

Creating value in the post-closure period through collaborative closure planning

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Abstract

Despite growing emphasis on integrating regional socioeconomic considerations into mine closure and post-closure planning in part through closure-specific engagement efforts, the prevalent industry approach to reclamation and closure remains focused on relinquishing assets and liability as quickly as possible. ERM refers to this approach as a “rush to relinquishment”. Yet adopting this mindset often results in overly ambitious timelines, untenable costs, and enduring liabilities that often overlook socioeconomic opportunities that can create shared value for miners and their regional stakeholders in the post-closure period. Through a variety of publicly available documents and publications, in this paper we demonstrate the value of a collaborative and increasingly flexible approach to closure planning that incorporates a more balanced form of stakeholder engagement. In particular, we describe an approach to engagement that rests between traditional bilateral forms of engagement and broad regional planning, and which can allow for innovative closure and post-closure project opportunities. We provide a discussion and emerging examples of this balanced form of engagement as part of outlining a preferred approach to mine closure and post-closure planning.

Keywords: *stakeholder engagement, collaboration, regional development, value creation, post-closure*

1 Introduction

Although mine closure is gaining increased recognition and governance in most mining jurisdictions globally, challenges remain for companies seeking to approach closure as an opportunity for value creation, socioeconomic transition planning, and regional development, rather than a “rush to relinquishment” (Pearce, 2021). Mining companies commonly conduct pre-determined restoration or reclamation work—without the input of external stakeholders—as quickly as possible following cessation of operations in order to obtain full return of financial security and relinquish future liability, assuming, often erroneously, that these tasks are achievable in short time frames (Manero, et al., 2020; Lamb, Erskine, & Fletcher, 2015). Yet based on our work in the mining industry, and supported by a growing body of guidance documents, publications, and studies, an approach to closure planning that emphasises collaboration and partnership-making ultimately provides greater benefit to stakeholders and miners alike by expanding post-closure project alternatives.

Through our experience in closure planning and with miners, we make the following, interrelated arguments:

1. Asset transformation or regeneration can drive regional sustainability and/or regional development.
2. Mining companies can be enablers of post-closure possibilities, but cannot singularly or sustainably lead a regional socioeconomic transition.
3. Similarly, for legal, liability, and financial reasons, stakeholders cannot expect miners to cede all decision-making capacity or control at closure, nor should this be built into expectations of a successful closure transition.

4. Viewing closure as an opportunity to (re)consider post-closure alternatives is and will continue to be critical to reputation building and maintenance; as miners must obtain social license to operate, they increasingly will have to obtain ‘social license to close.’

In general, there is recognition within the industry that both shareholders and stakeholders are placing increasing value on an integrated approach to closure with a very long runway (i.e., closure considerations should be considered or incorporated into feasibility/exploration stages). Nonetheless, we often see closure planning and execution driven largely by presumed regulatory requirements and capital/financial return, rather than more open-ended opportunities for collaboration and value creation. Ultimately, reactive closure planning based on compliance needs, rather than on proactive planning and engagement, is likely to continue finding limited success.

In what follows, we outline the challenges of a ‘rush to relinquishment’ approach and emphasize the importance of framing mining as a temporary land use (Keenan & Holcombe, 2021), wherein sustainable mine planning (including closure) can set the stage for a creative suite of post-closure land uses and values. We draw on case studies from Canada to underline the ways in which proactive and multifaceted forms of engagement and regional planning support innovative closure and post-closure opportunities.

2 Closure and the “rush to relinquishment”

The drive to relinquish assets and liabilities is typically associated with a set of constraints and presumptions. Broadly, these include the following (with overlap between them):

- Adherence to the closure and reclamation methods and outcomes outlined in the project environmental assessment, closure plan, or other initial authorizations: Regulatory requirements vary widely in their prescriptiveness, and miners and operators tend to treat approaches outlined in authorization documents as inflexible, despite often having been determined many years prior to closure. Yet an over-reliance on impact assessment and closure regulations can create both business and community risks (Monosky & Keeling, 2021)
- Emphasis on technical components (particularly chemical and physical stability) as closure drivers: Ensuring safety and stability through key technical pieces is a priority in closure planning. Social or community considerations are often treated as an add-on, and most frequently through workforce support programs (which may be insufficient to offset expectations around job creation in early project development stages) or community investment programming that is entirely funded by the miner and largely unsustainable in the longer-term (Gregory, 2021; Bainton & Holcombe, 2018).
- Reliance on reclamation or restoration of land and end land uses to ‘pre-mining conditions’: The level of effort to achieve pre-mining conditions is often impractical—if not impossible—and very costly, particularly given the sheer scale of some mine areas and land holdings (Werner, et al., 2020; Keenan & Holcombe, 2021). Such efforts should be compared with appropriate and feasible environmental and biodiversity targets that align with and/or are informed by community stakeholder goals and priorities, including an acknowledgement that targets may shift in response to long-term environmental or social and market change.
- Request for relinquishment of future liability, and request for return of financial security at time of relinquishment: Requests for relinquishment may only be considered after mining companies have demonstrated that reclamation goals have been achieved, and financial securities may only be returned following completion of reclamation work.

As ERM has demonstrated, successful relinquishment is rare (Churr, McNulty, & Posnik, 2014). Thus, pursuing the “rush to relinquishment” approach can have negative outcomes, including unrealistic budgeting and scheduling, reputational risks, and impacts to future liabilities as a result of not meeting targets.

Overall, a focus on relinquishment as an end goal leads to missed opportunities to enable and contribute to projects that can create future regional development. As a result, alternate approaches to long-term land

and site management, such as those driven by collaboration, are increasingly important, and, as the following section outlines, demonstrated by conspicuous shifts in industry practice.

3 Closure as temporary land use and opportunities for value creation in closure and post-closure

The push to clearly integrate closure and post-closure considerations in mine life cycle planning is based on the growing recognition that mining is a temporary form of land use, from which other uses can and should be possible in the future; although this may not always apply to the mine itself, it often accounts for mining infrastructure and surrounding lands and waters. As many of the points in Section 2 (above) underline, the understanding of mining as a temporary land use is compounded by an increasing drive for industry to do more than bio-physical rehabilitation at closure and a growing global prerogative that miners leave ‘positive legacies’ when operations cease.

The terms “repurposing,” “value creation,” “reimagining closure” (see Section 4, below), “post-closure” alternatives, and “(social) transition” are recent additions to industry parlance, reflected now in ICMM’s mine closure toolkits, Anglo American’s Social Way toolkit, and TSM’s Mine Closure Framework, to name a few examples.

Miners’ attention to the topic is also reflected in company structure and corporate policies or standards. This includes a full switch in terminology by some major operators from “legacies” to “assets”, partly to encourage an entrepreneurial approach to legacy management. One such example of this approach is Rio Tinto’s 2021 partnership with non-profit RESOLVE to launch Regeneration, a start-up billed as “an international restoration and remining social enterprise (RESOLVE, 2022),” focused on processing of waste from mine sites to support rehabilitation activities and restore natural environments. This work includes direct partnerships with Indigenous communities to re-process and transform legacy sites.

As the terms “repurposing” and/or “reimagining” (and the idea of transformation or transition) indicate, a growing mandate and model within the mining industry is thus to view closure not as an end point, but as a means for considering alternatives *outside or beyond* mining entirely. Achieving this is largely dependent not only on traditional forms of bilateral stakeholder engagement (miner and local communities), but broader-scale collaboration and partnership to enable transitions from mining to other forms of productive and sustainable land use.

4 Case studies

We provide three case studies in Canada to outline distinct approaches to mine closure and post-closure alternatives that rely to varying extents on collaboration for the shared closure/post-closure and reclamation goals and conduct a brief comparison of the ways in which each case speaks to the application of novel engagement strategies around closure. Based on these case studies, we outline key criteria for such effective collaborations.

4.1 Elliot Lake

“Elliot lake has become one of the most popular retirement communities in the province thanks to the quality of community infrastructure, affordable housing, and the pristine natural environment” reads the first line of the Elliot Lake Retirement Living website (City of Elliot Lake, 2022) based in Ontario, Canada. This is a significant feat given the retirement community is based in an area largely defined by uranium mining, with the last one in the area closing in 1996. Twelve underground uranium mines and eleven mills were opened in the vicinity of Elliot Lake between 1955 and 1958. Despite closures in the 1960s by the US Atomic Energy Commission, the mines were reactivated, expanded, and, in at least one case, repurposed for copper production throughout the 1960s to the 1990s. Environmental assessment and federal review of the non-operated (legacy) sites was completed in 2002 by the Canadian Nuclear Safety Commission (CNSC) (Berthelot, Place-Hoskie, Willems, & Black, 2019).

The 2001 Act respecting the City of Elliot Lake (Chap. Pr1 (Bill Pr4)) provides the legislative basis for the development of the shoreline and other land in the city for residential purposes. This very targeted Act was justified through the higher-than-average tax rates in the City of Elliot Lake following mine closures and the need to both expand the tax base and redistribute tax burdens (Berthelot, Place-Hoskie, Willems, & Black, 2019). While Elliot Lake may be broadly portrayed as an example of a mine closure ‘success’ case study (particularly in the context of perpetual management requirements), it is more specifically an example of the possibilities inherent to intentional development planning following mine closure.

Today, the area is well-known as a retirement community and example of rehabilitation and repurposing for multiple uses, including the Sherriff Creek Wildlife Sanctuary and recreation area. Driven fundamentally by municipal needs for increased access to capital, Elliot Lake points to key components for post-closure value creation, including robust original design criteria for closure and long and rigorous progressive reclamation work, but also the purposeful involvement of multiple stakeholders in transitioning and repurposing. In particular, the success of Elliot Lake demonstrates the ways in which effective closure and transition cases require comprehensive regional planning inputs. The role of municipal government is central in this case, with the City of Elliot Lake demonstrating “resilience through local governance” (Veiga, Scoble, & McAllister, 2001, p. 200) in mine closure, particularly with respect to land use and development planning. Indeed, the City used these successive mine closures—and the vulnerabilities these closures created and exposed—as the launching point for a substantial overhaul of the regional plan, actively considering and accounting for alternative land use goals and capabilities (and, correspondingly, alternative industry opportunities) in the longer-term. The intentional transition of Eliot Lake from a place associated with the production of nuclear energy to one associated with green space, thriving wildlife, and a quaint retirement locale required not only major injections of capital from municipal government, federal sources, and private industry and organizations, but also a collective acceptance that such transitions necessarily require significant time. Elliot Lake is an example of logical repurposing, as well as the consideration of distinct stakeholder interests and values in post-closure planning (although further inclusion of diverse interest holders is warranted).

More recent challenges in the Elliot Lake area are to further diversify income and livelihoods opportunities to stem the flow of out-migration, particularly by younger people from the area, and the associated loss of labour, capital, and services (urbanMetrics & BrookMcIlroy, 2013). These are additional but critical considerations for sustainable regional development.

4.2 City of Sudbury

The City of Sudbury, Ontario, after having ‘suffered’ more than a century of mining impacts and contamination, has won numerous awards for environmental restoration efforts. And while attention to such positive environmental outcomes is important, key to understanding this change is the interrelated forms of engagement through which this transformation has occurred.

One of the world’s largest deposits of nickel, copper, and precious metals are found in the Sudbury area, with historic production and future reserves and resources of nickel exceeding 18 million tons. Resource wealth, however, has historically come with a price tag. By 1960, the region was the largest point source of industrial pollution on earth. Environmental legislation passed in North America in the 1970s brought increasing awareness of the potential impacts of pollution, and in 1972, following the principle that the solution to pollution is diffusion, Inco Limited, Sudbury’s largest mining company, built a 1,250-foot smokestack at their smelting plant—the tallest smokestack in the world at the time. Throughout the 1970s and 1980s, the mining industry in Sudbury began responding to new environmental regulations, introducing new ore sorting and processing procedure technology, and better gas capture methods. Since then, total emissions of sulfur dioxide and metal particulates have been reduced by 98% (Gunn, Chartrand, & Morin, 2009).

From the 1970s, mining workers (and mining unions), politicians, university academics, industry, and community representatives (YMCA, volunteer groups), worked towards a broadly unified goal of cleaning and re-greening Sudbury, indirectly and slowly also altering the narrative of Sudbury as contaminated mining town. In 2008, then-mayor Rodriguez was quoted as saying that while Sudbury obviously could not dodge the impact

of the commodities crash/Global Financial Crisis, the area’s increasingly diversified economy—including growing health care and post-secondary education sectors—would soften the blow of cumulative mine closures, and, moreover, would not deter ongoing clean up and restoration efforts (Hoffman, 2008). Since then, the city has celebrated the planting of 10 million trees and shrubs, reclamation of more than 3,400 hectares, conversion of damaged areas into parks, 50% restoration of lost sport fish populations, and delisting of a COSEWIC species (Aurora trout) (Gunn, Chartrand, & Morin, 2009). Of at least \$30 million CAD spent on these initiatives, funding has come from solicited federal and provincial government grants, mining companies, and private sources, with (only) 15% spent directly by the City of Sudbury (City of Greater Sudbury, 2015).

This case study is not emblematic of a single mine closure. Nonetheless, the case of Sudbury exemplifies broad alignment and collaboration among local and regional political actors, community groups, research organizations, and multiple mining companies to respond to the cumulative and adverse impacts of mining, including legacy impacts and the impacts of sudden mine closures. This necessarily goes beyond traditional bilateral forms of engagement (i.e., encompasses more than a relationship between miner and local community), and stops short of comprehensive regional development (although re-development has been an important outcome or eventual consequence). Rather, the case of Sudbury’s post-closure(s) transformation includes a kind of constellation of complementary engagement approaches that were underpinned by a collective embrace of change in the face of environmental damage and broader political shifts. These approaches include extensive public-private partnership-making (including with universities/academic institutions), active and responsive regulatory change, creative industrial innovations in response to regional gaps or needs, and community/social movements broadly in support of ‘cleaning up’ and ‘greening’ the region. While closures in Sudbury did not result in the creation of a specific legislative response to regional planning (as with Elliot Lake), the result has been an ongoing regional transformation.

The “Sudbury Recipe” for restoring damaged landscapes has been adopted globally (Scales, 2018). While mining is still, critically, one of the forefront industries in Sudbury, collaborative—and successful—efforts to thwart the negative impacts of mining through mining innovation now equally define the regional identity.

4.3 Reimagining closure

While the cases of Elliot Lake and Sudbury show progressively shifting attitudes towards collaborative closure and reclamation processes driven by municipal- and regional-scale reaction to concerns about cumulative effects and contamination, the Reimagining Closure initiative demonstrates a proactive and highly collaborative approach to thinking beyond mining and/or “beyond the fenceline” (De Beers Group & Rio Tinto, Reimagining Closure, 2020).

Reimagining Closure is a joint initiative aimed specifically at engaging interest holders in a collaborative process to explore future socioeconomic opportunities in the Slave Geological Province (SGP) in the Northwest Territories (NWT), Canada. The initiative was spearheaded in 2020 by De Beers Group and Diavik Diamond Mines Limited with support from ERM, and co-design and facilitation with Coeuraj. A central driver of the initiative was the somewhat stark recognition that all four diamond mines in the NWT (Snap Lake, Diavik, Ekati, and Gahcho Kue) were expected to close within the next decade. With very high levels of resource dependence broadly in the NWT, and these diamond mines accounting for approximately one-third of the territory’s GDP, Reimagining Closure is a formalized approach to multi-party regional planning for future, post-closure opportunities, with the following objectives:

“...looking for creative ways to use mine closure as a mechanism to contribute to economic and social benefits that endure long past the actual closure of the mine. Whether it be through co-development and local partnerships, there are a number of ways to transition a former mining operation with regional development in mind” (De Beers Group & Rio Tinto, 2022, p. 3).

Factors critical to the success of Reimagining Closure—a forum that is a springboard for future-oriented planning, and a model for co-design for other industry players to adapt to different regional and socioeconomic contexts—include the following:

- Voluntary participation by diverse stakeholders and experts (in this case, Indigenous governments; local, territorial, and federal governments; northern industry and mining companies; Indigenous development corporations; regulators; parks and conservation bodies); and, correspondingly,
- The establishment of formalized platforms, spaces, and schedules for engagement that foster ‘big picture’ thinking as well as more tactical considerations and planning, and involving groups of different sizes for distinct purposes.

The multi-phase process began with Phase 1 (“Generating the Boundaries for Collaboration”) to Phase 2 (a focus on shared understanding of alternative closure possibilities); Phase 3, based on tactical planning, is in progress. Specific forms of engagement in the tactical phase include ongoing leadership alignment sessions to confirm shared priorities and goals, and co-design events to understand the regional socioeconomic impacts of planned mine closures, and identifying opportunities for alternative uses. These one-to-one and/or bilateral forms of engagement combined with collaborative, facilitated sessions, are together components of inclusive and purposeful regional planning efforts. Summary reports from co-design sessions with regional interest holders and stakeholders have been made publicly available (for example, (De Beers Group & Rio Tinto, Reimagining Closure Summary Report, 2022), and outline ideas generated during these sessions, as well as key assumptions these sessions are challenging, and a broad path forward for thinking and doing. As this is ongoing work, some of the tactical pieces are not yet fully executed; however, a strong foundation for collaboration through relationship-building, information-sharing, and idea-generating has been laid.

The establishment of somewhat similar forums in distinct geographies in 2020 including the Cooperative Research Centre (CRC) on Transformations in Mining Economies (TIME) in Australia. The CRC TIME is aimed at “reimagining and working to help transform post-mine transitions” (CRC TIME, 2020), underscoring a conspicuous shift in broad approach to mine closure to diversifying and increasing the resilience of local/regional economies with a view to the development of new forms of capital.

4.4 Comparative analyses

Although the case studies presented demonstrate distinct forms of closure and post-closure planning and collaboration, all three nonetheless speak to the different arguments presented in this paper and to showcasing novel (particularly for their time, for the different cases) approaches to engagement. Substantiated by all case studies are the arguments that asset transformation or regeneration can drive regional development, and that while mining companies can be enablers of post-closure possibilities, they cannot singularly or sustainably lead a regional transition. Elliot Lake, Sudbury, and Reimagining Closure in the SGP show that municipal and regional leadership, among other stakeholders, play key roles in driving and/or enabling (creative) transformation; this ranges from inclusive conversations and public forums all the way to distinct legislative change to support regional shifts in the face of the acknowledged vulnerabilities brought on by the closure of a mine (or mines).

Although only briefly touched on in this paper, all three case studies nonetheless show that mining companies do and must retain some decision-making capacity and control at closure. This includes through enabling the transfer of partial lease or land holdings for regional development and investment, through applying for permit adjustments and undertaking distinct/new permitting commitments in pursuit of changed closure and post-closure goals, and through making significant capital investments in socioeconomic and community programming for post-closure transitions—and typically without a formal requirement to do so. This last point speaks to the growing need for mines to obtain ‘social license to close’ through active collaboration and effort to consider what comes after closure. Although this specific intent is less clear in the case of Elliot Lake, it becomes more obvious in the Sudbury case, and is central to the rationale of Reimagining Closure, placing collaborative (and consultative) post-closure alternatives planning on the modern industry agenda.

5 Criteria for values-driven collaboration

Key criteria emerge from these case studies that speak to commonalities in successful, collaborative, and values-driven approaches to mine closure post-closure alternatives planning. These criteria are summarized in Table 1, below.

Table 1 Key criteria for values-driven, collaborative closure planning

Criteria	Details
Time	A realistic ‘runway’ is needed/an appropriate lead time to closure to foster key relationships and opportunities
Ability to secure third-party or alternative financing	Sustainable post-closure alternatives involve a shift in depending on miners as sole financiers
Clear, logical, and intentional repurposing or transformation	It is increasingly recognized that not all closed mines can be tourism destinations, but consideration of alternatives requires ‘big picture’ and tactical thinking
Alignment with regional development goals and corporate investment pillars	Mine closure and post-closure scenarios must still reflect social performance and ESG expectations or requirements for mining companies, as well as local and regional planning needs and priorities
Diverse stakeholder involvement	In particular, municipal bodies often have high levels of investment in post-closure successes and/or are directly responsible for land use planning. Post-closure opportunities must still serve stakeholder interests
Formation of decision-making bodies with defined roles, responsibilities, processes	Must be fit for purpose – for example, formal working groups are resource-intensive, and not appropriate for all assets/mining companies
Land use, ownership, and land value(s)	Miners often retain institutional control of key infrastructure (e.g., perpetual management needs). Clearly understanding land use capabilities at closure is essential. Moreover, a shift in land values (both economic and social values) is required; land that is often seen as depleted and/or value-less must be understood as holding value (or potential value) from closure to post-closure.

These criteria are demonstrated differently and unevenly across the three case studies. Time is a valuable resource, in closure planning as with all mine project phases, and Elliot Lake, Sudbury, and Reimagining Closure in the SGP all demonstrate that closure and transition planning require long lead times to support relationship-building and agreement-making along bilateral and multilateral lines. Elliot Lake is an example of a clear and intentional approach to repurposing, albeit with less intentional (and instead more reactionary) collaboration and input than that which is built into the Reimagining Closure process, and less diverse stakeholder involvement than either the case of Sudbury or Reimagining Closure. Reimagining Closure in particular highlights the formation of decision-making and engagement bodies specifically oriented to collaborative closure planning and alternatives consideration, with diverse stakeholder representation, whereas Elliot Lake and Sudbury underline the (very) high level of municipal investment in closure planning, often driven by as well as high levels of municipal responsibility for post-closure realities. All three underline that ability to secure alternative or third-party financing (particularly sustainable or enduring financing), alignment with regional development needs and goals, as well as consideration of alternative land uses and values are best determined by collaborative input and collective decision-making around the question, ‘what next?’

6 Conclusion

As mining companies, industry bodies, and regulators increasingly recognize, reactive and rapid closure planning tends to limit post-closure opportunities, constraining innovation and regional development potential while contributing to increasing closure costs, risks, and uncertainties. A changing perspective to seeing mine closure as an opportunity for value creation is demonstrated even in changing industry terminology; we now see much more conspicuous use of “repurposing”, “transition”, “transformation” and other words that denote understanding of mine closure as a temporary land use from which creative alternatives to mining may follow.

From traditional, bilateral forms of stakeholder engagement, increasing value is now also placed on collaborative, multi-party initiatives and ventures that allow for generative discussions and alignment on future development goals. While mining companies may facilitate or drive post-mining transitions, such collaboration is essential for the establishment of sustainable alternatives to mining in both the short- and long-term. The creation of shared value and leaving a lasting, positive legacy are made possible by more balanced approaches to stakeholder engagement and partnerships.

The key criteria for values-driven collaboration outlined above underline the significant inputs required for effective mine closure planning and in determining post-closure opportunities and possibilities. These criteria are also widely applicable to all stages of sustainable and responsible mine planning, extending before and beyond closure, indicating that considerations of strong leadership, inclusive representation, and dynamic and shared decision-making processes, including values (re)alignment, are central to collaboration around potential alternative uses, transformations, or repurposing of assets. Indeed, these criteria underpin the kind of mine—and mine closure—we all want to see.

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