating climate-related risks and opportunities into overall corporate strategies, companies can ensure that mine closure planning is aligned with climate goals and sustainability objectives. This may enable more proactive and comprehensive approaches to closure, which consider climate-related factors from the outset. Governance also requires robust risk management practices related to climate change.

Applying the Strategy requirement of TCFD to mine closure could enable companies to identify and assess climate-related risks associated with closure activities. By considering factors such as potential impacts on water resources, land stability and regulatory changes, companies can develop mitigation strategies and contingency plans to minimise risks and liabilities during closure. By identifying and analysing these risks, companies can develop adaptive management plans to enhance closure performance in the face of climate-related challenges. By considering future climate scenarios and their potential impacts on closure activities, companies can design closure plans that are resilient and adaptable to changing climatic conditions, ensuring the long-term success of rehabilitation efforts.

The TCFD Risk Management requirement encourages the integration of climate-related risks into overall risk management processes. For mine closure, this could encourage the integration of climate-related risks into closure planning, decision-making and operational practices. Companies can integrate climate considerations into closure risk registers, closure planning frameworks and monitoring systems.

The TCFD framework makes explicit the need for ongoing monitoring and review of climate-related risks and mitigation strategies. This entails implementing robust monitoring systems to track climate-related risks and their potential impacts on closure activities. Closure plans would benefit from regular reviews that would enable companies to assess the effectiveness of risk mitigation measures, identify emerging risks and make

necessary adjustments to closure plans. This iterative process could contribute to closure performance by enabling companies to remain aligned with evolving climate-related challenges.

By adopting TCFD principles and applying them to closure planning, companies may be able to improve their overall closure performance, address climate-related risks more effectively, ensure adequate financial provisions and contribute to sustainable post-closure outcomes. This could act as a catalyst for proactive and responsible mine closure practices, aligning closure objectives with broader climate and sustainability goals.

## 2.5 Carbon disclosure project

The Carbon Disclosure Project (CDP) is a global disclosure system for environmental information including carbon emissions, forestry and water usage. The CDP has gained prominence as a widely recognised environmental disclosure system with more than 18,700 companies disclosing through the CDP in 2022 (CDP 2023a).

The CDP incorporates mine closure requirements within its framework specifically via CDP's questionnaire for the mining sector that includes mine closure and rehabilitation. Companies are requested to disclose information related to their policies and practices related to mine closure and rehabilitation, as well as specific data related to the closure of mining operations. The questionnaire requires the disclosure of relevant information regarding company policies, practices and financial provisions for mine closure and rehabilitation. By posing these specific questions, the CDP prompts companies to disclose and ultimately address critical aspects of closure such as policy frameworks, stakeholder engagement, estimated closure costs, and restoration of biodiversity and ecosystems. The inclusion of mine closure requirements within the CDP questionnaire serves as a positive step towards promoting and fostering responsible closure practices. Through their mandate on mine closure disclosures, the CDP emphasises the importance of transparent reporting on mine closure. The CDP therefore enables stakeholders to evaluate a company's commitment to sustainable mine closure practices and supports the identification of potential risks and opportunities associated with mine closure activities (CDP 2023a, CDP 2023b).

Future iterations of the CDP could explore more detailed indicators and metrics related to mine closure, which would in turn enable more accurate assessments of companies' closure performance and therefore mining liabilities on closure and beyond. There may also be the opportunity to incorporate specific best practices and industry standards within the CDP questionnaire framework. This would serve to improve comparability and benchmarking across mining companies, enable more discerning and detailed information gathering on mine closure by investors, while simultaneously enhancing mine closure performance standards to contribute to the overall improvement of mine closure practices.

## 2.6 Post-2020 Global Biodiversity Framework

In December 2022, the 15<sup>th</sup> meeting of the Conference of the Parties to the United Nations Convention on Biological Diversity (COP15) was in Montreal, Canada. This summit included extensive discussion on ways to guide global action on nature through to 2030 due to recognition that global biodiversity declined between 2011 and 2022, and that at a global level none of the 20 Aichi Biodiversity Targets agreed in 2010 had been fully achieved. Consequently, the conference determined that a new biodiversity framework was needed to achieve the United Nations (UN) Sustainable Development Goals (SDGs) (International Union for Conservation of Nature [IUCN] 2022). This agreement, known as the Kunming-Montreal Global Biodiversity Framework, was adopted on the last day of negotiations and aims to address biodiversity loss, restore ecosystems and protect Indigenous rights (IUCN 2022).

The GBF was signed by 196 nations so that urgent action could be taken to halt and reverse biodiversity loss by 2030 (IUCN 2023). It consists of four long-term goals for 2050 and 23 interim targets to achieve by 2030. Given the links between the climate and nature crises, IUCN (2022) advises that the GBF targets should be viewed as aligned to existing climate commitments.

The GBF is not legally binding, but investment in mining projects could be affected if investors include this framework within their capital allocation decision-making. For example, new policies being implemented by the COP15 may initiate assessment by investors and other parties of their involvement with mining companies which operate in locations with high biodiversity. However, the introduction of this new framework will likely see an increase in the number of mining companies that align with the new biodiversity targets and potentially move away from pursuing new projects in areas of significant biodiversity value (O’Kane Consultants 2023). Implications for the financial sector are outlined by IUCN (2023) and include an expectation that nature-related disclosures will become a core part of every corporation’s annual reporting, including financial institutions. Other financially related aspects include development of new valuation schemes such as payment for ecosystem services, biodiversity-related green bonds and biodiversity offsets or credits (Latham & Watkins 2023).

As the GBF was only adopted earlier this year, mining companies and other relevant parties are still working their way through the details. However, a significant way in which mining companies can align themselves to this new framework could be through integrated mine closure planning and progressive reclamation of mined areas. Integrated mine closure planning allows more flexibility in planning management of future impacts, builds collaboration and trust with impacted communities and other stakeholders, increases the likelihood of achieving the next land use and builds confidence in investors that operations are being planned and implemented in an ethical manner that still provides strong economic returns (O’Kane Consultants 2023).

### 3 Methodology

A desktop review was conducted by the authors of this paper to determine the extent to which mine closure has been addressed in recent (2022) publicly available sustainability reports and ESG disclosures by 12 mining companies. These companies are Allkem Limited (Allkem), Anglo American plc (Anglo), Glencore plc (Glencore), Kinross Gold Corporation (Kinross), Mineral Resources Limited (MinRes), Newcrest Mining Limited (Newcrest), Newmont Corporation (Newmont), Northern Star Resources Limited (NSRL), Pilbara Minerals Limited (PML), Regis Resources Ltd (Regis), Sandfire Resources Limited (Sandfire) and South32 Limited (South 32). The reports prepared by these companies and reviewed during this study are listed in Table 2 along with the standards and frameworks against which the companies reported. Where reference was made to other sustainability or ESG reports, this is cited within this paper.

In reviewing these reports, we considered seven topics including materiality, closure cost estimation and provisioning, allocation of responsibilities and data difficulties. Key findings are summarised in Section 4.

## 4 Key findings and discussion

### 4.1 Reporting under multiple frameworks

It is immediately apparent from our review of the reports listed in Table 2 that companies report and disclose against multiple sustainability and ESG frameworks in one annual sustainability report (note that the GBF has been excluded from this table as it was only adopted earlier this year). This can streamline reporting for the company and makes it easier for interested parties to access all the information as it is centrally located. However, if readers are not familiar with the relevant frameworks, then it can be difficult to know if pertinent information has been included or excluded which can make it difficult for readers to be confident that they can use the information effectively and efficiently in their own decision-making. This is addressed somewhat through inclusion of a content index for each of the standards against which reporting was conducted (GRI, SASB and TCFD), which most organisations do.

More than half of the reports reviewed were prepared by organisations that are members of the ICMM, as referenced in the ICMM’s Sustainable Development Framework (Table 2). For example, in its sustainability



report, Newcrest explicitly disclosed that it is part of ICMM’s Mine Closure Working Group and participates regularly ICMM’s guidance discussions and reviews (Newcrest 2022).

In addition to the standards and frameworks described in Section 2, most of the reports reviewed also considered other reporting frameworks including those published by the UN. For example, Regis briefly disclosed its closure efforts specifically in relation to SDG Goal 15: Life on Land regarding restoration and rehabilitation of terrestrial ecosystems affected by mining activities (Regis 2022). Reference was also made by several gold mining companies (Kinross, Newmont and Regis) to the World Gold Council (WGC) Responsible Gold Mining Principles (RGMP), which was released by the WGC in 2019. The RGMP provides a framework for gold mining companies to demonstrate their commitment to responsible mining practices across various areas (including environmental stewardship, social responsibility, governance and closure) and aims to establish a common set of standards and expectations for responsible gold mining.

**Table 2 Reporting and disclosure standards and frameworks against which reporting/disclosures were made in the reviewed reports**

Task	Report Reviewed	Reporting and Disclosure Standards and Frameworks					Other
		GRI Standards	ICMM Framework	SASB Standards	TCFD	CDP	
Allkem	2021-22 sustainability report (Allkem 2022)	✓		✓			UN Global Compact Reporting Framework and SDGs
Anglo American	2022 sustainability report (Anglo American 2023)	✓	✓				European Union Non-Financial Disclosure Directive UN Global Compact Reporting Framework UN Guiding Principles Reporting Framework
Glencore	2022 sustainability report (Glencore 2023)	✓	✓	✓	✓		UN SDGs Global Industry Standard for Tailing Management
Kinross	2022 ESG report (Kinross 2023)	✓		✓			UN Global Compact Reporting Framework and SDGs
MinRes	2021-22 sustainability report (MinRes 2022)	✓		✓			UN Global Compact Reporting Framework and SDGs
Newcrest	2021-22 sustainability report (Newcrest 2022)	✓	✓				UN SDGs
Newmont	2022 sustainability report (Newmont 2023)	✓	✓	✓	✓		UN Guiding Principles Reporting Framework Extractive Industry Transparency Initiative Expectations World Gold Council Responsible Gold Mining Principles
NSRL	2021-22 sustainability report (NSRL 2022)	✓	✓	✓	✓		UN SDGs
PML	2021-22 annual report (PML 2022)			✓			-
Regis	2021-22 sustainability report (Regis 2022)		✓	✓	✓	✓	World Gold Council Responsible Gold Mining Principles UN SDGs
Sandfire	2022 sustainability report (Sandfire 2023)	✓		✓	✓		-
South32	2022 sustainable development report (South32 2022)	✓	✓		✓		-

## 4.2 Allocation of responsibility

The International Federation of Accountants states that responsibility for the oversight of an organisation's sustainability and ESG matters lies firmly with the Board of Directors. There is a need for strong leadership and for Board members to have adequate sustainability and ESG literacy as they are responsible for ensuring that there is an understanding and alignment of sustainability and ESG priorities throughout the organisation; that sustainability and ESG matters are incorporated into the organisation's purpose, strategy, decision-making, risk management, governance and reporting; that appropriate targets and metrics have been identified and are being monitored; and that sustainability and ESG reporting is connected to, and is of the same quality, as financial information (Leka 2022).

While ESG is already part of each board member's fiduciary obligations to stockholders and those obligations cannot be delegated to others (Gates et al. 2022), how the Board discharges those responsibilities varies widely depending on the company, the industry and the jurisdiction(s) in which the company operates (Leka 2022). For example, some organisations may have each board member assume all ESG responsibilities while others may utilise a new or existing committee to provide oversight and guidance (Gates et al. 2022).

Each of the sustainability and ESG reports reviewed during preparation of this paper acknowledged the company's high-level responsibility toward closure, citing the significant environmental, social, and economic impacts associated with mining operations. Further, information was usually provided in relation to ESG and sustainability roles and responsibilities. For example, the Anglo 2022 sustainability report (Anglo 2023) states that the role of the company's Board of Directors is to 'promote and safeguard the long-term success of the business, while considering the interests of its various stakeholders' and notes that there are four committees, including a sustainability committee, who take on certain responsibilities on behalf of the Board. In this instance, the sustainability committee holds accountability for overseeing how the company manages its most material sustainability issues with responsible mine closure identified as a material matter in relation to the Zero Harm element of the company's Sustainable Mining Plan (Anglo 2023). Similarly, governance of Glencore's sustainability framework rests with the Board's Health, Safety, Environment and Community (HSEC) Committee which sets the strategic direction of Glencore's sustainability activities. However, responsibility for implementing the framework across the company rests with senior management who identify the material issues and take a hands-on approach to management and monitoring of sustainability activities around the company (Glencore 2023).

## 4.3 Materiality

Following our review of the reports listed in Table 2, it is clear that many companies provide comprehensive mapping of their ESG priorities with their material ESG topics and corresponding frameworks, initiatives and reporting standards, and long-term targets in ESG priority areas are disclosed. Provided that closure is determined as a material ESG topic, details on annual performance targets for closure are also disclosed and in many cases are mapped to the specific framework and reporting standard clauses. The key frameworks and reporting standards in this case are the GRI and SASB standards and, in some cases, Sustainability Development Goal 17 – Life on Land and industry specific principles and standards.

Mine closure is usually discussed in the Environment section and Stakeholder Engagement section of sustainability reports under the heading of Integrated Mine Closure or simply Mine Closure. However, from our review, it appears that even when mine closure and rehabilitation are considered to be a material issue for a company, the information shared therein is often not particularly detailed. For example, the Newmont 2022 Sustainability Report identifies that closure and reclamation are regarded as being highly material to the organisation, and while there is a reasonable volume of information on closure strategies, studies and assessments, it appears that only limited rehabilitation data have been provided (Newmont 2023). Similarly, Regis identified mine closure and rehabilitation to be a material issue and provides information on this topic in a chapter called 'Integrated land management' in its 2022 sustainability report (Regis 2022). However,

while this includes relatively detailed data on the progress of land disturbance and rehabilitation at its Duketon gold mine in Western Australia since 2018, other information provided tends to be broad in nature. In other cases, quarterly objectives and targets for concurrent reclamation and costs are provided as part of Corporate Responsibility Performance Metrics (see, for example, Kinross 2023).

Interestingly, the 2021 ESG report published by coal mining and energy producer Peabody states that successful land restoration is a recurring metric on executive compensation programs, together with an overarching goal of reclaiming as much or more land than is disturbed annually (Peabody 2022). This suggests that this topic is highly material to this company's business, but it was not included in the list of material issues for the reporting year covered by that report.

Despite the need for closure disclosures, some companies such as NSRL (2022) do not consider mine closure to be a material risk to the company so the detail of its disclosures would be correspondingly low. There could be several reasons for this. For example, it may be sufficiently early in the mining life cycle that a company deems proactive legacy management to be unimportant for it at the present time. Alternatively, it may be because the company has already accurately estimated the costs associated with closure activities and has set aside sufficient funds to fulfill closure obligations. Adequate financial provisioning would ensure that the company can meet its closure responsibilities without significant financial strain or risk of non-compliance. Further, if the risks associated with closure planning (such as soil erosion, water contamination or habitat loss) have already been effectively managed or mitigated, the materiality of these risks would be lowered somewhat. Effective stakeholder engagement, regular community involvement and proactive legacy management within a progressive closure approach will also minimise social conflicts and concerns, reducing the materiality of these closure risks.

#### 4.4 Rehabilitation progress reporting

Most of the reports reviewed during this study disclosed some detail on rehabilitation and land restoration undertaken during the reporting period. This included the quantity of land mined or disturbed, and the amount of land restored for a particular site or sites and was usually given in tabular form. Companies also provided insights into their approach to rehabilitation and land restoration. This included describing the methods, techniques and technologies used for reclamation, revegetation and soil management. Companies usually also highlighted their efforts to restore ecosystems, promote native species diversity and improve soil quality. However, the extent to which disturbed land has been restored was generally not disclosed and it was not clear if land that was reported as being rehabilitated had been restored to its pre-mining status or to another approved land use. The methods used to evaluate rehabilitation progress were also usually not disclosed, along with whether completion criteria had been agreed and to what extent these had been achieved, and whether land under rehabilitation still required intervention to ensure the resilience of the ecosystem.

Despite the general lack of rehabilitation data, some of the reviewed reports presented specific case studies and examples of successful rehabilitation projects. These case studies demonstrated a company's achievements, showcased innovative approaches and shared lessons learned. For example, Anglo (2023) mentioned the company's relationship and collaboration with Canadian First Nation peoples in a case study, while Kinross (2023) provides examples of efforts on biodiversity and practical risk mitigation. Additionally, MinRes (2022) mentions collaborative initiatives and partnerships undertaken to enhance rehabilitation outcomes. While these may involve collaboration with research institutions, NGOs or government agencies to leverage expertise, resources and knowledge exchange for better land rehabilitation practices, for MinRes this involved working with a company specialising in native vegetation regrowth (MinRes 2022).

Case studies showcase real-world examples of mine closure practices and their outcomes. They provide tangible evidence of how different approaches and strategies have been implemented and their effectiveness in achieving closure objectives. By utilising case studies, companies can learn from the experiences of other companies and apply that knowledge to improve their own closure planning and

implementation. Case studies can provide valuable insights and lessons learned from actual mine closure projects and are a vital component in telling the mine closure and rehabilitation story to sustainability and ESG report readers, whether investors or just interested parties. They can be used to highlight the company's commitment to responsible land management and allow mining companies and industry stakeholders to examine both successful and unsuccessful closure efforts, identify best practices and understand the challenges encountered.

#### 4.5 Closure cost provisioning

Mining companies are responsible for ensuring adequate financial provisions for closure. This includes estimating closure costs, establishing financial assurance mechanisms and setting aside funds to cover closure liabilities (which is known as provisioning). By sharing such information in sustainability and ESG reports, companies can demonstrate that they understand their closure and rehabilitation liabilities and can meet their financial obligations in this regard.

The estimation of closure costs, the methods used for financial provisioning and the mechanisms in place to ensure that sufficient funds are available for closure activities should form part of ESG disclosures. However, few of the reports reviewed during preparation of this paper provided specific information on closure cost estimates or provisioning. Indeed, it appears that of the reports reviewed, only Pilbara Minerals disclosed rehabilitation and mine closure costs with these provided in the Annual Financial Report that was included within the wider 2022 annual report (PML 2022). Regis also publicly reports its mine closure costs in its Annual Report, but these were not disclosed in the company's 2022 sustainability report (Regis 2022).

#### 4.6 Social closure reporting

In the reports reviewed during preparation of this paper, mine closure was typically mentioned under the environment section of the sustainability report, but there were a few exceptions to this. For example, Anglo (2023) mentioned sustainability under Zero Harm while Glencore (2023) addressed sustainability in the Responsible Citizenship section of its report, disclosing information from a predominantly social standpoint and choosing to address rehabilitation and land use from a stakeholder perspective.

Generally, all the reviewed reports addressed the company's accountability for managing the social impacts of closure to varying degrees. Companies disclosed details particularly in relation to local communities and indigenous groups, and addressed responsibility to engage with stakeholders, understand their concerns and incorporate their perspectives into closure planning and decision-making processes. The topics addressed included potential socio-economic disruptions, ensuring community well-being and facilitating sustainable post-closure livelihoods.

Davies et al. (2023) recommend that companies actively engage with investors to identify ESG concerns from the start of a project or operation and explain how they propose to mitigate or eliminate those ESG risks. Not only does an open and constructive dialogue show a company's commitment to the ESG agenda, but also potentially dampens the ire of activist shareholders in the face of any future challenge (Davies et al. 2023). However, it is recognised that the level of stakeholder interest and expectations regarding closure may vary depending on factors such as the proximity of the mine to local communities or the perceived environmental impacts. Consequently, the approach taken by mining companies in this regard will depend on the materiality of the issue.

#### 4.7 Data difficulties and digital solutions

Investors are increasingly incorporating ESG data into their investment decision-making processes and need data that are reliable, factual and consistent to track progress, and to gather the information critical for investment comparison and risk mitigation (Patel 2022). Meaningful ESG data and clear information on sustainable practices allow companies to demonstrate their mine closure and other sustainability outcomes

better, but there are often difficulties with the quality, consistency and accessibility of data. Further, it can be difficult for companies to provide sufficient detail without triggering ‘n information overload as investors ‘swim against a tidal wave of ESG data’ (Ground 2022).

When asked by Capital Group (2022) about what would help with ESG analysis and implementation, investors identified the need for standardisation of tools and data, provision of consistent data from asset managers and more automated analysis tools for ESG data. However, many mining companies lack the sophisticated digital tools needed to collect clean, validated and centralised data with end-to-end visibility. As Vagenas (2021) asks, how can you improve your ESG credentials if you cannot measure and transparently report your activity? How can companies best present their closure credentials in a way that helps inform investors?

Despite opportunities to do so, companies typically do not provide detail the full range of closure-relevant topics including closure monitoring programs, parameters measured or frequency of monitoring, nor the results obtained. Given that mine closure is usually a significant issue for a mining company, it should be deemed a material risk both in terms of potential economic, environmental and social impacts and the level of stakeholder concern or interest. However, the absence of standardised reporting guidance explicitly tailored to closure can make it challenging for companies to provide comprehensive and consistent disclosures on closure activities. Instead, mining companies tend to prioritise detailed reporting on other aspects of their operations such as production, safety or community engagement, which are considered more immediate or directly linked to financial performance.

Data are sourced from many different areas of a mining company and therefore needs to undergo clear classification and consolidation. Coherent analysis is also required to ensure that the data provide value and becomes more than just useless information. Consequently, an expeditious transformation to, and the harnessing of, digital technology to capture ESG data is becoming a major factor in improved business performance. Digital platforms can enable efficient management of vast amounts of data and can ensure easy retrieval and timely analysis throughout the closure process. The use of digital technology can be deployed toward predictive modelling to make more informed decisions and reduce closure risks. Harnessing seemingly disparate data into actionable items can be fundamental to the success of closure strategies, from remote sensing data to revegetation resilience to soil sampling data, timely, regular and relevant information is most advantageous. Leveraging the power of data can lead to improved accuracy and monitoring of performance indicators, and the creation of more insightful and actionable closure reporting.

## 5 Conclusion

The goal of ESG reporting is to disclose data on a company’s environmental, social and governance performance in a way that allows investors and other stakeholders to understand the organisation’s business strategy, risks and opportunities, and to use this information in their own decision-making. The type and quality of data varies across organisations and in relation to closure tends to be limited to reporting of rehabilitation footprints. However, it is expected that sustainability and ESG standards and frameworks will continue to evolve and that some of these may converge over time, which will provide stronger and more consistent reporting guidance. In the interim, the onus is on companies to provide investors and other stakeholders with relevant mine closure data and other information needed for informed decision-making.

## Acknowledgement

The authors would like to thank those who reviewed this paper during its preparation.

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