



Mining Sector Employment Timeline

Local Employment Planning Council



Acknowledgements

The Local Employment Planning Council (LEPC) and Riverlight Consulting Inc. wish to recognize the organizations in Ontario's mining industry and the Project Manager of Mining Services at the Thunder Bay Community Economic Development Commission (CEDC) who contributed their resources, knowledge and insights for the development of this research.

Note to Readers

The data presented in this report is representative of the latest publicly available information at the time of research for this report.

The views expressed in this report do not necessarily reflect the opinions of the Local Employment Planning Council, our Directors, supporters, partners and the Government of Canada and the Government of Ontario.

The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, site conditions change, or applicable standards are amended, modifications to this report may be necessary.

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This project is funded in part by the Government of Canada and the Government of Ontario.

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1.0 Introduction

Renewed optimism in the Northwestern Ontario mining sector is evident from the significant growth in regional advanced exploration and planned mining development. This growth is expected to result in substantial economic opportunity and social development for the region. This will place unique pressures on community and government services as well as the mining labour market. Taking all necessary steps to ensure that Northwestern Ontario is prepared with a sufficiently trained workforce is key to maximizing retention of economic benefits resulting from the prospective mining development.

The Local Employment Planning Council (LEPC) has been at the forefront of this effort, leading in the creation of innovative labour market solutions by:

- Providing authoritative and evidence-based research;
- Identifying employment trends;
- Targeting workforce opportunities; and
- Initiating workforce development strategies.

By executing on their mandate, the LEPC continues to work towards ensuring that the human resource pool will be strategically aligned, competitively positioned and progressively developed to meet future social and economic demands across Northwestern Ontario.

The LEPC, in collaboration with regional mining experts, has identified nine (9) new mining projects in Northwestern Ontario that are expected to go into construction within the next five to ten years. (Northwestern Ontario currently has 5 gold and one palladium mine.)

The LEPC has retained Riverlight Consulting Inc. to study these nine (9) advanced mining development projects in Northwestern Ontario to provide evidence-based research and identify employment trends in the mining industry, as these projects move into construction and operation within the next 10 years. The goals of this study are to provide:

- The total employment that is expected to be generated by these mining projects;
- Outline the staffing requirements of each mining project using defensible assumptions;
- Identify employment trends;
- Develop a functional model, which can be used to update the findings of this study as new data becomes available or if market conditions change; and
- Customize the model to facilitate LEPC use.

It is our objective to provide the LEPC with a thoroughly researched, intuitive model which can serve their mandate for years to come, and further promote economic development in Northwestern Ontario.

2.0 Regional Mining Overview

2.1 New Mining Projects Covered in this Study

The list of Mining Projects included in this study was developed with LEPC with input provided by regional mining experts. These are all located within the catchment area of the LEPC, and as such contribute towards the organization's goals of creating a strategically aligned, competitively positioned and progressively developed human resource pool to meet future social and economic demands across Northwestern Ontario.

All technical data collected as well as all analyses generated in this Study are based on nine (9) mining projects that are anticipated to become operational over the next ten (10) years. These are advanced exploration projects that have had studies completed ranging from resource estimates through to full feasibility studies. The nine potential mining projects studied are:

- **New Gold Inc.** – Rainy River Mine (Intrepid Zone);
- **Treasury Metals Inc.** – Goliath Gold Project;
- **Greenstone Gold Mines¹** – Greenstone Gold Project;
- **Zen Graphite Ltd.**– Albany Graphite Deposit;
- **Noront Resources Ltd.** – Eagles Nest Project;
- **First Gold Mining Corp.** – Springpole Lake Project;
- **Pure Gold Mining Inc.** – Madsen Gold Project;
- **Frontier Lithium Inc.** – PAK Lithium Project; and
- **Avalon Advanced Minerals Inc.** – Separation Rapids Project.

These projects were selected because they are at feasibility phase and/or are proceeding through environmental assessment, have measured and indicated resources, and have good potential to become producing mines within the next five years. All of these projects are well described by information that is publicly available through news releases and/or on the System for Electronic Document Analysis and Retrieval (SEDAR).

There is no guarantee that these projects will proceed to development. However, for the purposes of forecasting the potential labour market impact of mining sector growth on the Northwestern Ontario region, they are considered to be the projects that are most likely to come to market. Having selected these projects as those most likely to reach the operations stage, it is also reasonable to expect that, even if one or more of these projects does not proceed they will very likely be replaced by others that are currently not as advanced. Based on the active level of exploration currently on-going in Northwestern Ontario, the pipeline of future mining projects is considered to be substantial for the near future.

The mining developments that have been selected for this Study are illustrated in Figure 1 below.

¹ 50/50 partnership between Centerra Gold Inc. and Premier Gold Mines Ltd.

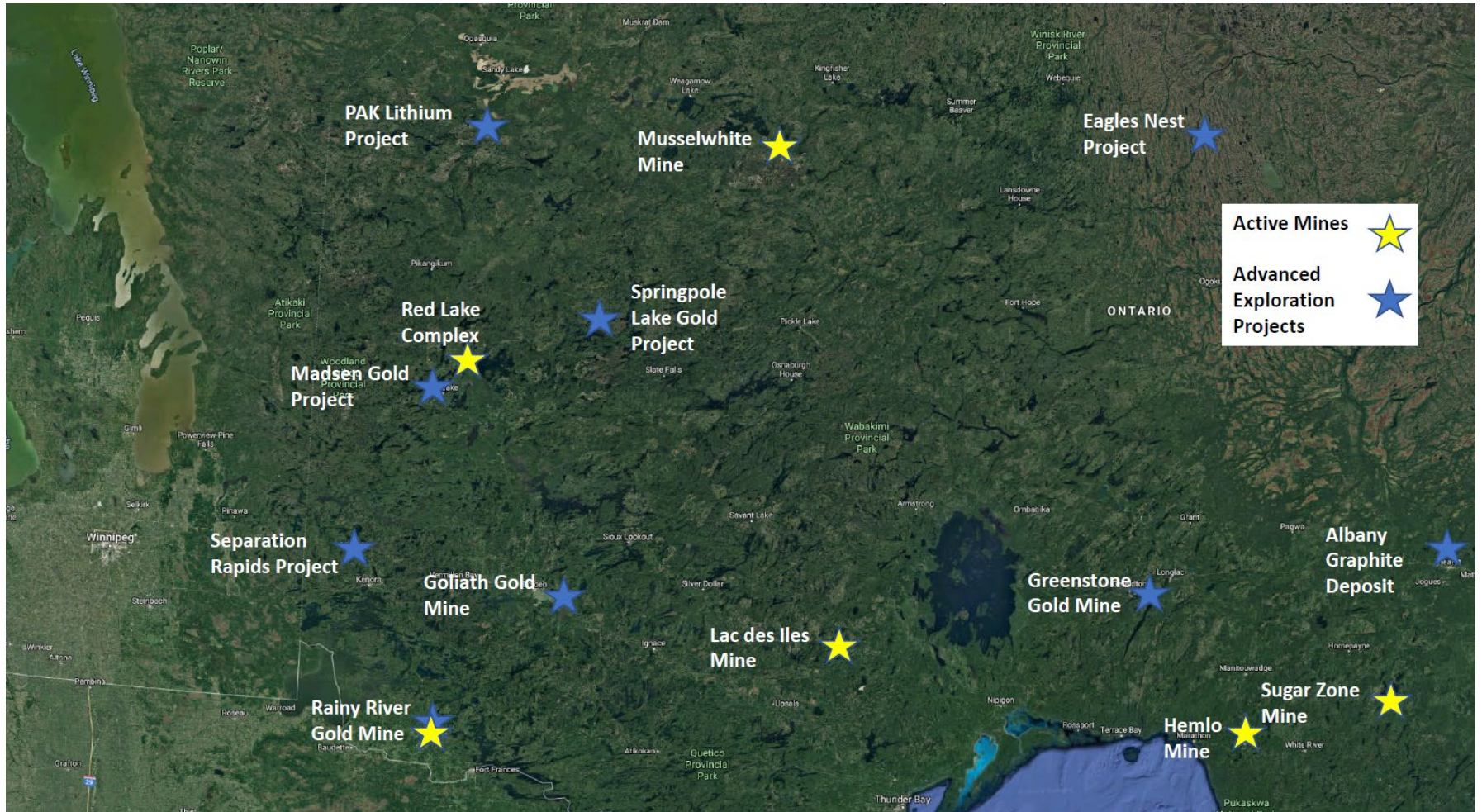


Figure 1 - New Northwestern Ontario Mining Projects

3.0 Mining Employment

Analysis of these nine (9) projects has indicated the significant labour requirements needed across Northwestern Ontario to support the upcoming mining development. While this report outlines the employment projections based on the most recent data available, this section will also outline the methodology undertaken to ensure that the LEPC is able to use this analysis to react to changes in market conditions.

3.1 Introduction to the Model

This Study has incorporated the analysis into an editable model for use by the LEPC to ensure that it can adjust the findings as market conditions change. This process involves reviewing comparable projects to determine key indicators and trends, which can provide additional insight into the most recent available data related to the investigated mining projects.

In providing this Model to the LEPC, it is our hope that the methodology and findings described in this report can prove to be valuable for years to come.

3.2 Methodology

The methodology to develop the Mining Employment Timeline included the following phases:

- Project Profile Development;
- Development of Assumptions; and
- Model Development.

3.2.1 Project Profile Development

Project Profiles were developed through extensive background research and document review related to the nine (9) mining projects. This included but was not limited to:

- Reviewing project feasibility studies, economic assessments, and environmental assessments if completed;
- Reviewing regional economic/ labour market reports that reference the identified mining projects; and
- Reviewing company website, news reports and other publicly available information related to the identified mining projects.

These resulting project profiles identify project characteristics including:

- Mine Type and Phase;
- Construction Start Dates;
- Operation Start Dates;
- Life of Mine duration;
- Published employment requirements for construction & operations employment;
- Capital Expenditure;
- Operational Expenditure; and
- Annual mine output.

➤ Breakdown of Construction and Operation Occupations

A varying amount and quality of information is publicly available for each mining project, primarily due to the phase of development. To overcome gaps in information, assumptions needed to be developed to provide reasonable estimates for key project information.

3.2.2 Development of Assumptions

Assumptions were developed for projects where primary data is absent. These assumptions were based on documents acquired during the Background Research phase, and were derived from comparable projects, regional economic analyses and Statistics Canada data.

Assumptions were tailored to each project related to the key information available in the respective project profile, as well as determining the strongest indicators/trends associated with a specific project due to:

- Commodity;
- Mine Type (open pit/underground);
- Capital/Operational Expenditure; and
- Mine output.

Mine inputs that demonstrated the strongest correlations across comparable projects were used to develop the assumptions for each mining project.

3.2.3 Model Development

The project profiles along with project assumptions have been integrated into an Excel document to create the LEPC Mining Employment Timeline. The model provides an overview of the cumulative employment requirements due to the prospective mining developments included in this Study.

The model has been designed in a manner to allow LEPC staff to edit key project information to facilitate updated projections.

The key findings of this analysis will be presented in the following sections.

3.3 Total Workforce Demand

The total jobs generated by the nine (9) projects included in this analysis were projected over the period of 2019 to 2030. The resulting distribution is illustrated in Figures 2 & 3 below.

PROJECTS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Rainy River (Intrepid Zone inclusive)													
Goliath Gold													
Greenstone Gold													
Albany Graphite													
Eagles Nest													
Springpole Lake													
Madsen Gold													
PAK Lithium													
Separation Rapids													
Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Annual Average
	Construction												
Construction Positions	903	1,466	563	638	1,546	1,388	479	0	0	0	0	0	582
	Operation												
Operation Positions	646	632	1,202	1,506	2,010	2,481	2,655	3,009	3,017	2,963	2,963	2,963	2,170
	Total												
Total Positions	1,549	2,098	1,765	2,143	3,556	3,868	3,134	3,009	3,017	2,963	2,963	2,963	2,752

Figure 2 – New Mining Projects Overview

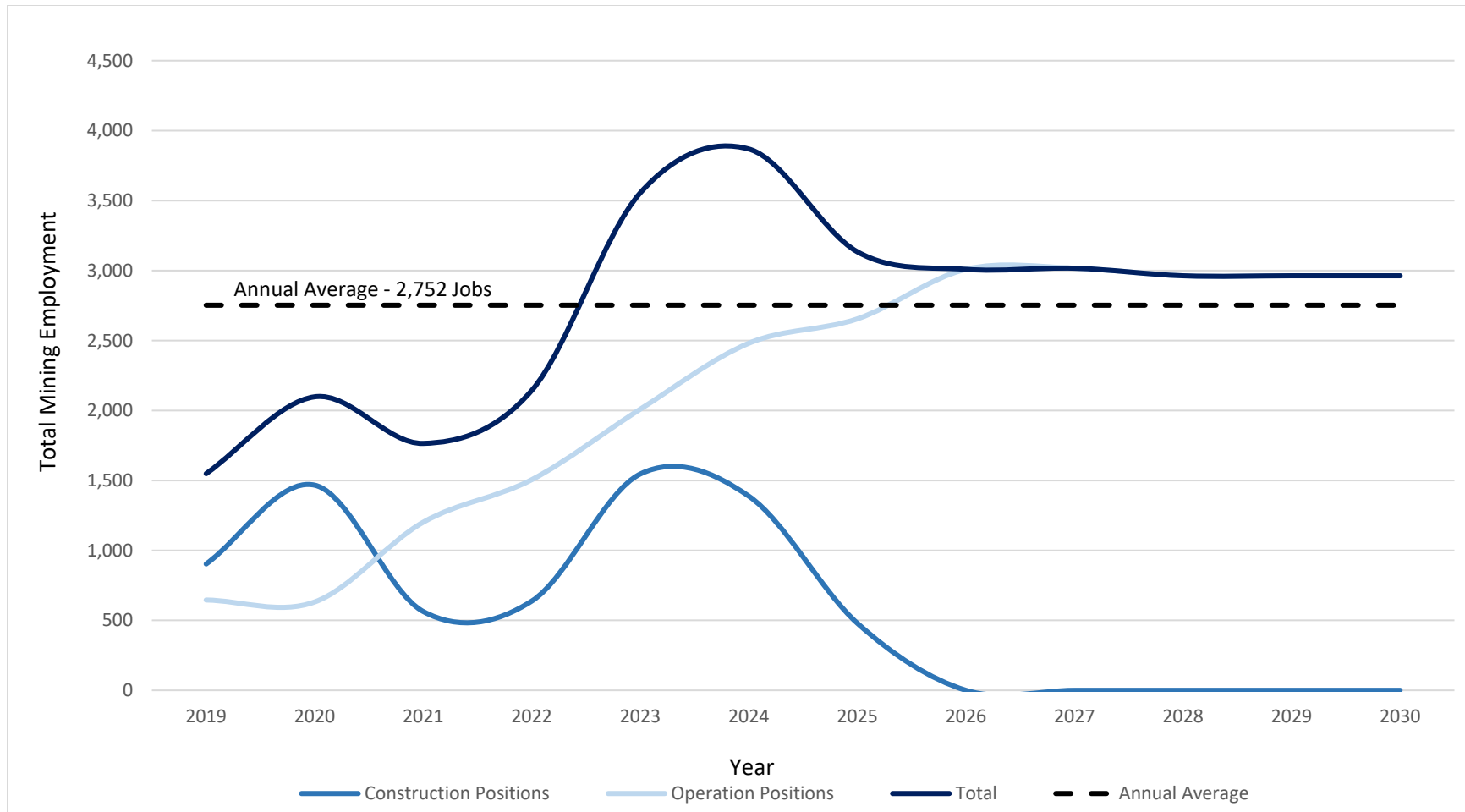


Figure 3 – Total Projected Mining Employment (2019-2030)

From Figures 2 and 3, it is apparent that there is a highest demand for jobs during the 2023-2024 period. This is due to several of the mining projects coming into construction at roughly the same time coupled with the fact that in most cases, the number of workers required during the construction phase significantly exceeds the number of workers required during the operation phase of a project. As such, the data shows a peak mining employment level for these nine (9) projects in 2024 at 3,868 jobs after which there is an observed dip and leveling off of workforce requirements once these projects transition into the operations phase.

3.4 Mining Profession Requirements

Since this study reflects the need of nine (9) separate mining projects, there are several factors present that can affect the distribution of required workforce. The most likely of these is the timing of the projects. Even though the best available data used at the time of this report indicates significant overlap of the construction phases of these projects, the prospect of project delays need to be considered. To correct for this, the average job creation over the twelve-year period (2019-2030) will be used to better reflect what overall hiring requirements will be over that duration. This reduces the risk of following a possible false peak employment level in 2024. The annual average workforce that will be sustained over the time period (2019-2030) is projected to be 2,752 workers.

3.4.1 Employment during Construction Phase

Table 1 below illustrates the sustained mine construction employment projections over the 2019-2030 period.

Table 1 - Mining Employment Categories (Construction)

Construction Staff	Annual Average (2019-2030)
Infrastructure	
General Site Preparation	30
Workshops/Storage	41
Support Facilities	21
Camp	2
Fuel Systems	11
Other Facilities	0
Sub-Total	105
Power and Electrical	
High Voltage	28
Site Power Distribution	7
IT and Site Communications	14
Sub-Total	49
Water & Tailings Management	
Potable Water	3
Reclaim Water	5
Tailings Management Facility	42
Surface Water Management	10
Effluent Water Management	9
Fire Water	1
Domestic Sewage	1
Sub-Total	71
Process Plant General	
Process Plant	15



Construction Staff	Annual Average (2019-2030)
Crushing and Ore Handling	19
Grinding and Gravity	19
Pre-Leach/Leach/CIP	15
CN Detox& Final Tails	4
Acid Wash, Elution, Carbon Regeneration	2
Refinery	0
Electrical Process Plant	5
Plant Reagent & Services	4
Plant Supply	0
Sub-Total	82
Construction Indirect Costs	
Engineering	55
Construction Facilities & Services	38
Contractor Mobilization & Demobilization	47
Construction Camp Facilities and Operation	35
Sub-Total	175
General Services	
Departments	33
Logistics/Taxes/Insurance	15
Operations Accommodations	1
Sub-Total	49
Preproduction, Startup, Commissioning	
Mining Preproduction / Commissioning	22
Mining Haul Roads	2
Spares & First Fills	3
Process Plant Preproduction / Commissioning	11
Operational Readiness Support	3
Sub-Total	41
Total	582

In this study, the total employment projected to be required by the prospective mining projects during the construction phase is defined by 7 occupation categories. These construction categories have been tied to major capital expenditures projected at the beginning of each project. Assumptions were derived for each subcategory and refined based on the distribution of capital expenditures provided in technical reports related to each project.

Table 1 illustrates that 582 construction jobs are expected to be sustained throughout the 2019 to 2030 time period. Though this may seem like a low number, due to the fact that typically, more jobs are required during construction than operation, to the relatively brief duration of the construction phase (typically 2 years) brings down the average. Construction jobs are projected to peak in 2023 at 1,546 jobs.

The requirements in each of these categories are summarized in Table 1 above, which is derived from the model in Appendix A. The distribution of these categories is further defined in Figure 4.

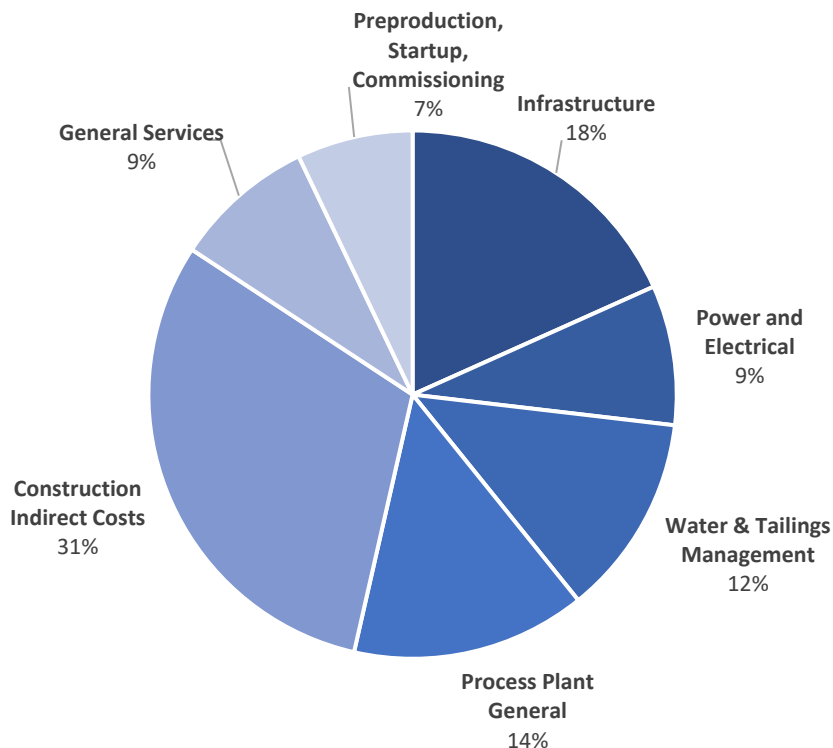


Figure 4 - Distribution of Construction Occupations

Both Table 1 and Figure 4 illustrate that the three largest employment categories during the construction phase are Infrastructure, Process Plant General and Construction Indirect Costs, which collectively account for more than 60% of total employment.

3.4.2 Employment during Operation Phase

Table 1 below illustrates the sustained mine operation employment projections over the 2019-2030 period.

Operations Staff	Annual Average (2019-2030)
G&A Services	
Mine Manager	9
HR Superintendent	8
HR Clerk	3
Recruiter	5
Mine Clerk (Document Mgmt.)	9
Receptionist/Office Administrator	17
Accountant	13
Purchasing	21



Operations Staff	Annual Average (2019-2030)
Warehouse Clerk (Shipping/Receiving)	50
H&S Coordinator	10
H&S Trainer	11
Community/ First Nation Relations Manager	12
Environmental Coordinator	8
Environmental Technician	9
IT	15
Security/First Aid Person	25
Dryman	8
Chief Geologist	9
Chief Engineer	17
Long Range Planner Engineer	2
Mech. Eng.	3
Elec. Eng.	8
Yard Man	22
Technical Services	
Senior Geologist	16
Geological technician	29
Pit geologist	18
Sampler	21
Hydrology Specialist	5
Long Term Planner engineer	7
Production Engineer	21
Surveyor	21
Rock mechanic Engineer	2
Drill and Blast Technician	4
Maintenance	
Maint. Superintendent	8
Chief mechanic	10
Foreman Mechanics	16
Mechanics	116
Mechanic helpers	71
Mechanical Engineer	10
Planner	7
Welder	44
Machinist	4
Supervision Operation	
Superintendent	9
Mine Captain	31
Shift Boss	42
Mine clerk	8



Operations Staff	Annual Average (2019-2030)
Operation	
Driller - Drill & Blast	79
Driller helpers	21
Sharpener - Drill & Blast	6
Shovel Operators	64
Loader operator	71
Truck Drivers	194
Dozer Operators - Road & Dump	44
Grader Operators - Road & Dump	40
Service operator - Service	75
Labourer - Service	132
Trainer - Supervision	19
Mill & Assay Lab	
Mill/Assistant Mill Superintendent	46
Trainer - Supervision	18
Technical (Metallurgist, Technician)	84
General Operations/Shift Foreman	30
Operators (Crushing, Grinding, CIL)	167
Mechanical/Electrical Planner	16
Maintenance Foreman (Mech, Elec)	10
Maintenance (Millwright, Welder)	61
Electrician/Instrumentation Technician	51
Site Services	34
Chief Chemist	8
Technicians (Sample Prep, Wet Lab, Assays)	82
Total	2,162

Table 2 Mining Employment Categories (Operation)

In this study, the total employment projected to be required by the prospective mining projects during the operation phase is defined by 6 occupational categories. These occupational categories have been tied to major operational expenditures expected during the life of each project. Assumptions were derived for each subcategory and refined based on the distribution of operational expenditures and mine output provided in technical reports related to each project.

Table 2 illustrates that 2,618 operation jobs are expected to be sustained throughout the 2019 to 2030 time period. This is due to the sustained nature of the operations phase. Operation jobs are expected to peak in 2027 at 3,017 jobs.

The requirements in each of these categories are summarized in Table 2 above, which is derived from the model in Appendix A. The distribution of these categories is further defined in Figure 5.

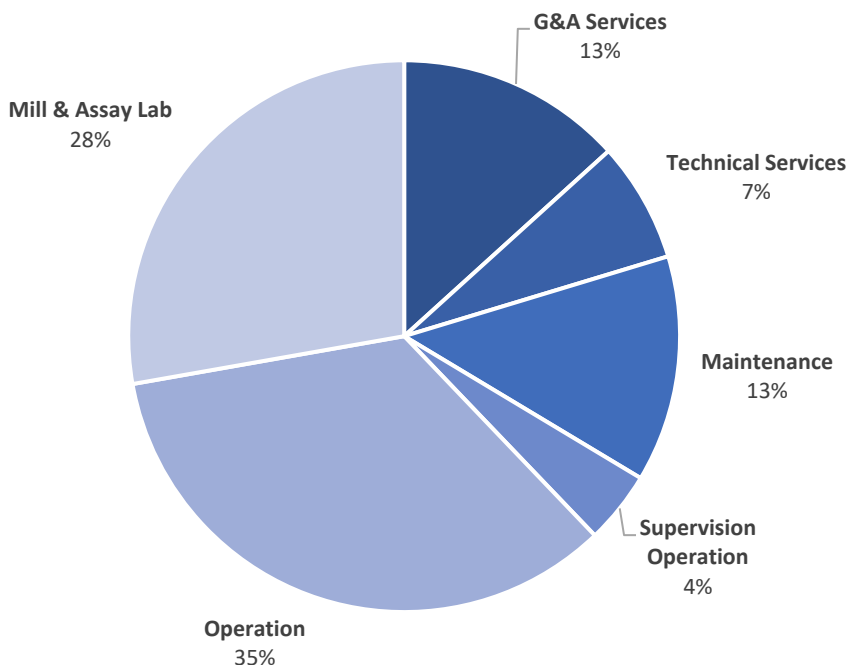


Figure 5 - Breakdown of Operation Jobs

Table 2 and Figure 5 illustrate that the three largest employment categories during the operation phase are Operation, Mill & Assay Lab and Maintenance, which collectively account for about 75% of total employment.

3.5 Employment Trends and Challenges

As discussed in this section, the cumulative effect of anticipated mining development in Northwestern Ontario is projected to lead to a sizeable positive employment growth for Northwestern Ontario. However, it is also important to understand the trends challenges facing the mining industry. These include:

- **Labour Shortage:** The labour market within Northwestern Ontario is tight, especially for positions that require advanced training, trade certifications, and/or education. Mining companies in the region have expressed concern that there are challenges with attracting and retaining employees for their operations, resulting in skilled positions remaining unfilled.
- **Mobile Workforce:** The workforce in the mining industry is highly mobile, as the industry is global with many international companies that have operations worldwide. Thus, the competition for skilled labour is high as workers can move from one operation to the other. According to the MIHRC, many skilled mining workers have left the Thunder Bay district and relocated to Southern Ontario or other regions of Canada including Alberta and Saskatoon.
- **Aging Workforce:** The skilled workforce is aging. The aging workforce requires that Thunder Bay district will need to replace a large number of experienced workers within the next 5 to 10



years. By 2027, the Mining Industry Human Resources Council (MiHR) forecasts more than 52,000 employees will retire from the sector, which represents over 25% of the industry's current workforce by MiHR definitions. This will result in a significant loss of industry knowledge and experience

- **Immigration:** When the local, provincial and national labour market is not able to meet the employment opportunities for a given sector, companies may turn to international sources for talent. Immigrants will be a key source of talent as mining seeks to meet hiring needs in the years ahead. Mining is a global industry and many skilled workers come to Canada to find opportunities. Both efforts to attract immigrants to work in remote communities and streamlining of processes for foreign-credential recognition will be important.
- **Mining as a Career of Choice:** Fewer young people are entering the Canadian labour market and only a small portion of them are attracted to the mining industry. To meet future needs, industry players will need to coordinate intensified efforts to raise awareness of the mining industry, debunk “mining myths” among young people and remove barriers to youth participation in the industry.
- **Indigenous people:** Indigenous people are well positioned to take advantage of employment opportunities and significantly decrease their regionally high unemployment rates. Although the Indigenous people are well positioned from a demographic standpoint, many require development in literacy and numeracy in order to successfully prepare them for many training and educational programs and to be able to sustain potential employment opportunities. Many residents living in First Nations communities are not mobile. Educational and training institutions, First Nations Education Services, government agencies and mining companies should collaborate to identify training opportunities to help the Indigenous population maximize their ability to take advantage of the many employment opportunities that will be created from the growth in the regional economy. Lack of adequate housing in communities, doctors, amenities and services will prove problematic in attraction and retention efforts.
- **Women in Mining:** Women are broadly under-represented in the Canadian mining industry, making up just 17%² of the workforce. Removing barriers and encouraging women into leadership roles will address both labour shortages and the leadership challenges. Women are also mainly employed in clerical and corporate services roles, with participation lower than 5% in most trades and production roles.

² MiHCR, 2016

4.0 Recommendations

The style of this report does not lend itself well to recommendations as the primary focus of the study has been on development of the adaptive mining employment timeline. However, following many of the observations noted in this report, there are some key high-level recommendations for LEPC which could assist in the advancement of their vision.

- It is recommended that LEPC continuously update the Mining Employment Timeline as new data on each mining project becomes available. Failure to do so will result in this product being “static” instead of “dynamic”
- It is recommended that LEPC use the Mining Employment Timeline in a “conservative” manner; always under-representing the potential scale of growth. This will help to ensure that expectations remain manageable and that economic development planning, and other programs are designed accordingly.
- It is recommended that LEPC continue its commendable work in liaising with industry experts to identify additional mining projects that may be coming through the pipeline.
- It is recommended that LEPC continue to work with regional educational providers to ensure that current students are aware of the avenues available to them in the mining industry. As discussed in this report, the peak of mining employment is expected to meet during 2023-2024, which allows time for current students to be trained through any of the following:
 - Dual Credit Programs;
 - Co-op Programs;
 - Specialist High Skills Major Programs;
 - Ontario Youth Apprenticeship Program;
 - Colleges;
 - Universities;
 - Distance Education; and
 - Apprenticeships.
- While there is an understanding that a significant percentage of the existing mining sector workforce entering retirement (approximately 25% of the workforce by 2027), further research and analysis should be done into the key skillsets that will be lost in Northwestern Ontario due to this exodus. This will help determine additional gaps where the future human resource pool need to fill.

5.0 Disclaimer

This report has been prepared and the work referred to in this report has been undertaken by the Riverlight Consulting Inc. for the exclusive use of North Superior Workforce Planning Board (LEPC), who has been party to the development of the scope of work and understands its limitations. The methodology, findings, conclusions, and recommendations in this report are based solely upon the scope of work and subject to the time and budgetary considerations described in the proposal and/or contract pursuant to which this report was issued. Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. Riverlight Consulting Inc. accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

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This report must be read as a whole, as sections taken out of context may be misleading. If discrepancies occur between the preliminary (draft) and final versions of this report, it is the final version that takes precedence. Nothing in this report is intended to constitute or provide a legal opinion.

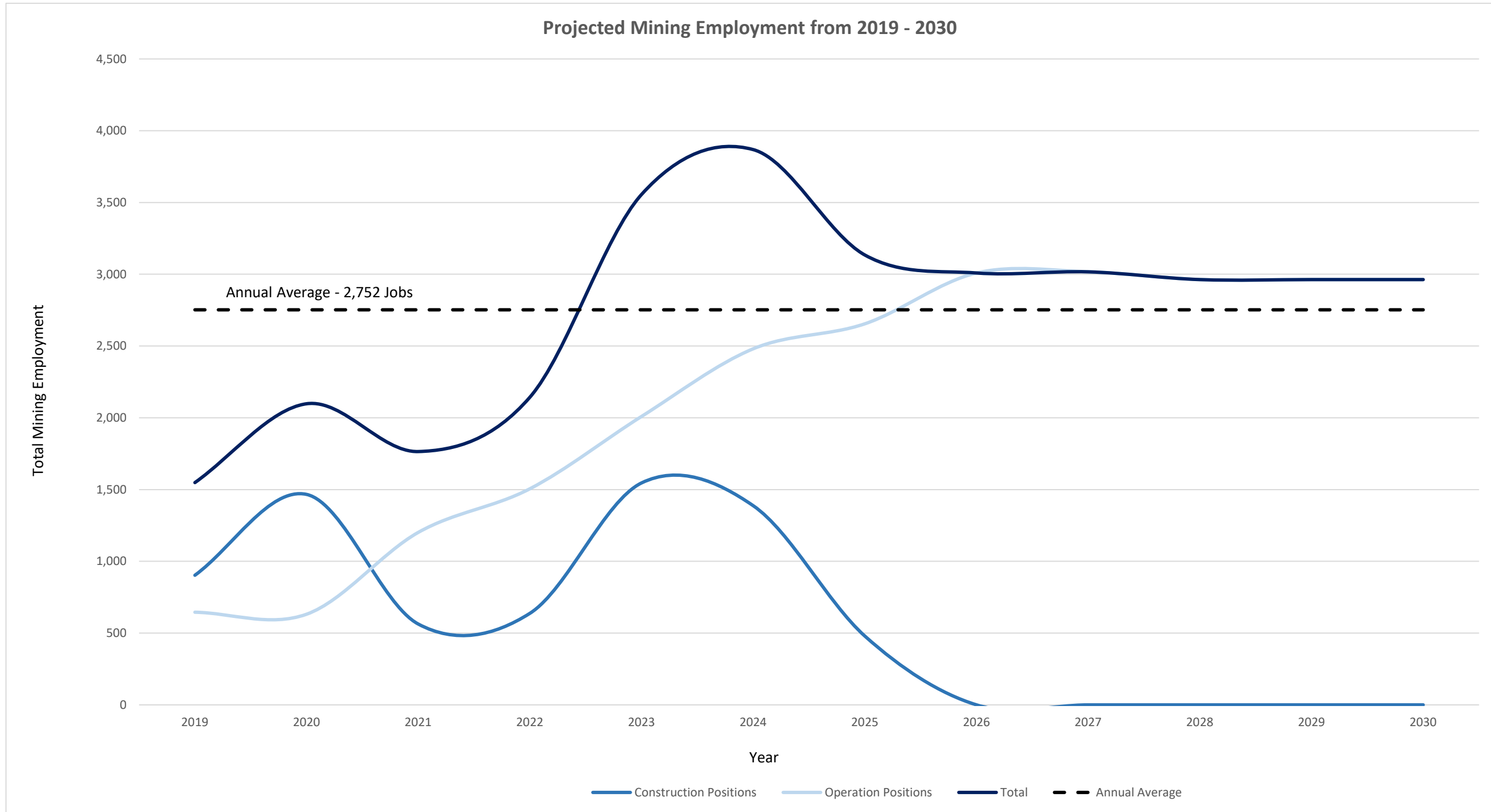


Appendix A

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NSWPB
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Operation Positions	646	632	1,202	1,506	2,010	2,481	2,655	3,009	3,017	2,963	2,963	2,963	2,170
		Total											
Total Positions	1,549	2,098	1,765	2,143	3,556	3,868	3,134	3,009	3,017	2,963	2,963	2,963	2,752



NSWPB
Mining Employment Timeline

Construction Staff	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Annual Average
Infrastructure													
General Site Preparation	45	78	33	32	77	69	24	0	0	0	0	0	30
Workshops/Storage	62	107	45	43	105	95	33	0	0	0	0	0	41
Support Facilities	32	55	23	22	55	49	17	0	0	0	0	0	21
Camp	3	5	2	2	5	5	2	0	0	0	0	0	2
Fuel Systems	16	28	12	11	28	25	9	0	0	0	0	0	11
Other Facilities	0	1	0	0	1	1	0	0	0	0	0	0	0
Sub-Total	158	274	116	111	270	243	84	0	0	0	0	0	105
Power and Electrical													
High Voltage	47	71	24	27	75	73	25	0	0	0	0	0	29
Site Power Distribution	11	17	6	7	18	18	6	0	0	0	0	0	7
IT and Site Communications	23	34	11	13	36	35	12	0	0	0	0	0	14
Sub-Total	81	122	41	47	129	125	43	0	0	0	0	0	49
Water & Tailings Management													
Potable Water	4	7	2	3	7	7	2	0	0	0	0	0	3
Reclaim Water	8	11	4	4	12	12	4	0	0	0	0	0	5
Tailings Management Facility	70	105	35	41	111	108	37	0	0	0	0	0	42
Surface Water Management	17	26	9	10	27	26	9	0	0	0	0	0	10
Effluent Water Management	15	22	7	8	23	22	8	0	0	0	0	0	9
Fire Water	1	2	1	1	2	2	1	0	0	0	0	0	1
Domestic Sewage	2	3	1	1	3	3	1	0	0	0	0	0	1
Sub-Total	117	176	58	68	186	180	62	0	0	0	0	0	71
Mobile Equipment													
Mine Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Plant and Surface Mobile Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Process Plant General													
Process Plant	25	37	12	14	39	38	13	0	0	0	0	0	15
Crushing and Ore Handling	31	46	15	18	49	48	16	0	0	0	0	0	19
Grinding and Gravity	31	47	16	18	50	48	17	0	0	0	0	0	19
Pre Leach/Leach/CIP	24	36	12	14	39	37	13	0	0	0	0	0	15
CN Detox& Final Tails	6	9	3	4	10	9	3	0	0	0	0	0	4
Acid Wash, Elution, Carbon Regeneration	3	5	2	2	5	5	2	0	0	0	0	0	2
Refinery	1	1	0	0	1	1	0	0	0	0	0	0	0
Electrical Process Plant	8	12	4	5	13	13	4	0	0	0	0	0	5
Plant Reagent & Services	6	10	3	4	10	10	3	0	0	0	0	0	4
Plant Supply	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total	136	204	68	79	216	210	72	0	0	0	0	0	82

**NSWPB
 Mining Employment Timeline**

Construction Indirect Costs													
Engineering	83	144	61	58	142	128	44	0	0	0	0	0	55
Construction Facilities & Services	58	101	42	41	99	89	31	0	0	0	0	0	38
Contractor Mobilization & Demobilization	71	124	52	50	122	110	38	0	0	0	0	0	47
Construction Camp Facilities and Operation	53	92	39	37	90	82	28	0	0	0	0	0	35
Sub-Total	266	460	194	185	453	408	141	0	0	0	0	0	176
General Services - Owner's Cost													
Departments	55	83	28	32	88	85	29	0	0	0	0	0	33
Logistics/Taxes/Insurance	25	37	12	14	39	38	13	0	0	0	0	0	15
Operations Accommodations	2	4	1	1	4	4	1	0	0	0	0	0	1
Sub-Total	82	123	41	48	130	126	44	0	0	0	0	0	50
Preproduction, Startup, Commissioning													
Mining Preproduction / Commissioning	34	58	25	23	57	52	18	0	0	0	0	0	22
Mining Haul Roads	3	6	2	2	5	5	2	0	0	0	0	0	2
Spares & First Fills	4	8	3	3	8	7	2	0	0	0	0	0	3
Process Plant Preproduction / Commissioning	16	28	12	11	27	25	8	0	0	0	0	0	11
Operational Readiness Support	4	8	3	3	7	7	2	0	0	0	0	0	3
Pre-production Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0
Contingency	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-Total	61	106	45	43	105	94	33	0	0	0	0	0	41
Total	903	1,466	563	638	1,546	1,388	479	0	0	0	0	0	582

NSWPB
Mining Employment Timeline

Operations Staff	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Annual Average
G&A Services													
Mine Manager	3	3	5	6	8	9	11	13	13	13	13	13	9
HR Superintendent	3	3	4	5	7	8	10	12	12	12	12	12	8
HR Clerk	0	0	1	1	1	3	4	5	5	5	5	5	3
Recruiter	3	3	4	4	7	6	7	7	7	7	7	7	5
Mine Clerk (Document Mgmt.)	3	3	5	6	8	9	11	13	13	13	13	13	9
Receptionist/Office Administrator	6	6	8	10	14	17	20	24	24	24	24	24	17
Accountant	3	3	7	8	10	14	17	20	20	20	20	20	13
Purchasing	9	8	11	13	20	21	25	29	29	29	29	29	21
Warehouse Clerk (Shipping/Receiving)	20	20	28	34	50	58	64	65	65	65	65	65	50
H&S Coordinator	3	3	5	6	8	9	12	16	16	16	16	16	10
H&S Trainer	3	3	5	6	9	11	14	17	17	17	17	17	11
Community/ First Nation Relations Manager	6	6	5	7	12	11	14	16	16	16	16	16	12
Environmental Coordinator	3	3	4	5	7	8	10	12	12	12	12	12	8
Environmental Technician	3	3	5	6	9	11	12	12	12	12	12	12	9
IT	6	6	8	10	14	17	19	21	21	21	21	21	15
Security/First Aid Person	0	0	14	14	14	25	31	41	41	41	41	41	25
Dryman	0	0	5	5	5	11	11	11	11	11	11	11	8
Chief Geologist	3	3	5	6	8	9	11	13	13	13	13	13	9
Chief Engineer	6	6	8	10	14	17	20	24	24	24	24	24	17
Long Range Planner Engineer	0	0	1	1	1	3	3	3	3	3	3	3	2
Mech. Eng.	0	0	1	1	1	3	4	5	5	5	5	5	3
Elec. Eng.	3	3	4	5	7	8	10	12	12	12	12	12	8
Yard Man	6	6	14	15	20	28	29	29	29	29	29	29	22
Technical Services													
Senior Geologist	6	6	9	11	15	18	20	22	22	22	22	22	16
Geological technician	6	6	13	20	29	31	39	42	42	42	42	42	29
Pit geologist	3	3	13	14	16	22	23	25	25	25	25	25	18
Sampler	6	6	11	13	17	22	26	29	29	29	29	29	21
Hydrology Specialist	3	3	3	4	6	6	7	7	7	7	7	7	5
Long Term Planner engineer	3	3	4	5	7	8	9	9	9	9	9	9	7
Production Engineer	9	8	11	14	20	23	26	28	28	28	28	28	21
Surveyor	6	6	11	13	17	22	26	29	29	29	29	29	21
Rock mechanic Engineer	0	0	1	1	1	3	3	3	3	3	3	3	2
Drill and Blast Technician	0	0	3	3	3	5	5	5	5	5	5	5	4
Maintenance													
Maint. Superintendent	3	3	4	5	7	8	10	12	12	12	12	12	8
Chief mechanic	3	3	6	7	9	10	12	14	14	14	14	14	10
Foreman Mechanics	3	3	10	11	13	19	20	22	22	22	22	22	16
Mechanics	37	36	69	80	109	138	151	155	155	155	155	155	116
Mechanic helpers	26	25	40	48	68	81	91	96	95	95	95	95	71

NSWPB
Mining Employment Timeline

Mechanical Engineer	3	3	4	5	7	8	11	15	15	15	15	15	10
Planner	3	3	4	5	7	8	9	9	9	9	9	9	7
Welder	17	17	25	30	43	51	56	58	58	58	58	58	44
Machinist	0	0	1	1	1	3	5	8	8	8	8	8	4
Supervision Operation													
Superintendent	3	3	5	6	8	9	11	13	13	13	13	13	9
Mine Captain	11	11	16	30	40	42	39	40	40	36	36	36	31
Shift Boss	11	11	25	39	49	59	55	55	54	50	50	50	42
Mine clerk	3	3	4	5	7	8	10	12	12	12	12	12	8
Operation													
Driller Drill & Blast	32	31	70	79	84	105	82	100	99	88	88	88	79
Driller helpers	6	6	17	19	19	25	23	30	30	28	28	28	21
Sharpener Drill & Blast	0	0	3	3	3	5	7	11	11	11	11	11	6
Shovel Operators	11	11	46	50	51	67	70	94	94	90	90	90	64
Loader operator	11	11	36	61	80	85	91	98	98	94	94	94	71
Truck Drivers	46	45	117	156	202	254	243	253	262	250	250	250	194
Dozer Operators Road & Dump	11	11	33	36	38	59	52	61	61	57	57	57	44
Grader Operators Road & Dump	11	11	22	36	46	56	52	52	51	47	47	47	40
Service operator Service	0	0	29	28	43	88	103	116	124	124	124	124	75
Labourer Service	32	31	64	92	122	143	162	192	191	186	186	186	132
Trainer Supervision	6	6	8	13	19	22	25	25	25	25	25	25	19
Mill & Assay Lab													
Mill/Assistant Mill Superintendent	23	22	23	32	48	51	58	59	59	59	59	59	46
Trainer Supervision	9	8	10	12	19	20	22	24	24	24	24	24	18
Technical (Metallurgist, Technician)	26	25	34	43	62	73	80	132	132	132	132	132	84
General Operations/Shift Foreman	9	8	12	15	22	25	28	48	48	48	48	48	30
Operators (Crushing, Grinding, CIL)	72	70	90	115	167	193	212	216	216	216	216	216	167
Mechanical/Electrical Planner	6	6	7	10	13	17	18	24	24	24	24	24	16
Maintenance Foreman (Mech, Elec)	3	3	5	6	9	11	12	14	14	14	14	14	10
Maintenance (Millwright, Welder)	17	17	30	38	49	67	72	89	88	88	88	88	61
Electrician/Instrumentation Technician	17	17	26	32	44	56	62	72	72	72	72	72	51
Site Services	14	14	16	21	32	34	38	47	46	46	46	46	34
Chief Chemist	3	3	4	5	7	8	9	11	11	11	11	11	8
Technicians (Sample Prep, Wet Lab, Assays)	29	28	42	52	73	90	98	115	114	114	114	114	82
Total	646	632	1,202	1,506	2,010	2,481	2,655	3,009	3,017	2,963	2,963	2,963	2,170

NSWPB
Mining Employment Timeline

Mine	Mining Company	Mine Type	Construction Start Year	Construction Duration	Production Start Year	Mine Life
Rainy River (Intrepid Zone inclusive)	New Gold	Gold - Underground	2020	2	2022	14
Goliath Gold	Treasury Metals	Gold - Open pit then underground	2020	2	2022	13
Greenstone Gold	Greenstone Gold	Gold	2019	2	2021	15
Albany Graphite	Zen Graphite	Graphene	2024	2	2026	10
Eagles Nest	Noront Resources	Copper/ Nickel - Open Pit	2021	2	2023	11
Springpole Lake	First Mining Gold Corp	Gold - Open Pit	2022	2	2024	12
Madsen Gold	Pure Gold	Gold - Underground	2019	2	2021	14
PAK Lithium	Frontier Lithium	Lithium - Open Pit and Underground	2023	2	2025	16
Separation Rapids	Avalon Advanced Materials	Lithium - Open Pit	2024	2	2026	10

First Year in Model	2019
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	Rate	Date updated
\$US to \$Cad conversion rate	1.34	08-Apr



Local Employment
Planning Council



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