



FINAL DRAFT

Mining Readiness Strategy

Prepared by MNP LLP for the City of Thunder Bay and the
Community Economic Development Commission (CEDC)

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Introduction

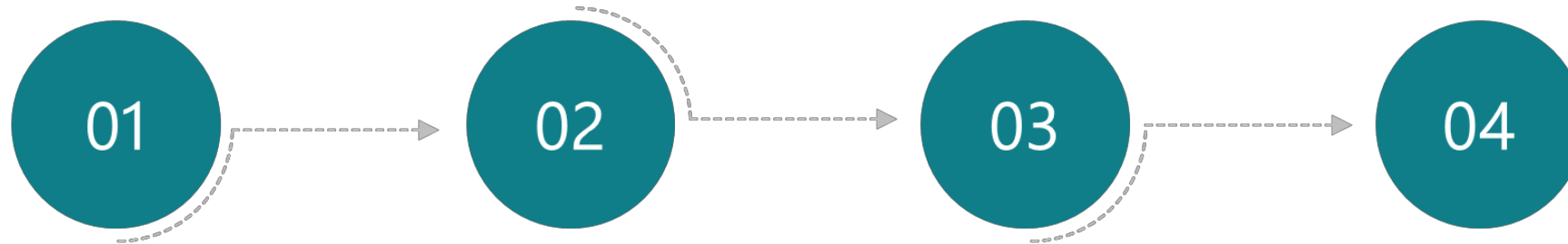
A guiding framework for the City of Thunder Bay to support the growing Northwestern Ontario mining sector

The City of Thunder Bay and the Community Economic Development Commission (CEDC) engaged MNP and TBT Engineering to develop a Mining Readiness Strategy focused on regional developments over the next ten years (2020 to 2030). The report focuses primarily on:

- **Business Development in Supply and Services:** Maximizing exploration and mining service and supply opportunities for Thunder Bay, including connecting directly with the 6 mines and 15 exploration managers, identifying indirect and induced businesses and gaps in the supply chain.
- **Workforce Training and Development:** Develop an understanding of positions required by mines now and in the future, assess existing college, university and trade programs and how to address any gaps.
- **Transportation and Electrical Infrastructure:** Identify road, port and airport access and electricity requirements and constraints for the 15 exploration sites.
- **Economic Impact of New and Existing Mine Developments for Thunder Bay:** Estimate the contribution to Thunder Bay's economy by the 6 producing mines and 15 exploration projects.
- **Research and Development:** Identify potential technology advances and partnerships with local education and research centers.
- **Identifying Gaps and Barriers to Exploration and Mine Development in Northwestern Ontario.**

The report concludes with strategic recommendations that the CEDC can implement to support the exploration and mining sector in the City of Thunder Bay and Northwestern Ontario.

Approach and Methodology



Project Initiation and Research

- Reviewed project background documents to familiarize with work completed to date.
- Researched public documentation on the mining industry in Northwestern Ontario to develop a current state understanding of mining in the region.



Conducted Stakeholder Interviews

- Scheduled and conducted interviews with the exploration and mining companies, and various associations (40+ total interviews).
- Summarized the major “what we heard” themes from stakeholder feedback.



Collected Data and Information

- Compiled data and information gathered from research and stakeholder feedback.
- Developed forecasts and requirements for mining employment and infrastructure.
- Estimated the economic impacts of mining in Northwestern Ontario.



Developed Strategic Recommendations

- Drafted recommendations for Thunder Bay-CEDC mining readiness strategies.
- Developed business cases for recommendations utilizing SMART performance metrics.
- Completed final mining readiness report and executive summary deck for public consumption.

Regional Mining Overview

Ontario



Currently the largest producer in Canada of gold, platinum group metals, and nickel. Second largest producer of copper.



The value of mineral production in Ontario has consistently exceeded \$10 billion since 2014, and reached a value of \$10.7 billion in 2019.



Exploration expenditures between \$517 to \$585 million over the last three years.



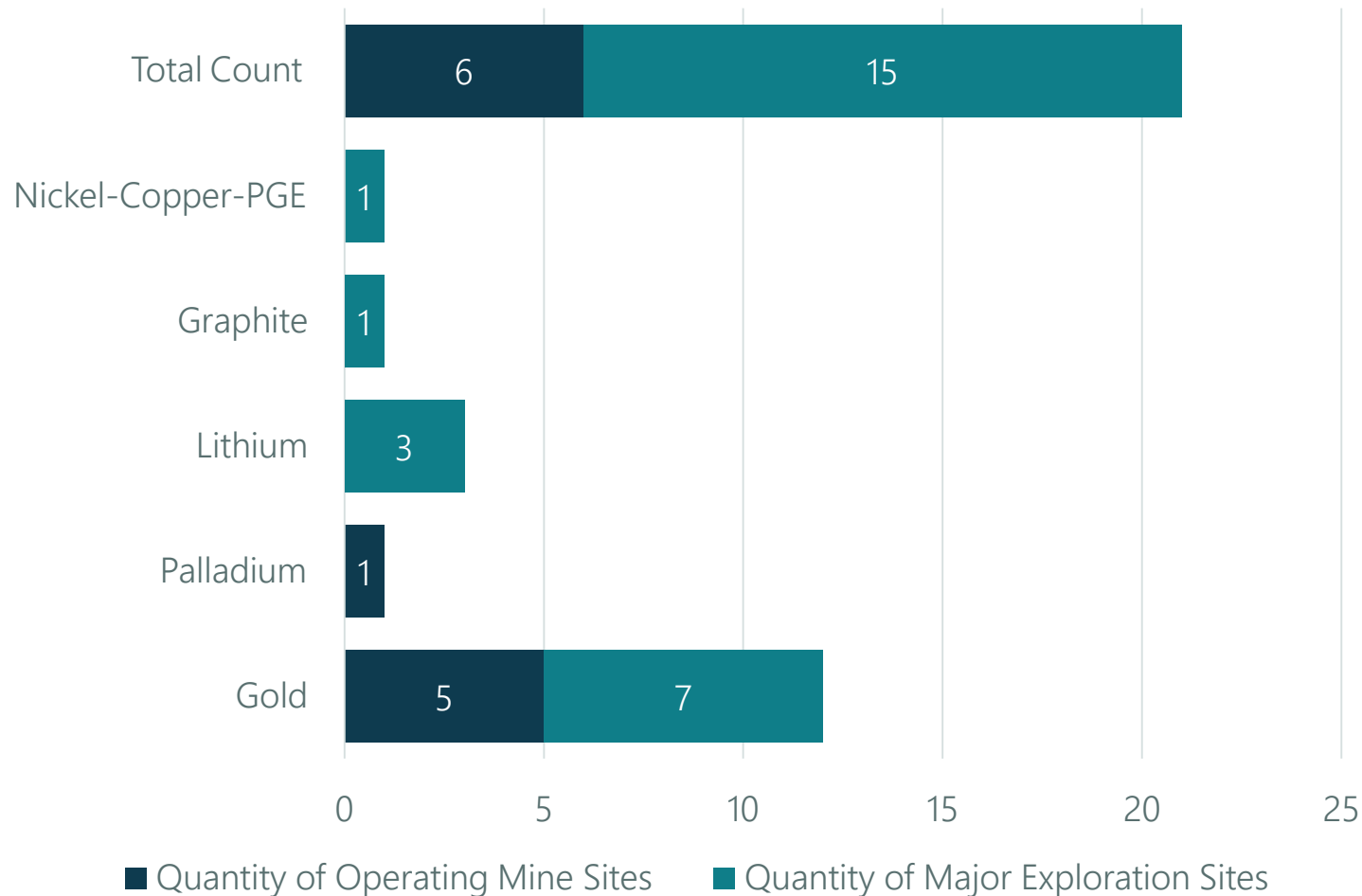
Estimated 26,000 direct jobs and 46,000 indirect jobs in mineral processing and mining supply and services in Ontario.



In 2020, Ontario had 40 operating mine sites (20-gold mines, 9-base metal mines 1-iron mine and 1-platinum group metal mine).

Regional Mining Overview

Northwestern Ontario – Distribution of Metals by Major Exploration Sites and Active Mines



6

Existing Operating Mines

Primarily gold mines, and one palladium mine.

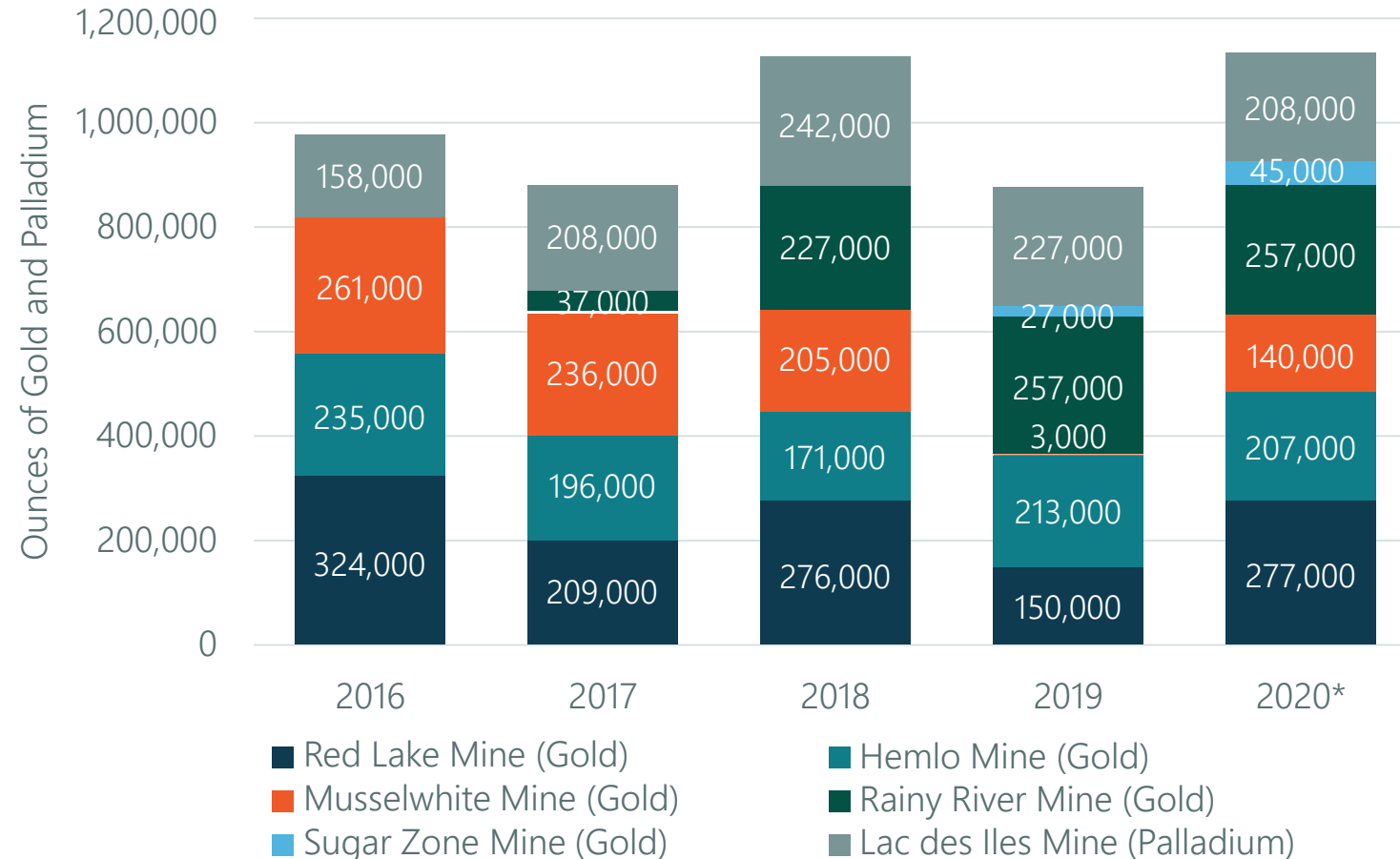
15

Major Exploration Sites

Primarily gold, palladium and lithium.

Regional Mining Overview

Northwestern Ontario – Historic Active Operating Mine Production (Gold and Palladium)



790,000+
 Average Ounces of Gold Produced
 per Year

Between 5 current gold mines.

200,000+
 Average Ounces of Palladium
 Produced per Year

By 1 current palladium mine.

*2020 production value is estimated.



Mining Industry Stakeholder Feedback

Top Interview Themes

- 1 The CEDC is perceived by mining industry stakeholders as a key facilitator for business introductions and sharing knowledge about economic development opportunities and support.
- 2 City/CEDC needs to advance their marketing and communications strategy to emphasize that Thunder Bay is a full-service hub for Northwestern Ontario.
- 3 Exploration and mining companies will prefer to buy local if their supply chain staff are aware of the local businesses which are qualified to deliver the needed supplies and services.
- 4 There is an emerging opportunity for critical mineral processing and support directly within the municipal boundaries of Thunder Bay.
- 5 There is a near-term great need for skilled trades and numerous types of support services roles as new mines are constructed and begin operations.

Mining Industry Stakeholder Feedback

Top Interview Themes

- 6 A tailored strategy to support local workers and Indigenous community members gain the job skills along with the logistical support to get to the work sites is needed.
- 7 The city of Thunder Bay has abundant municipal infrastructure to support growth in the regional mining industry, but the broader northwest regional infrastructure has some significant challenges with road and electricity supply.
- 8 Thunder Bay is currently receiving significant economic benefits due to the mining industry and is well perceived and positioned to benefit from the forecasted increase in mining activity.
- 9 All mining companies are willing to partner with local research facilities if the opportunity arises.
- 10 Extended timelines for permitting and approvals is seen as the major impediment to advancing mine development.

Mining Supply and Services

Business Development in Thunder Bay – Business Type Focus Areas



Proximity to Mines

- Local distribution centers.
 - Transportation and logistics services (e.g. trucking).
- Equipment and parts service centers.
- General mine support services (e.g. security, transportation, cleaning, catering, health, etc.).
(e.g. shovels, etc.)
- Ground support materials



Workforce Training

- Skilled trades training centers.
- Mining skills training centers.
- Life skills and career development services.



Critical Minerals

- Chemical processing plants for critical mineral processing (e.g. lithium, graphene).

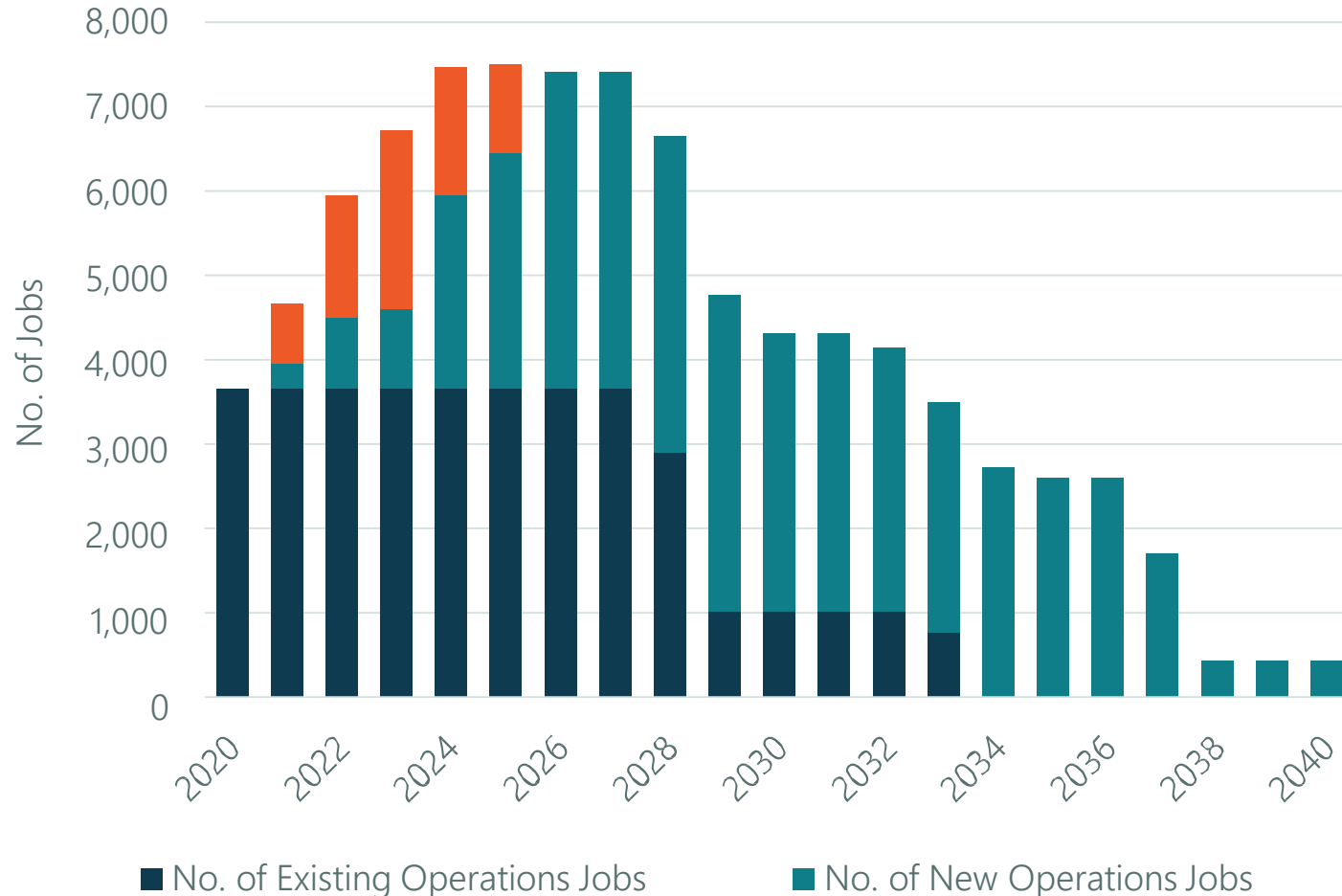


Available Land

- Promote available commercial and industrial land available in the city.

Workforce Training and Development

Northwestern Ontario Estimated 20-Year Employment Projection



3,600+

Mine Operations Jobs in 2020

Estimated for the 6 operating mines in Northwestern Ontario.

100%

Increase in Mine Operations Jobs

Estimated to peak at 7,400+ total positions.

2,000+

Peak Construction Jobs in 2023

Estimated for the 15 major exploration sites in Northwestern Ontario.

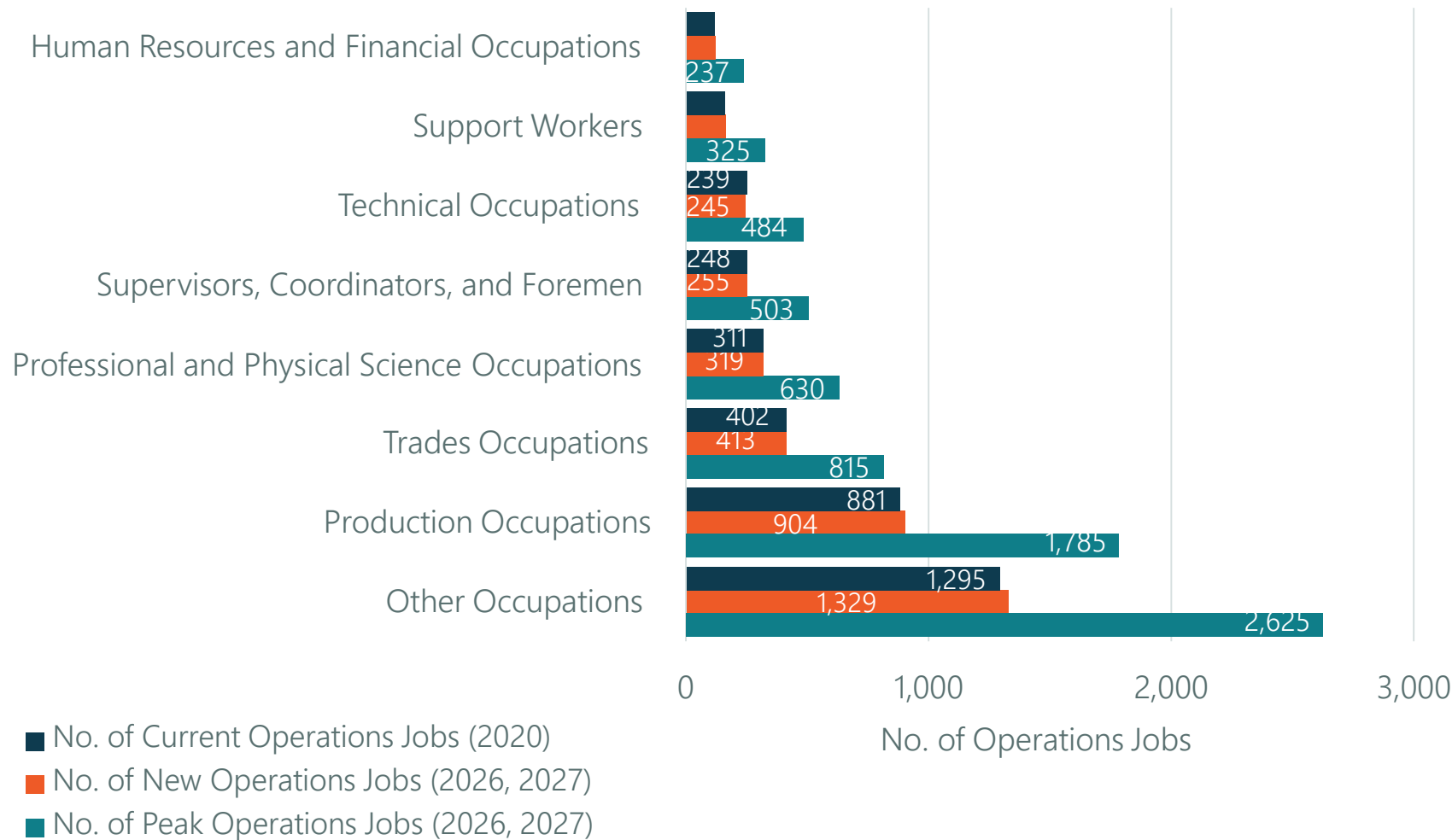
7,000+

Peak Mining Jobs between 2023-2028

Estimated jobs required for construction and operation of new and existing mines.

Workforce Training and Development

Northwestern Ontario Estimated Mining Occupation Distribution (Current and Peak Levels)



2X
Operations Job Growth

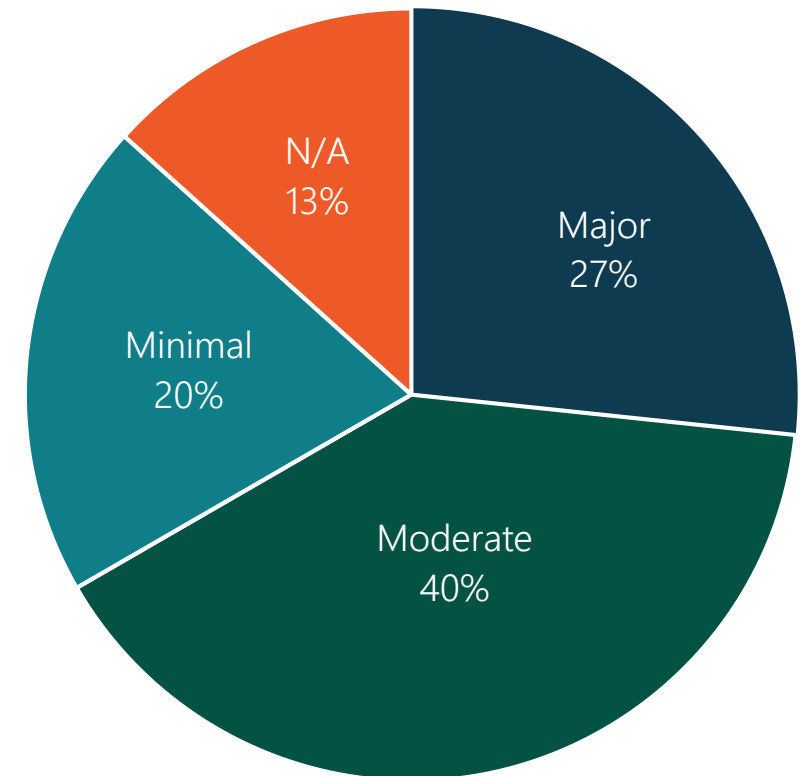
Estimated around 2026 when all six current operating mines are still in production and multiple major exploration sites have converted to operating mine sites.

Transportation and Electrical Infrastructure

Access Road Requirements

Of the 15 exploration sites reviewed, 60 percent had minimal or moderate access road construction requirements, due mostly to their advantageous location close to the major highway network in Northwestern Ontario. Sites requiring major construction include:

- Access to the Ring of Fire.
- Realigning existing Highway 11 road and electricity infrastructure that is currently passing through the site.
- Construction of all-season roads to improve current access restrictions of air travel and winter road only access (Frontier Lithium's PAK project, and First Mining Gold's Springpole Lake project).

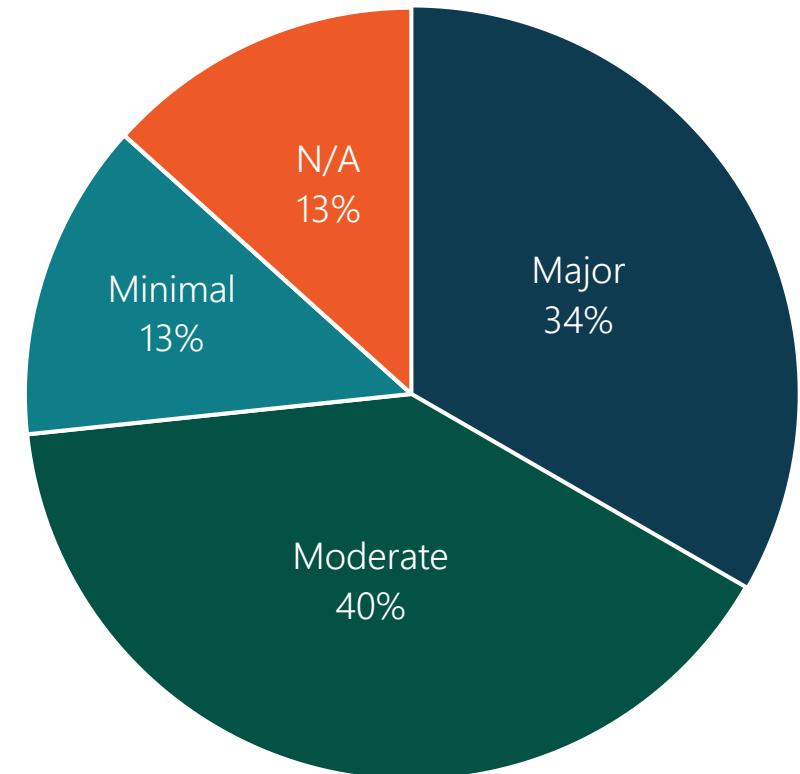


Transportation and Electrical Infrastructure

Electricity Supply Requirements

Of the 15 exploration sites reviewed, 53 percent had minimal or moderate electricity infrastructure requirements, due to their proximity to nearby transmission lines. Sites requiring major electricity infrastructure construction include:

- Multiple sites requiring over 25 km of new transmission lines.
- Multiple sites requiring power plants to be built due to lack of available local transmission lines or capacity.



Transportation and Electrical Infrastructure

Electricity Demand Projection – Northwestern Ontario Total Impacts



190 MW

Estimated Current Operating Mine Electricity Demand

Levels expected to be maintained until 2027.

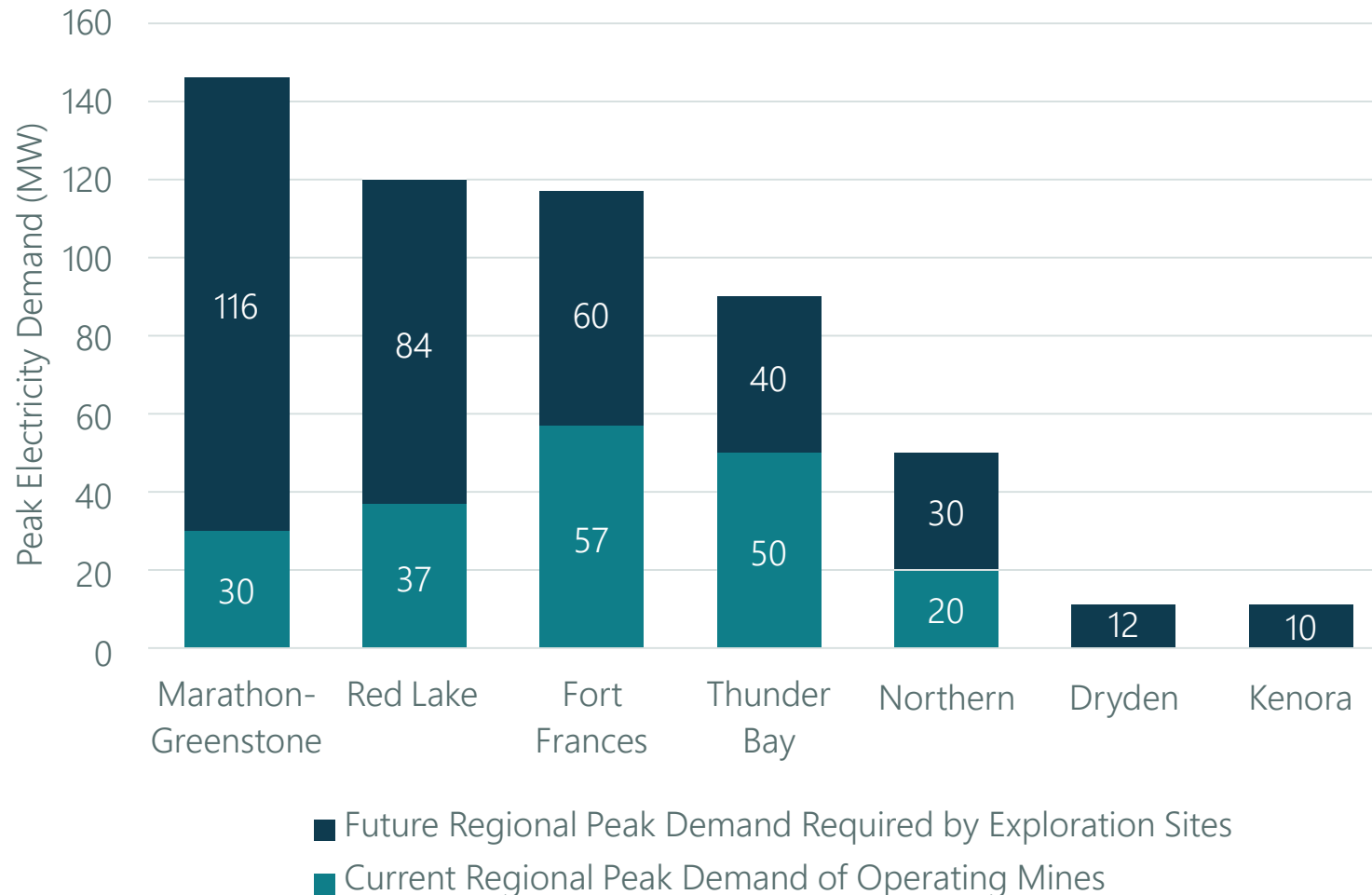
180%

Estimated increase in Electricity Demand from New Mines in 2026

Levels expected to increase from 190 MW present day amount to over 540 MW.

Transportation and Electrical Infrastructure

Electricity Demand Projection – Regional Impacts



380%

Estimated Electricity Demand Growth in Marathon-Greenstone

From 3 new major exploration sites.

220%

Estimated Electricity Demand Growth in Red Lake

From 4 new major exploration sites.

80-150%

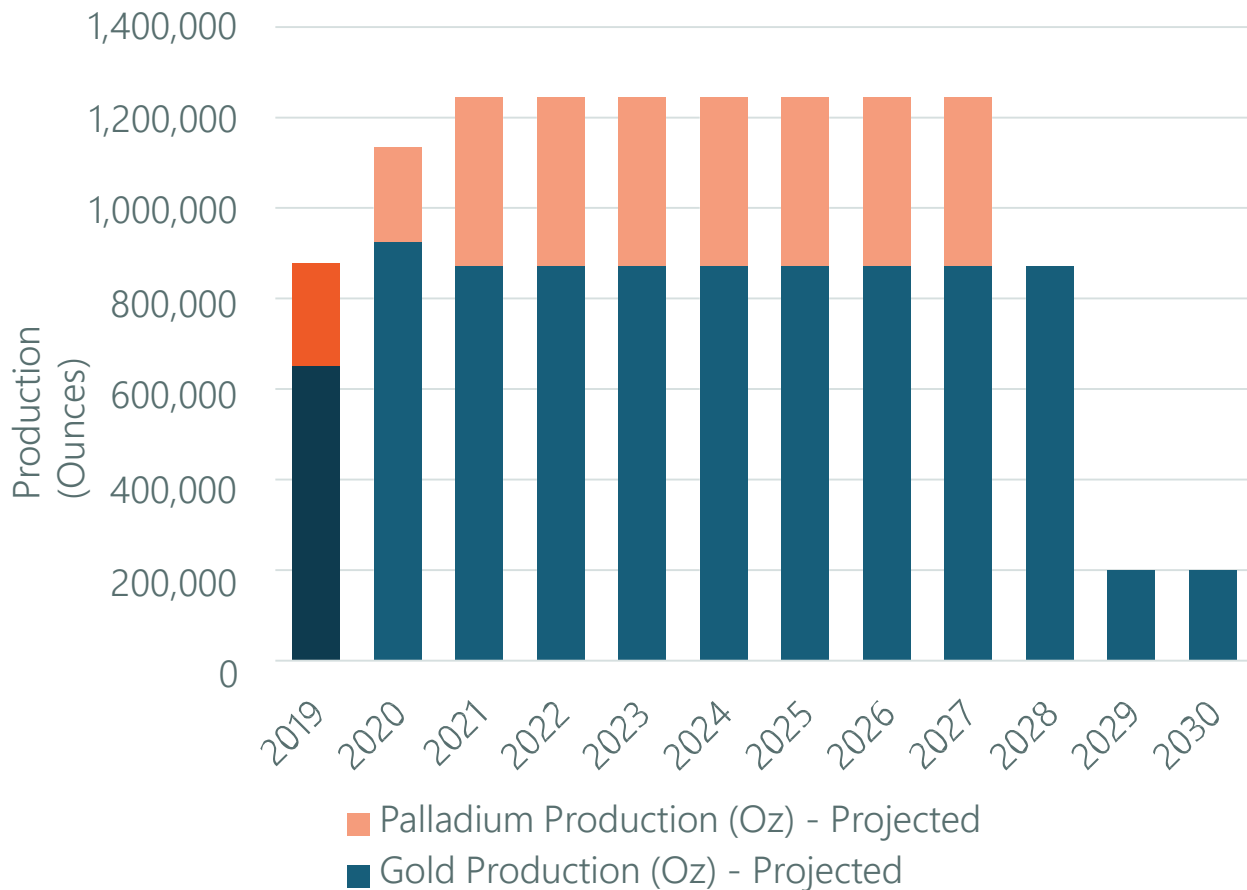
Estimated Electricity Demand Growth in Fort Frances, Thunder Bay and Northern Regions

From 6 new major exploration sites.

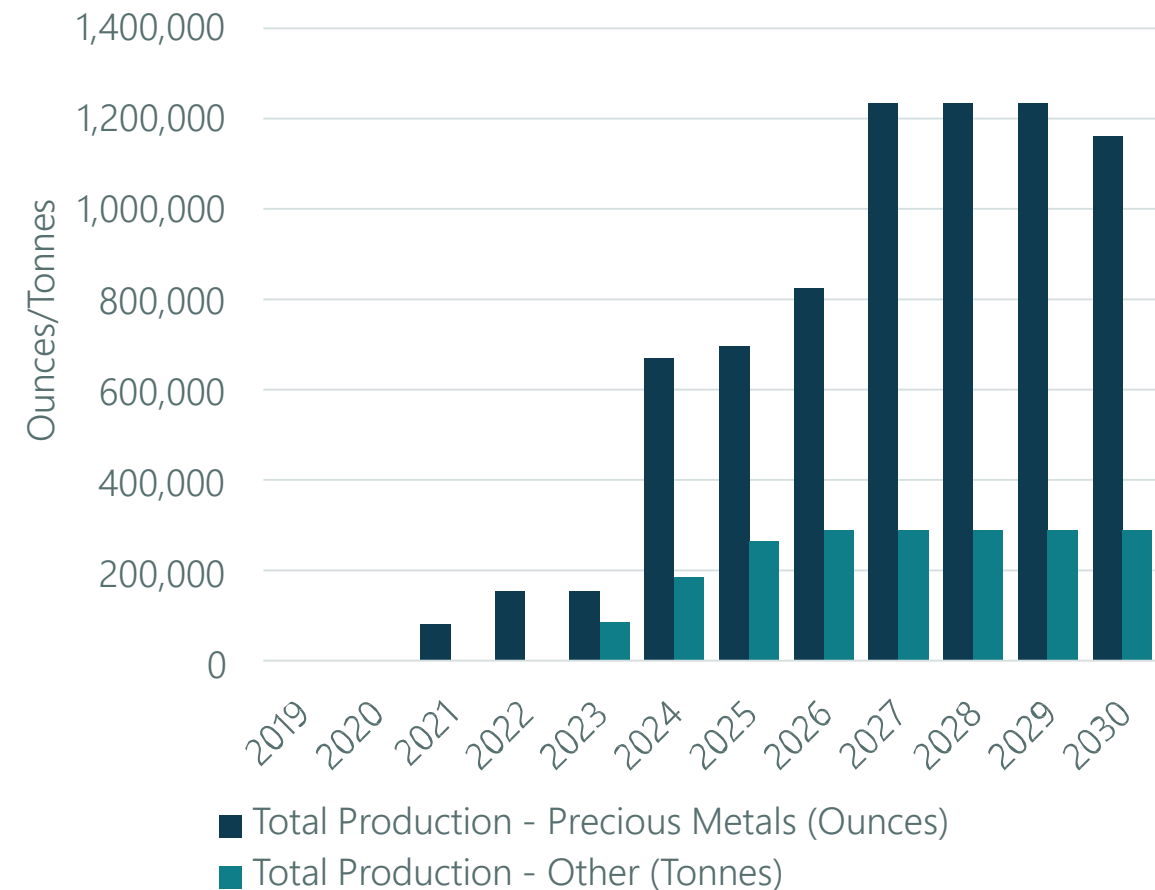
Economic Impact

Projected Mining Output for Current Operating Mines and Major Exploration Projects

Current Operating Mines



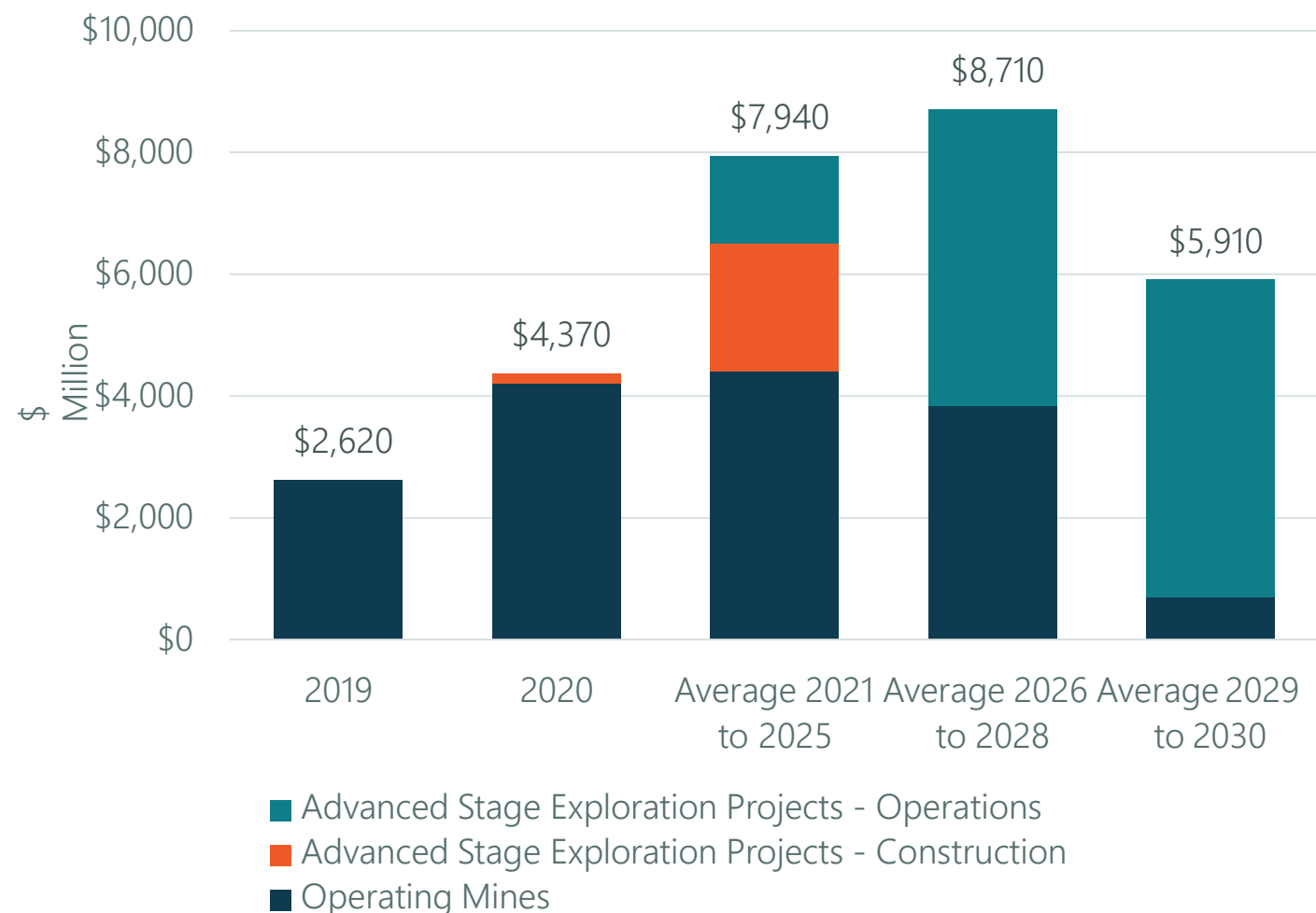
Major Exploration



Economic Impact

Estimated Total Direct, Indirect and Induced Output for Northwestern Ontario

- Economic Output is the total gross value of goods and services produced by a given organization, industry or project, measured by the price paid to the producer. This is the broadest measure of economic activity.
- Direct impacts are changes that occur in “front-end” businesses that would initially receive expenditures and operating revenue as a direct consequence of the operations and activities of a facility.
- Indirect impacts arise from changes in activity for suppliers of the “front-end” businesses.
- Induced impacts arise from shifts in spending on goods and services as a consequence of changes to the payroll of the directly and indirectly affected businesses.



Strategic Recommendations

Main Focus Areas to be Implemented throughout 2021

1. The CEDC should act quickly to implement the strategic recommendations with completion targets by the end of 2021.
2. Leverage technology and digital media by enhancing the CEDC Mining website, allowing ease of access to contemporary information and facilitate the exchange of information and data.
3. Develop or expand on the CEDC mining readiness Marketing and Communications plan to ensure the Thunder Bay is widely known as the node for facilitation, collaboration, training and information of mining related services.
4. Advanced facilitation and knowledge transfer about the regional Mining Supply and Services offerings, making prospective clients and companies aware of who's in the region and able to support the growing mining industry.
5. Promote Thunder Bay as the Workforce Training and Development hub for mining sector and inform the education and training associations of what types of jobs are needed in the future.
6. Improve the regional mining industry stakeholders' awareness (e.g. electricity planning and infrastructure organizations, exploration and mining companies, and provincial and federal government) of the Transportation and Electrical Infrastructure needs and planned or in-progress projects.
7. Evaluate strategic incentives and municipal infrastructure priorities which incentivize Business and Economic Development for the Mining Sector.

Strategic Recommendations

Estimated Implementation Plan

GANTT: Thunder Bay Mining Readiness Strategy		START		2021			
NO.	ACTION	DATE	TIMELINE	Q1	Q2	Q3	Q4
1.1	Implement strategic actions within next 12 mths	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
2.1	Digital media and website enhancement plan	1	2	[Teal bar spanning Q1, Q2]			[Grey bar in Q4]
3.1	Facilitate industry introductions	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
3.2	Provide quarterly dashboard emails	2	1		[Teal bar in Q2]		[Grey bar in Q4]
3.3	Case studies of successful indigenous relations	3	1		[Grey bar in Q2]	[Teal bar in Q3]	[Grey bar in Q4]
3.4	Promote Thunder Bay as a full-service community	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
3.5	Regular government communications on mining	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
4.1	Promote existing mining sector supply/services	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
4.2	Communicate/develop critical mineral processing	2	2		[Teal bar spanning Q2, Q3]		[Grey bar in Q4]
4.3	Enhance existing mining supply/service directory	2	3		[Teal bar spanning Q2, Q3, Q4]		
4.4	Mining sector supply chain info on CEDC website	2	2		[Teal bar spanning Q2, Q3]		[Grey bar in Q4]
4.5	Available vacant land info on CEDC website	2	1		[Teal bar in Q2]		[Grey bar in Q4]
5.1	Gather skills gaps and current/future job data	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
5.2	Facilitate working groups with trainers/educators	2	3		[Teal bar spanning Q2, Q3, Q4]		
5.3	Promote mining skills, positions and training	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
5.4	Provide information on local education/training	2	2		[Teal bar spanning Q2, Q3]		[Grey bar in Q4]
6.1	Gather data on site infrastructure requirements	3	1		[Grey bar in Q2]	[Teal bar in Q3]	[Grey bar in Q4]
6.2	Communicate infrastructure gaps and barriers	4	1		[Grey bar in Q2]		[Teal bar in Q4]
6.3	Public updates on infrastructure initiatives	3	2		[Grey bar in Q2]	[Teal bar spanning Q3, Q4]	
6.4	Prioritize updating the International Airport	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
7.1	Strategic incentives for attracting businesses	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			
7.2	Prioritize municipal infrastructure developments	3	2		[Grey bar in Q2]	[Teal bar spanning Q3, Q4]	
7.3	Develop/expand COVID-19 economic recovery	1	4	[Teal bar spanning Q1, Q2, Q3, Q4]			