Advantage Northwest

Mining Readiness Strategy

OPPORTUNITIES • PARTNERSHIPS • PROSPERITY

Mining Readiness Strategy:

An Integrated Regional Economic Development Plan

Final Report

April 2013

City of Thunder Bay — Superior by Nature

Respecting the Past — Embracing the Future

Fort William First Nation

Thunder Bay CEDC

EXECUTIVE SUMMARY

Introduction and Strategy Context

The Northwestern Ontario region is forecasting **significant growth in mineral exploration and mining development**. This growth is expected to result in substantial economic and social development for Thunder Bay, its surrounding municipalities and First Nation communities. The discovery and development of **major gold deposits**, **nickel and chromite** in Northwestern Ontario's "Ring of Fire" and other mineral resources are expected to create a variety of business opportunities that positively influence the Region's economic outlook. This growth will place unique pressures on infrastructure and government services as well as the current, and future, mining labour market.

The Mining Readiness Strategy (Strategy) is a **comprehensive, inclusive and integrated economic development plan** designed to help Northwestern Ontario stakeholders focus and capitalize on the many opportunities that mining development will bring to the Region.

The Strategy was commissioned by the City of Thunder Bay, the Thunder Bay Community Economic Development Commission (CEDC) and the Fort William First Nation (FWFN) with funding support from a number of partners including FedNor, the Northern Ontario Heritage Fund, and other contributors such as the Thunder Bay International Airports Authority Inc., the Thunder Port Authority, Thunder Bay Hydro, TBay Tel, the Northwestern Ontario Municipal Association (NOMA), Lakehead University and Confederation College.

Social and Community

The Strategy included a community and stakeholder engagement program. The intent of the consultation and engagement process was to develop an understanding of the actions currently underway in response to potential mining opportunities and how previous experiences with mining are shaping current and future interest and priorities.

The consultation and engagement process consisted of a number of activities:

- Compiling a list of all stakeholders and refining/updating the list throughout the study as surveys were conducted, and through input received from focus groups and public information sessions.
- Organizing and conducting telephone surveys, focus group and public information sessions.
- Conducting community meetings in the City of Thunder Bay and the FWFN to provide members of the public an opportunity to learn about the potential for mining in Northwestern Ontario, to understand the purpose of this Strategy, and to provide input.

The ultimate goal of the public consultation process was to inform stakeholders of the Project, gather feedback, respond to stakeholder comments and questions, and incorporate the outcome of this process through the development of the Strategy.

Mining

Analyses of potential impacts and benefits reported in this Strategy are based on **10 mining projects**. Nine of these are advanced exploration projects that have had studies completed ranging from resource estimates through full feasibility studies. The other is a proposed expansion to an existing mine. The ten potential projects under study are as follows:

- Cliffs Natural Resources Inc. – Black Thor Chromite Project (Ring of Fire area)
- Noront Resources Ltd. – Eagle's Nest Nickel, Copper, Platinum, Palladium Project (Ring of Fire area)
- Rainy River Resources Ltd. – Richardson Twp. Gold Project (Kenora)
- Rubicon Minerals Corporation – Phoenix Gold Project (Red Lake)
- Osisko Resources Ltd- Hammond Reef Gold Project (Thunder Bay South)
- Stillwater Mining (Canada) Ltd. – Marathon copper-PGE Deposit (Thunder Bay South)
- Bending Lake Iron Group Limited – Bending Lake Iron Property (Kenora)
- Treasury Metals Inc. – Goliath Gold Project (Kenora)
- Goldcorp Inc. – Cochenour/Bruce Channel Gold Project (Red Lake)
- North American Palladium Ltd. – Lac des Iles Project (expansion project) (Thunder Bay South)

For the purposes of analyzing the potential economic impact of mining sector growth, these 10 projects are considered to have the **best chance of proceeding to construction and operation**. Due to the extensive exploration activity and high geological potential within Northwestern Ontario, it is reasonable to expect that if one or more of these projects does not proceed they **will be replaced by others** that are currently not as advanced.

Economic Impact

An analysis was conducted to determine the **economic impact (economic growth) that could be realized in Northwestern Ontario and the Thunder Bay region** as a result of the development of the 10 selected mining projects.

To estimate the value of this economic impact an economic multiplier analysis was conducted to estimate the direct, indirect and induced economic benefits that will result. The **economic impact of mine development includes growth of the gross economic product (GDP) as well as growth in employment** as a result of mine construction and operation. The results of this analysis are summarized in Table 1.1.

Table ES.1

Average Annual Impact on GDP and Employment

GDP Impact (in millions)			
Impact	**Ontario Annual Average**	**N.W.O Annual Average (79% Ontario)**	**Thunder Bay Annual Average (60% N.W.O)**
High	$2,089	$1,650	$990
Medium	$1,791	$1,415	$849
Low	$1,492	$1,179	$707
Employment			
Impact	**Ontario Annual Average**	**N.W.O Annual Average (66% Ontario)**	**Thunder Bay Annual Average (60% N.W.O)**
High	12,350	8,151	4,891
Medium	10,586	6,987	4,192
Low	8,821	5,822	3,493

It is estimated that the growth of the mineral sector from the 10 selected projects will result in the creation of about **10,000 full-time equivalent positions (man-years) per year for the next 10 years, and economic revenues to Northwestern Ontario between $1 billion and $1.7 billion per year**.

Supply Chain

This Strategy also analyzed the impact of the ten mining projects on spin-off activities that are expected to cycle through the economy as a result of investment made in mining projects. Mining and exploration companies operating in Ontario **require a wide range of products, expertise and services from suppliers in commercial, industrial and consumer sectors** of the economy. The mining supply chain describes the system involved in moving these products and services from a supplier to the mining operations. From the analysis it is expected there will be considerable opportunities for suppliers to support the potential mining projects in Northwestern Ontario since investment in mining will result in creating quality jobs and GDP growth in upstream sectors.

Results of the analyses indicate there **will be significant opportunities for the existing as well as prospective new supply services** to enter or expand their involvement in the mining supply chain and achieve substantial growth.

Energy

The Strategy examined the **electricity infrastructure** that is needed in Northwestern Ontario to support growth in the mining sector. The objective was to assess its readiness for future development of the mining sector, in light of the planned elimination of coal as a source of fuel for

the Thunder Bay Generating Station, development of the East-West tie transmission line and other planning initiatives in the region.

Key findings are:

- Although the **East-West tie transmission line** will provide a reliable external source of electricity upon completion, its **status from 2014 to its anticipated in-service date of 2019 will not secure the reliable supply needed for the development of the mining sector** which is forecasted to mature before the in-service date of the line.
- After the retirement of the coal-fired Thunder Bay Generating Station, the electricity system will rely on an inflexible generation mix plus interconnection to external generation with **limited reliability**. This could **delay the development of mining activities** until the commissioning of the East-West Tie is completed. This **delay could extend beyond 2019 if construction of the East-West Tie is delayed** as a consequence of time requirements for Environmental Assessment (and other permits) and the First Nation consultation process.
- In contrast, it is **expected the Thunder Bay Generating Station conversion could be permitted/approved in a much shorter timeframe** given the urban location of the plant and the fact it is simply going through a fuel conversion process that is expected to result in lower emissions and environmental risks.
- According to the available energy data, it is concluded that **mining requirements cannot be secured through existing transmission infrastructure**. This is due-to the remoteness of many future mining projects, including the Ring of Fire. This is a **major and critical limiting factor for the development of the mining sector** in Northwestern Ontario. It is recommended to **accelerate the development of transmission infrastructure** for reinforcing Pickle Lake and Red Lake and supplying the Ring of Fire. The delay in the development of the infrastructure required by the mine sites will introduce equivalent delay and potential cancellation or considerable downsizing of the proposed mining projects.

Transportation Infrastructure

A transportation assessment of the study area was conducted to provide an overview of the existing transportation infrastructure, and to review challenges and opportunities of the infrastructure system in relation to the projected growth in the mining sector.

Thunder Bay as a Transportation Hub

- The **Thunder Bay Port Authority, the largest export port in Northern Ontario, is in a strategic location to service mining development in the study area**. The port has a total capacity to handle 11 million tonnes of dry bulk products per year, of which nearly 90% is currently unused.
- Iron ore is currently the largest commodity being handled along the St. Lawrence Seaway. **As the iron mines develop in Northwestern Ontario, the Thunder Bay Port Authority could play a bigger role in the transport** of iron ore and related iron and steel products along the Seaway.

- There is **currently limited north-south connectivity between the CN Rail mainline and the Thunder Bay Port Authority.** This could be a barrier for Thunder Bay to capture some of the mining transport activities and services, particularly for mines located in the remote north.
- **Currently, there is no container service at the Thunder Bay Port Authority,** or any ports in the Great Lakes System. This, compared to rail haul to other east coast ports, **may serve as a limitation to the transport of mining ores/concentrates and mine supplies** into and out of the Thunder Bay Port.
- **The Port**, similar to the St. Lawrence Seaway, has an **average operating window of 282 days in a year**, from mid/end of March to December. This **may be another limitation** when competing with year-round transport by to and other east coast ports.
- **Thunder Bay currently serves as the "hub" for a number of operating gold, platinum and palladium mines**, and **many other gold mines in advanced exploration** stages. In terms of mining personnel flying in and out, the **Thunder Bay International Airport has the competitive advantage** over other regional airports (e.g. Timmins) due to the number and frequency of regional, provincial and inter-provincial connections available.
- For the **transport of supplies and mined products**, driving to the "end of the road" is often a preferred strategy due to the lower cost involved, particularly for mines located in the remote north of the study area. This **may put regional/local airports at an advantage** due to their proximity to the mines (e.g. Gold Canyon being serviced out of Red Lake). In most cases, airlines serving the northern communities and mining projects use a hub-and-spoke system within the region. Wasaya Airways, as an example, uses Sioux Lookout as the main regional hub for passenger and freight services to 21 First Nation communities in the north, routing through Pickle Lake and Red Lake (the end of the existing roads) depending on the final destinations.

Ring of Fire Road and Rail Infrastructure

- The **lack of transportation infrastructure is recognized as a major obstacle for mining development in the Ring of Fire area**. To bridge this gap, Cliff Resources has proposed a 340-km north-south road corridor to connect its mine site to a proposed transload facility near the CN Cavell Junction (near Nakina). At the same time, Canada Chrome Corporation (a wholly-owned subsidiary of KWG Resources) is proposing a rail corridor along the same alignment, suggesting that a rail corridor, despite a higher initial capital cost (estimated at $1.5 billion for the McFaulds Lake Railroad versus $1 billion for the all-weather road), is expected to result in lower operating costs, higher pay loads and less environmental impacts.
- Regardless of road or rail, the **surface transportation linkage to the Ring of Fire is essential to on-going exploration and development.** Financial contributions from the provincial and federal governments will be sought for this "most promising mining opportunity in Canada in a century". Under the appropriate funding and development structure (e.g. via public-private partnership), the road/rail corridor could be developed on a user-pay basis for advancing the various mining projects in the area.
- In addition to mining development, a number of First Nations communities along the proposed corridor (e.g. Webequie, Lansdowne House, Fort Hope, Marten Fall/Ogoki and

Aroland) could also benefit from the development of secondary roads connected to the main corridor. This in turn would lead to employment, economic development and reduce cost of living.

Mines in the Remote Northwest

- Compared to the Ring of Fire, mines located in the northwest of the study area (north of Red Lake and Pickle Lake) are more scattered and **sensitive to the remoteness in their location and supply networks**. The Gold Canyon gold mine, as an example, is 110 km away from the closest community (Red Lake), and 85 km from the closest all-weather road by ice road (constructed annually). When the ice road is not operational, site access is via helicopter or float plane.
- **Winter roads are critical for on-going mining exploration in the North, particularly in remote locations north of Red Lake and Pickle Lake**. Maintenance and upgrade programs should take into consideration the needs of the mining projects.
- In the Northwest of the study area, **many mines are in advanced exploration stage** (e.g. PC Gold, Rockex Iron, Rubicon Minerals and Goldcorp Bruce Channel). As these projects mature, **transportation requirements will expand**, including the need for road/rail/marine connections, to bring equipment and supplies in, and ship commodities out to market. The **upgrade and/or construction of additional all-weather roads will become critical to these mines as they move into the operational stage**.
- The current winter road networks provide seasonal connections to a total of 23 remote communities in Northwestern Ontario. **Extension of the all-weather road network in the remote north would also provide opportunities to connect First Nations communities that are currently reliant on costly winter road and air supply systems**.

Municipal and First Nation Infrastructure – City of Thunder Bay and Fort William First Nation

Municipal infrastructure in Thunder Bay and the Fort William First Nation's were characterized and assessed as part of this Strategy. Key components reviewed included housing, industrial/commercial lands and infrastructure demands in the context of mining sector activity within Northwestern Ontario.

Housing

- The City **currently has a total of 2,980 buildable units** including single detached, semi-detached, town house, and apartment units including units contained in registered plans, draft approved plans, and plans under circulation.
- Based on a five year historical average there is an annual absorption rate of 97 single detached housing lots within plans of subdivision. This has occurred over a period during which the City and the Region experienced negative population growth.
- The current housing market within the community is extremely tight, due to low supply and high demand within the resale housing market. This resulted in a 14% increase in

resale prices in 2012. Within the rental market, the vacancy rate in December 2012 was 1.1%, second lowest in the country.

- Based on projected mining related employment increases, it is estimated that the **annual absorption rate could increase from between 5.21 to 7.29 additional single detached housing lots** within plans of subdivision. This would result in estimated 102 to 104 new single detached housing units absorbed by the market annually.
- Estimates of future housing demand from mining sector growth are somewhat uncertain without certainty that the new mining employees will seek housing in the community.
- A number of other economic conditions are impacting housing development within the community. These include relatively low market rent levels, relatively low housing prices, and more recently, escalating construction costs.

Industrial and Commercial Lands

- Thunder Bay and the Fort William First Nation have a **large and varied inventory of vacant or available industrial lands** capable of accommodating mining associated growth.
- Many of the heavy industrial lots and large industrial lots contain **contaminated soils** resulting in investor uncertainty and development costs. While remediation is not a requirement under provincial or municipal land use controls or regulations if the property remains as an industrial use, increasingly, potential owners as well as investors and financial institutes are wary of becoming involved in properties with contaminant levels that are not thoroughly investigated and documented.
- Many of the heavy industrial lots and large industrial lots often have **complicated ownership structures**. Some also have covenants associated with the property titles restricting future uses, and/or for various other reasons may not be available for sale or lease.
- While significant industrial lands are available on Mission and McKellar Islands these are limited by the **lack of access to natural gas and municipal sewer service**.
- The supply and availability of commercial lands within Thunder Bay has not been identified as an impediment to mining related development, rather this growing sector may be seen as a strength.

Infrastructure Demands

- The City is **supporting upgrades** to Golf Links Road/Junot Avenue upgrades under the Renew Thunder Bay initiative. These upgrades would facilitate development of the Innova Business Park and the potential for an additional 2,000 to 5,000 jobs.
- Development of the **Northwest Arterial Road** is **key to the long term development of the northwestern section of the City** and to relieving traffic congestion at points along the Thunder Bay Expressway.
- In order to increase the number of residential units within the northwestern section of the community **additional sanitary sewer capacity will be needed** into this area.

Health

Due to the expected rise in population due to mining and subsequent economic development activity, added pressure will be placed on existing health care resources. Changing population characteristics as well as health care professional retirement rates further emphasize the urgent need to address the increasing demand for health care resources. Occupations that will require the most new entrants in order to meet increasing demand include registered nurses, nurse aids, paramedics, pharmacists and laboratory technologists.

Throughout the Districts, technology such as Ontario Telemedicine Network (OTN) are being embraced and used to their capacity. OTN has cut down the amount of time and money spent on travel between communities, facilitates staff training, and has opened up counseling services to rural communities.

Labour

Growth in employment from mining sector growth represents an **opportunity to put the people of Northwestern Ontario to work in unskilled, skilled and professional jobs** throughout the economy in a variety of sectors. However, in order for the Region to maximize the benefit of this growth in jobs, it is important that as many of these jobs as possible are created in Northwestern Ontario, and that **employees stay in and invest in Northwestern Ontario**.

Recognizing the **higher than national average population growth of the Aboriginal community**, the young average age of the community, the chronically high rates of unemployment and under-employment, and their knowledge of and cultural and spiritual relationship to the land in Northwestern Ontario, there is a **special opportunity to increase Aboriginal participation in the growing labour force** that must be an important objective of employment growth in the economy of Northwestern Ontario.

In Thunder Bay, there are a total of **6,305 unemployed people** (5,191 non-Aboriginal and 1,114 Aboriginal). This number is significantly less than the 10,586 full-time equivalent positions estimated to be sustained annually between 2013 and 2022, and almost half of the 12,612 full-time equivalent positions expected to be sustained in 2015 when mining expenditures reach their peak. This indicates that **even if 100 percent of the unemployed population in Thunder Bay were to be trained and prepared for these jobs, there would still not be enough workers to fill the available jobs**. In fact, across the entire Northwestern Ontario region, there are 9,881 (6,961 non-Aboriginal and 2,920 Aboriginal) unemployed residents; just enough to fill the jobs available in a single year of production. This places a **strong imperative on Northwestern Ontario residents to acquire their Grade 12 diploma and attain skills that will be in demand as the economy grows.**

Education and Training

This Strategy provides a characterization of the various post-secondary training programs that are available within the region, and provides an assessment of available and forecasted capacity As discussed, there is a significant opportunity for Northwestern Ontario to supply the labour force needed to address forecasted economic growth. Maximizing capture of this employment potential in Northwestern Ontario will require a trained workforce to fill these jobs.

Training opportunities in Northwestern Ontario are well suited to preparing the local workforce for employment opportunities in the growing economy. The training institutions of Northwestern Ontario have built relationships and have extensive knowledge of the Region's residents. They provide students and jobseekers with traditional educational training for skilled and professional employment, as well as more non-traditional training to help increase educational attainment levels and success in the workforce following graduation. Most of the institutions, most notably the Aboriginal training institutions, are helping to provide programs tailored specifically to the needs of Aboriginal students and prospective students.

Although current levels of training are exemplary, Northwestern Ontario is encouraged to continue its current endeavors in training the local work force for mining related employment. However, because there are a total **9,100 construction jobs and 26,534 operation jobs** projected between 2013 and 2022, there is still a **high demand for training to fill these jobs**. It is of great importance that these training institutions increase current capacity, as well as implement new training programs.

Project Development and Financing Strategies

This Strategy describes some of the **more traditional business partnership and financing models** available to Aboriginal and non-Aboriginal communities and developers that are interested in developing infrastructure and related projects.

However, successful and timely development of the mineral sector in Northern Ontario will require **creative approaches to ownership, financing/funding and partnering**.

Effective partnering arrangements that involve public and private sector participants and the First Nations communities, are likely to enhance opportunities to provide the **creative financing necessary** to develop key projects that will enhance the feasibility of many mining projects and facilitate development of many others. Keys among these projects are **transportation infrastructure** and **power supply.**

Effective partnering must include First Nations. Without significant involvement of the First Nations, the political risk of developing projects could be a significant barrier to project equity and finance. Opportunities for First Nation ownership and control, in addition to significant social and economic benefits will be key to establishing the level of partnership that is necessary. The challenge of providing First Nations the necessary financial support to secure an equity position in projects will require creative approaches to partnering and share holding that will require significant buy-in of the private sector equity owners and financiers. **Without significant involvement of the First Nations in these projects the opportunity for successful execution is in serious jeopardy**.

Recommendations

Over 45 recommendations are made as a result of the analyses conducted in preparing this Strategy. Key recommendations are summarized as follows:

Supply Chain:

It is important that industrial clusters are established between Thunder Bay, the Fort William First Nation, other First Nations and communities in the mining areas and the mining sector companies to ensure a flow of information as to market growth, goods and services required, etc., to provide businesses and governments the opportunity to respond positively to opportunities.

Energy:

A Committee of government agency representatives and First Nations leaders needs to be convened to help make decisions on types of power to be generated and location of transmission lines. The Common Voice Northwest Energy Task Force should form the core component of the Committee. It is critical that high voltage transmission lines are extended to both Pickle Lake and Red Lake to provide tie-in points into the areas of mining growth and to facilitate interconnection of remote First Nations. It is also critical that TBay Hydro and the Ontario Power Authority identify power generation gaps in the coming years and assess the contribution that can be made by the soon to be closed Thunder Bay Generating Station. To assess this properly, a short to medium term energy plan is required.

Transportation:

It is recommended that a Planning Committee be established, made up of government agency representatives, First Nations leaders and mining companies, to prepare a regional transportation plan and make hard decisions on the types of transportation to be built, the location of specific facilities and input as to who will finance, own and operate these facilities. Impacts and benefits to First Nations as well as the protection of treaty and Aboriginal rights should be the responsibility of a specific subcommittee made up of Aboriginal leaders. The Ministry of Northern Development and Mines is expected to take a leadership role in establishing these committees. In addition, the Premier's Office should be involved in identifying creative opportunities for infrastructure financing and to specifically request the involvement of the Major Projects Management Office in the permitting and approvals of any project to be implemented.

Infrastructure:

Thunder Bay needs to focus effort on establishing additional rental housing and be sure to stay ahead of the demand for additional homes for sale. Servicing (roads, sewer, water) should be put in place in the Northwest part of the City to provide access to a number of approved residential lots. If the supply of buildable lots drops to a critical low, the City is encouraged to take an active role in the development of new housing lots to stay ahead of demand.

High quality industrial lands are available for development in Thunder Bay and the Fort William First Nation. Investing in infrastructure such as a new bridge over the Kaministaqua River into the FWFN will help to increase the value of these lands for prospective developers. Additional industrial lands could be made available through the remediation of "brown-field" sites. The Fort

William First Nation and the City of Thunder Bay are encouraged to continue feasibility studies into developing a processing facility for nickel or other metals on these lands.

Health:

It is recommended that a Recruitment Centre should be established within Northwestern Ontario to represent the region as a hub for healthcare services. Additionally, more educational opportunities are encouraged to be provided to support the development of healthcare professionals. This should be done in conjunction with colleges, universities, and post-secondary institutions to develop recruitment tools to attract graduates and immigrants in becoming healthcare professionals.

Labour:

All orders of government should collaborate to ensure proper training and education are in place to maximize the potential of putting Northwestern Ontario residents to work. Specific efforts to increase Aboriginal participation as well as women are recommended. In the shorter term, it may be necessary to encourage the immigration of trained/skilled workers from countries with rich traditions in mining. Any immigration should be of a short term nature only and should be designed to fill in skills gaps until such time as resident workers have received the appropriate training in order to assume the positions.

Education and Training:

Educators and trainers are encouraged to build capacity and programming to further develop the successful growth that has occurred over the past decade. Focus on training for specific mining services as well as spin-off industries and professions. Increasing the number of students accessing training is critical and expansion of dual credit programming is encouraged where students can attain Grade 12 and initiate skills training at the same time. Creating a community of mining education between the many educational and training facilities and the mining sector would help to tailor industry needs with the growth plans of the educational facilities. Coordination of this growth could be provided by a Regional Integrator, who oversees interconnections between youth and education and educational facilities and industry.

Partnering and Financing:

It is important that new approaches to financing infrastructure and energy projects are identified and that opportunities for increased Aboriginal involvement in projects (ownership and operations) are created. Many of the facilities required to foster growth of the mining sector in remote Northwestern Ontario will be difficult for any one group to finance, requiring a sharing of ownership and responsibilities, perhaps through models such as private-public partnerships, that have been used successfully in the past.

Next Steps:

The CEDC is expected to take a leadership role in the implementation of this Strategy. It is recommended that a Mining Readiness Coordinator is appointed from within the CEDC to take the lead role. Establishing timelines and measureable objectives to ensure successful implementation will be extremely important to ensure that the Strategy is a dynamic and on-going process that is

fuelled by success. In the shorter-term, it is important that all orders of government take on the responsibilities of their mandate to help execute the Strategy. Funding will be required for some elements of the Strategy, and the government is encouraged to act quickly to provide the funds and leadership necessary to maintain some of the very aggressive timelines that are proposed to bring mining projects to the market. The public is encouraged to maintain an active role in the implementation of the Strategy.

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List of Acronyms

AANDC	Aboriginal Affairs and Northern Development Canada
AC	Algoma Central
ACE	Academic and Career Entrance Certificate
AETS	Anishnabek Employment and Training Services
BOO	Build Own Operate
CAAR	Canadian Aboriginal Apprenticeship Research
CAPE	Capital for Aboriginal Prosperity and Entrepreneurship
CCME	Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
CEDC	Community Economic Development Commission
CESME	Centre of Excellence in Sustainable Mining and Exploration
CFDC	Community Futures Development Corporations
CMA	Census Metropolitan Area
CMHC	Canadian Mortgage and Housing Corporation
CN	Canadian Nation
CP	Canadian Pacific
CPR	Canadian Pacific Railway
DFO	Fisheries and Oceans Canada
DPS	Development Permit System
EA	Environmental Assessment
EBP	Environmental Registry
EDO	Economic Development Offices
EPCM	Engineering, Procurement, Construction Management
FIT	Feed In Tariff
FNEI	Five Nations Energy Inc.
FPF	Ferrochrome Production Facility
FWFN	Fort William First Nation
GDP	Gross domestic product
GED	General Education Diploma
GIS	Geographical Information System
GPS	Global Positioning System
GS	Generating Station
HBI	Hot briquetted iron
HORCI	Hydro Once Remote Communities Inc.
IBA	Impacts and Benefits Agreements
IDN	Integrated District Network
IESO	Independent Electricity System Operator
INAC	Indian and Northern Affairs Canada
IPAs	Independent Power Authorities
ISD	Integrated Service Delivery
JV	Joint Venture

KKETS	Kiikenomaga Kikenjigewen Employment and Training Services
LIHN	Local Health Integration Network
LTA	Lighter Than Air
MEDC	Marathon economic Development Corporation
MIHRC	Mining Industry Human Resources Council
MLS	Multiple Listing Service
MNDM	Ministry of Northern Development and Mines
MNR	Ministry of Natural Resources
MPAC	Municipal Property Assessment Corporation
MRI	Magnetic resonance imaging
MRS	Mining Readiness Strategy
MTO	Ministry of Transportation
MUSH	Municipalities, Universities, Schools and Hospitals
NADF	Nishnawbe Aski Development Fund
NAN	Nishnawbe Aski Nation
NOACC	Northwestern Ontario Associated Chambers of Commerce
NOHFC	Northern Ontario Heritage Fund Corporation
NOMA	Northwestern Ontario Municipal Association
NOSM	Northern Ontario School of Medicine
NRTE	Natural Resources Training and Employment Program
NSWPB	North Superior Workforce Planning Board
NTAB	Northwest Training Adjustment Board
OEB	Ontario Energy Board
OFNLP	Ontario First Nation Limited Partnership
OGS	Ontario Geological Survey
OMERS	Ontario Municipal Employees Retirement System
OPA	Ontario Power Authority
Oshki	Oshki-Pimache-O-Win
OSSD	Ontario Secondary School Diploma
P3	Public-Private Partnerships
PEA	Preliminary Economic Assessment
PIS	Public Information Sessions
RBC	Royal Bank of Canada
RES	Renewable Energy Systems
RESOP	Renewable Energy Standard Offer Program
ROFATA	Ring of Fire Aboriginal Training Alliance
RTB	Renew Thunder Bay
SAMSSA	Sudbury Area Mining Service and Supply Association for Northwestern Ontario
SCC	Supreme Court of Canada
SEDAR	System for Electronic Document Analysis and Retrieval
SES	Science and Environmental Studies
Shooniya	Shooniya Wa-Biitong Training and Employment Centre for Treaty #3 Area

SLAAMB	Sioux Lookout Area Aboriginal Management Board
SLMHC	Sioux Lookout Meno Ya Win Health Centre
T&NO	Temiskaming and Northern Ontario Road
TBGS	Thunder Bay Generating Station
TBIA	Thunder Bay International Airport
TEK	Traditional Ecological Knowledge
TEL	Technology Enabled Learning
TS	Transmission Station
WIM	Women in Mining

1 PREFACE

SNC-Lavalin Inc. and Edward Hoshizaki Development Consulting, with the assistance of One World Brand Management, Marvin Pelletier and Generator were, commissioned by the City of Thunder Bay, the Thunder Bay Community Economic Development Commission (CEDC) and the Fort William First Nation (FWFN) (hereafter referred to as the "Thunder Bay Group") to undertake the Mining Readiness Strategy – An Integrated Regional Economic Development Plan. Funding support has been provided by a number of partners including TBayTel, The Northwestern Ontario Municipal Association (NOMA), Lakehead University, Confederation College, FedNor, Northern Ontario Heritage Fund, Thunder Bay International Airport Authority, Thunder Bay Port Authority, and Thunder Bay Hydro.

Structure of the Mining Readiness Strategy Report

Section 1: **Preface** and a detailed synopsis of what is presented in the Strategy

Section 2: **Introduction** and **Strategy Context**

Section 3: **Community and Stakeholder Engagement**

Section 4: **Mining in Northwestern Ontario**, with descriptions of the mining projects covered in the MRS, potential future mining projects and permitting issues

Section 5: **Economic Impact** of anticipated mining development to determine the economic potential within the Region.

Section 6: **Impact of Potential Mining Developments** on the mining supply chain

Section 7: An assessment of **Energy Infrastructure** in Northwestern Ontario to determine the readiness for future development of the mining sector.

Section 8: An assessment of **Transportation Infrastructure** in Northwestern Ontario as well as a discussion of transportation issues and opportunities associated with current and anticipated mining development in Northwestern Ontario.

Section 9: An assessment of **Municipal Infrastructure** within the region including local road networks, water/wastewater, industrial/commercial land, and housing.

Section 10: A discussion of the impact on **Healthcare Services** in Northwestern Ontario.

Section 11: **Labour** within Northwestern Ontario and assesses the available labour, impact on the workforce and what the projected workforce will be in the upcoming years as a result of mining.

Section 12: **Education and Training** as it provides a characterization of the various training programs in relation to mining that are offered within the region. This section also assesses the readiness of institutional training capacity of the region.

Section 13: **Project Development** and **Financing Strategies**

Section 14: **Conclusions** and **Recommendations**

Our Reference: 11714

"It is the year 2036 and there's a new Northern Ontario.

Northern Ontario has a skilled, educated, healthy and prosperous population that is supported by world-class resources, leading edge technology and modern infrastructure. Companies scan the world for opportunities to create jobs, attract investment and serve global markets.

Communities are connected to each other and the world, offering dynamic and welcoming environments that are attractive to newcomers. Municipalities, Aboriginal Communities, governments and industry work together to achieve shared economic, environmental and community goals."

'Vision'
Growth Plan for Northern Ontario
Places to Grow Act, 2005
Province of Ontario

2 INTRODUCTION AND STRATEGY CONTEXT

2.1 The Mining Readiness Strategy

The Northwestern Ontario region is experiencing **significant growth in mineral exploration and mining development**. This growth is expected to result in the substantial economic and social development of Thunder Bay, Fort William First Nation (FWFN), its surrounding municipalities and First Nation communities. The discovery and development of **major gold deposits**, nickel and chromite in the "Ring of Fire", and other mineral resources are expected to create a variety of business opportunities that positively influence the Region's economic outlook.

The expected growth will place unique pressures on community and government services as well as the mining labour market. There will also be challenges in providing the necessary infrastructure as well as medical, educational and social services to support and facilitate growth. In addition, it will be important to ensure that the effects of this growth do not result in negative environmental, cultural, social and economic impacts to people and communities throughout the Region.

The Mining Readiness Strategy (MRS) is a **comprehensive, inclusive and integrated economic development plan** designed to help Thunder Bay and regional stakeholders focus and capitalize, on the many opportunities that mining development will bring to the Region. Be it job creation, business opportunities, infrastructure development or an improved quality of life for Aboriginal and non-Aboriginal populations, this is a '***once in a century'*** opportunity for the Region, province and country as a whole.

The key areas of focus for the MRS include:

- **Transportation Planning and Infrastructure** needs, locally and regionally.
- **Power Generation and Transmission**, including an assessment of future community, business and industrial energy needs and electricity supply.
- **Workforce Training and Development** and related community needs, i.e. facilities and programs.
- **Business Development** including innovation and opportunities for business to business and government to business partnerships.
- **Economic Growth** including a forecast of job creation and economic output throughout the local, regional and Ontario markets.
- **Environmental Sustainability and Responsible Growth.**
- **Housing, Community Services** and related infrastructure.
- **Capital Investment** and financing strategies and opportunities for partnering.

The MRS is being led by a **Working Group and a Leadership Alliance Committee**, both of which are made up of representatives from the contributing partners, the City of Thunder Bay, the CEDC and the FWFN. The Leadership Alliance and Working Group are directing the work of a consultant team made up of **SNC-Lavalin Inc**., an internationally renowned engineering and construction firm, together with the well-known Northwestern Ontario firm of **Edward Hoshizaki Development Consulting**, and a number of local experts including **Lakehead University, One World Brand Management, Generator and Marvin Pelletier**.

Study Area

Thunder Bay, Fort William First Nation and Region – identifying Municipalities and First Nations in the Region

The study area incorporates municipalities and First Nations throughout Northwestern Ontario including **three districts**, **thirty-six municipalities**, **six tribal councils** and **sixty-three First Nation communities**.

Specific focus is given to the **Thunder Bay region** in the areas of:

- Social and Community Engagement
- Economic Impact of Anticipated Mining Development
- Impact of Mining Development on the Supply Chain
- Municipal Infrastructure
- Training

Given the magnitude of mining potential within the **Northwest Ontario,** wider regional consideration was given in respect of:

- Mining potential
- Energy (transmission and generation)
- Transportation Infrastructure
- Education and Training
- Financing and Partnering

Table 2.1

Municipalities in Northwestern Ontario

District	Municipality
Thunder Bay District	Town of Marathon Municipality of Greenstone Municipality of Neebing Municipality of Oliver Paipoonge Municipality of Shuniah Township of Conmee Township of Dorion Township of Gillies Township of Manitouwadge Township of Nipigon

District	Municipality
	Township of O'Connor Township of Red Rock Township of Schreiber Township of Terrace Bay City of Thunder Bay
Rainy River District	Township of Alberton Town of Atikokan Township of Chapple Township of Dawson Township of Emo Town of Fort Frances Township of Lake of the Woods Township of LaVallee Township of Morley Town of Rainy River
Kenora District	City of Kenora Municipality of Machin Municipality of Red Lake Municipality of Sioux Lookout Township of Ear Falls Township of Ignace Township of Pickle Lake Township of Sioux Narrows – Nestor Falls
Algoma District	Municipality of Wawa Township of White River Township of Hornepayn

Table 2.1 identifies the associated municipalities within the **Thunder Bay, Rainy River, Kenora** and **Algoma** Districts.

Table 2.2 lists the **First Nation communities in Northwestern Ontario** by Treaty and Tribal Council. There are a number of First Nation Tribal Councils that provide primarily technical services for groups of First Nations in their respective treaty areas. There are also organizations that are not identified as Tribal Councils but effectively operate in similar fashion. Tribal Councils are overseen by their member First Nations and do not have a governance relationship with the political Tribal organizations.

Table 2.2

List of First Nation Communities in Northwestern Ontario

Treaty	Tribal Council	First Nation Community
Treaty 9 & 5	Matawa First Nations Council	Aroland First Nation Constance Lake First Nation Ginoogaming First Nation Long Lake #58 First Nation Eabametoong First Nation Marten Falls First Nation Neskantaga First Nation Nibinamik First Nation Webequie First Nation
	Shibogama First Nations Council	Wunnum Lake First Nation Kingfisher Lake First Nation Wapekeka First Nation Wawakapewin First Nation Kasabonika First Nation
	Windigo First Nations Council	Bearskin Lake First Nation Sachigo Lake First Nation North Caribou First Nation Koocheching First Nation Cat Lake First Nation Slate Falls First Nation Whitewater First Nation
	Keewatinook Okimakanak First Nations Council	Deer Lake First Nation Fort Severn First Nation Keewaywin First Nation McDowell Lake First Nation North Spirit Lake First Nation Poplar Hill First Nation
	Unaffiliated/ Independent	Flying Post First Nation
Treaty 3	Anishinabeg of Kabapikotawangag Resource Council	Anishinabe of Wauzhushk Onigum Anishnaabeg of Naongashiing (Big Island) Big Grassy First Nation Northwest Angle No. 33 First Nation Northwest Angle No. 37 First Nation Ojibways of Onigaming First Nation
	Bimose Tribal Council	Wabauskang First Nation Ochiichagwe'Babigo'IningFirst Nation Asubpeeschoseewagong First Nation Washagamis Bay First Nation Shoal Lake #39 First Nation Shoal Lake #40 First Nation Eagle Lake First Nation

Treaty	Tribal Council	First Nation Community
		Wabigoon First Nation Lac Des Miles Lacs First Nation
	Pwi-Di-Goo-Zing Ne-Yaa-Zhing Advisory Services	Couchiching First Nation Lac La Croix First Nation Naicatchewenin First Nation Nigigoonsiminikaaning First Nation Rainy River First Nation Seine River First Nation Mitaanjigamiing First Nation
	Unaffiliated/ Independent	Ochiichagwe'babigo'ining First Nation Ojibway Nation of Saugeen (Savant Lake)
Robinson-Superior Treaty	Nokiiwin Tribal Council	Animbiigoo Zaagi'igan Anishinaabek (Lake Nipigon Ojibway) Bingwi Neyaashi Anishinaabek (Sandpoint First Nation) Biinjitiwaabik Zaaging Anishinaabek (Rocky Bay First Nation) Kiashke Zaaging Anishinaabek (Gull Bay First Nation) Pic Mobert First Nation Fort William First Nation
	Unaffiliated/Independent	Pic River First Nation Michipicoten First Nation Pays Plat First Nation Namaygoosisagagun First Nation Red Rock Indian Band Sand Point First Nation Whitesand First Nation

2.2 Mining Readiness Strategy Objectives

The main objectives of the MRS are to:

- Characterize and provide an **overview of the potential of the mineral sector in Northwestern Ontario.** This has been conducted by assessing the following: mineral exploration, mine development and production (including labour, infrastructure, service and supply businesses and value added), exploration activities, major mining developments at pre-feasibility and feasibility stage, major mining developments at the environmental assessment stage, operating mines, employment levels, investment levels, and staking activity/exploration trends.
- Conduct an **economic impact analysis** based on **10 potential new mining developments** to determine economic potential within the Region (jobs and GDP).
- Assess the **electricity infrastructure** in Northwestern Ontario and assess its readiness for future development of the mining sector (supply and demand).

- Assess the **transportation infrastructure** in Northwestern Ontario including rail, road, airport and marine infrastructure. Identify infrastructure challenges and opportunities in relation to anticipated mining sector growth in the Region.
- Assess the current **municipal lands and infrastructure** of Thunder Bay and Fort William First Nation; specifically residential land availability, local road network, water/wastewater capacity, industrial/commercial land availability, and housing availability.
- Assess the **labour market** of Northwestern Ontario by characterizing the available labour, the impact of mining on the workforce and projections of labour requirements resulting from mining sector growth.
- Assess the **education and training programs** of Northwestern Ontario by characterizing the available training programs in the Region and determining the readiness of education and training capacity for increased mining development.
- **Assess funding and financing available** for development of programs and infrastructure, and discuss alternative sources of financing and effective partnering.

2.3 Historical Background

Thunder Bay and Region

European settlement in the Thunder Bay area began with two French fur trading posts, established in 1683 and 1717. Both forts were subsequently abandoned. In 1803 the Montreal-based **North West Company established Fort William** as its mid-continent depot. The fort thrived until 1821 when the North West Company merged with the **Hudson's Bay Company**, and Fort William was no longer needed.

By the 1850s, the Province of Canada began to take an interest in its western extremity. **Discovery of copper** in the Keweenaw Peninsula of Michigan had prompted a **national demand for mining locations on the Canadian shores of Lake Superior**. The Province of Canada negotiated the Robinson Treaty in 1850 with the Ojibwa of Lake Superior. As a result, an Indian reservation was set aside for them south of the Kaministiquia River. In 1859–60 the Department of Crown Lands surveyed two townships (Neebing and Paipoonge) and the Town Plot of Fort William for a European-Canadian settlement.

After Confederation … Ontario did not extend much beyond the Great Lakes but in 1870, the new Canada bought all the land draining into Hudson Bay for £300,000 … from The Hudson's Bay Company.

A Northern Centennial
Toronto Star. Dec. 16, 2012

Further settlements developed a few miles to the north of Fort William following construction of a **road connecting Lake Superior** with the Red River Colony. The federal public works depot and construction headquarters was called Prince Arthur's Landing until it was renamed **Port Arthur by the Canadian Pacific Railway (CPR)** in 1883. It was not until 1970, through the **merger of the Cities of Fort William, Port Arthur** and geographic townships of Neebing and McIntyre, that the City of Thunder Bay was formed.

Early in the twentieth century, the **Thunder Bay region began a period of sustained growth, based on improved access to markets** and the subsequent wheat boom in western Canada. **Growth was fuelled by the rapid expansion of rail facilities**, including a twinning of the CPR's Winnipeg–Thunder Bay line; the establishment of facilities by **Canadian Northern Railway at Port Arthur**; construction of facilities at the **Fort William Mission by the Grand Trunk Pacific Railway**; and construction of the **National Transcontinental Railway**. Grain elevator construction boomed as the volume of **grain shipped to Europe via Fort William** and **Port Arthur** (often referred to as "The Lakehead" for its geographic location at Canada's west end of the Great Lakes increased. By 1914 the twin cities had modern infrastructure: sewers, safe water supply, street lighting, and electric lights. The boom came to an end in 1913–14, aggravated by the outbreak of the First World War. A war-time economy emerged with the manufacture of munitions, and shipbuilding.

The **forest products industry** has played an important role in the Thunder Bay economy from the 1870s. Logs and lumber were shipped primarily to the United States. In 1917 the first pulp and paper mill was established in Port Arthur. It was followed by a mill at Fort William in 1920. Eventually there were seven mills operating.

Manufacturing resumed in 1937 when the **Canada Car and Foundry Company** plant re-opened to build aircraft for the British. Now owned and operated by **Bombardier Transportation**, the plant has remained a mainstay of the post-WWII economy. It has produced forestry equipment, and mass transportation equipment for urban transit systems, such as the Toronto Transit Commission and GO Transit.

"American-born C.D. Howe represented the riding of Port Arthur in Parliament for 22 years … he industrialized our nation and is one of the most influential figures in Canadian history."

A Northern Centennial
Toronto Star. Dec. 16, 2012

The expansion of highways, beginning with the **Trans-Canada Highway** and culminating with the opening of **Highway 17**, **linking Sault Ste Marie to Thunder Bay,** in 1960, significantly diminished railway and shipping activity in the 1970s and 80s. Shipping on the Saint Lawrence Seaway was superseded by trucking on highways. Grain shipping eastward on the Great Lakes has declined substantially in favour of transportation to the Pacific Coast ports. As a result, many grain elevators have been closed and demolished [1].

Fort William First Nation

Fort William First Nation is an **Ojibway First Nation** located south of and adjacent to the City of Thunder Bay. As of January 2008, the First Nation had a registered population of **1,798 people**, of which their on-reserve population was 832 people. As a signatory to **Robinson-Superior Treaty,** Fort William First Nation is a member of **Union of Ontario Indians**, a Political Territorial Organization that represents many of the Anishinaabe First Nation governments in Ontario located about Lake Superior and Lake Huron. They are also members of the Nokiiwin Tribal Council.

The Fort William reserve, located on Canada's western end of Lake Superior adjacent to the City of Thunder Bay was set aside under the provisions of the Robinson-Superior Treaty in 1850. The north shore of Lake Superior is the southern edge of the Canadian Shield, vast country of rock formations shaped by glaciers and waterways. The traditional territories occupied and used by community members of Fort William stretch from Pigeon River to the south, the Treaty No.9 boundary to the north, and Lake Nipigon to the east.

In the negotiation of The Robinson Superior Treaty, the Fort William leadership agreed not to interfere with foreign settlers. In return, the Crown promised reserve land, annual cash payments, trade goods (eg. flour), and complete freedom to continue to hunt and fish as before (except on private land) within their traditional territory. At that time, FWFN was a thriving community. Most people made their living in traditional ways, and took advantage of the nearby Hudson's Bay Post to sell furs and buy supplies. About ten families were employed in the commercial fishery, exporting many barrels of salted fish annually to Detroit and points east. These families represented about half of the FWFN band members who gathered on the Lake Shore seasonally, but spent most of their winters in the interior on their hunting and trapping grounds.

Since the treaty of 1850, Fort William has developed an excellent record in its dealings with government and private industry in its efforts to become self-sustaining and the **hub of Northwestern Ontario Aboriginal business and communities**.

Our Mission: ***Enhancing and supporting Aboriginal business and economic development through a range of distinct services***

Our Vision: ***To become the Hub of the North for all First Nation Communities in Northwestern Ontario***

Fort William First Nation website

Fort William First Nation has leveraged its geographic position to establish itself as an **economic centre for regional First Nations**. The First Nation has built a large commercial park that houses a number of regional organizations, government agencies and private sector companies. These include:

- Aboriginal Affairs and Northern Development
- Nishnawbe Aski Development Fund
- Wasaya Airways
- Nishnawbe Aski Nation
- Dilico Child and Family Services
- Royal Bank of Canada (RBC)

The centralization of senior government positions, plus the closure of offices in smaller communities and the transfer of responsibilities to regional First Nation organizations, has **strengthened Thunder Bay as a service hub to First Nations communities**. Increasing numbers of Aboriginal organizations and services are locating facilities or offices within the Thunder Bay Census Metropolitan Area (CMA). These include political territorial organizations, Tribal council offices, branch community administration offices, education and training services, health and wellness services, legal services, social services, and cultural organizations.

2.4 The Regional Economy

Prior to the **loss of six of the seven forest product operations** (primarily pulp and paper mills) located in Thunder Bay, the City and Development Thunder Bay (now the Thunder Bay Community Economic Development Commission (CEDC)) embarked on a strategy to transition to a knowledge based economy. While there was a loss of 4,200 jobs in the manufacturing sector from 2001 to 2008 these were offset by an increase of 2,900 jobs in professional services, education, health, and information services. This growth has continued since that time with the opening of a number of knowledge based initiatives.

The Thunder Bay CMA's regional role is reinforced by a number of factors but it is clear that following are the critical sectors moving forward:

- Mining
- Aboriginal Partnerships
- Government Services
- Forestry
- Transportation
- Health Sciences and Medical Research
- Manufacturing
- Professional Services

Table 2.3 provides a summary of key economic activities in the Thunder Bay region.

Table 2.3

Thunder Bay CMA Employment Growth / Decline by Sector – 2001 to 2009

	Thunder Bay CMA			
Industry Sector	**2001**	**2009**	**Absolute Change**	**Percent Change**
Agriculture	0*	0*	n.a.	n.a.
Forestry, fishing, mining, oil and gas	0*	0*	n.a.	n.a.
Utilities	0*	0*	n.a.	n.a.
Construction	**3,300**	**3,900**	**600**	**18.2%**
Manufacturing	**7,100**	**2,900**	**-4,200**	**-59.2%**
Trade	9,300	9,900	600	6.5%
Transportation and warehousing	3,900	3,600	-300	-7.7%
Finance, insurance, real estate and leasing	2,900	2,500	-400	-13.8%
Professional, scientific and technical services	**2,400**	**3,100**	**700**	**29.2%**
Business, building and other support services	2,200	1,800	-400	-18.2%
Educational services	5,000	5,700	700	14.0%
Health care and social assistance	9,200	9,900	700	7.6%
Information, culture and recreation	**2,200**	**3,000**	**800**	**36.4%**
Accommodation and food services	4,200	4,300	100	2.4%
Other services	3,100	3,200	100	3.2%
Public administration	4,300	3,900	-400	-9.3%
TOTAL	**61,600**	**59,900**	**-1,700**	**-2.8%**

Source: Statistic Canada

** Employment numbers for these sectors are low as the Labour Force Survey does not produce an adequate sample to estimate employment for the Thunder Bay Census Metropolitan Area.*

Mining

Northwestern Ontario has a long history of mining and mineral production starting with the discovery of Silver Islet in 1868, the Kerry (Moss Lake) Mine in the Shebandowan area (1870s), the **gold camps** of **Red Lake and Pickle Lake** in the 1920's, and the Beardmore Geraldton camp in the 1930s. Development continued with **iron ore in Atikokan** in the 1930s and Ear Falls in the 1960s while **base metals opened up north of Ignace** in the 1970s. In the 1980s, **Hemlo gold camp** and the Winston Lake zinc mine opened on the North shore of Lake Superior, and in the 1990s the **Lac Des Iles palladium mine** opened.

"Situated in one of the world's most prolific gold producing regions, Red Lake Gold Mines has produced 20 million ounces since 1949…

… it continues to be one of the highest-grade gold mines and lowest cost producers in the world. RLGM is also the largest gold mine in Canada.

http://www.goldcorp.com/Theme/GoldCorp/files/factsheets_media/Goldcorp_FactSheet_RedLake.pdf

There are now five **mines operating in Northwestern Ontario**, four of them producing **gold**. The world annual gold production from the Region is approximately 2,400t. Canada produces approximately 4% of this total and Ontario produces approximately 55% of Canada's total. **Northwestern Ontario produces approximately 60% of Ontario's total gold production.**

There has been a **record amount of exploration** in the last decade resulting in a number of new mines in the development stages. **Exploration expenditures in 2011** were estimated to be **$475 million** in Northwestern Ontario, with well over **60% of the investment earmarked for gold exploration.** This investment has led to the development of a strong base of exploration activity and growth in the number of mining suppliers. This growth has been facilitated by CEDC initiatives. Growth potential in the gold sector continues, and in recent years discoveries of rare earth metals, as well as nickel and chromite in the area referred to as the Ring of Fire, provide optimism that the mining sector will grow in economic importance for Northwestern Ontario.

The provision of local commercial and business support from Thunder Bay to mining activity in the Region is not a new development as demonstrated by one of the artifacts discovered during the recent renovation of Thunder Bay City Hall. A **time capsule** found during the renovation contained, among other things, a copy of the **1903 Industrial Review** and Greater Ontario Business Directory which highlighted both Port Arthur and Fort William (now Thunder Bay) and their **involvement in mining, transportation and commerce** (see Figure 2-1).

In a recent presentation in London, Ontario's Senior Economic Officer, Michael Stewart stated "the (Ring of Fire) Region has the production potential on the scale of historical mining regions, such as Sudbury and Timmins"

MINING JOURNAL
Canada: Ontario's Exciting Prospects Up North
Aug. 31, 2012

Figure 2-1

1903 Industrial Review and Greater Ontario Business Directory Highlighting Port Arthur and Fort William Commercial Involvement in Mining [2]

Forest Products Industry

The **decline in the forest products** industry in Northwestern Ontario caused significant employment and income losses throughout the Region. In Thunder Bay CMA, closures or shutdowns within pulp and paper mills as well as sawmills saw the **loss of over 5,000 jobs in the manufacturing sector**. Closures or shutdowns included Cascades, Abitibi Consolidated Fort William Mill, Bowater Kraft A Mill, Northern Wood Preservers, Great West Timber – Thunder Bay Sawmill and Northern Hardwoods and Abitibi's Thunder Bay Mill.

Even against these declines, there has been some resurgence in the forest products industry in the Region. Recently the **pulp mill in Terrace Bay was purchased by Aditya Birla Group** and is now operating and producing pulp with plans to convert the facility to dissolve wood pulp for rayon fibre. Resolute Forest Products, the former Abitibi Bowater, which has operations in Thunder Bay and a kraft mill in **Fort Frances**, has announced the construction of new sawmills in **Atikokan** and **Ignace**. The site of **Marathon Pulp** has been sold and its community forest allocated to a local citizens organization.

The **Dryden** pulp mill has continued to operate, and sawmills in **Sioux Lookout** and **Kenora** have restarted. As well, plans for pellet plants in **Atikokan, Whitewater Lake First Nation, Fort William First Nation** and **Sandpoint First Nation** are underway. While the forest products sector in Thunder Bay has declined it is now poised for growth and it continues to be a significant regional employer. With contributions from direct employment and the well developed service industry it continues to be an important component of the Northwestern Ontario economy.

Transportation

As noted in Section 8 of this report, Thunder Bay provides a unique **blend of transportation infrastructure networks and services**. These include air, rail, road, and marine facilities. Thunder Bay is located along Canada's transcontinental highway route, 30 minutes from a major border crossing into the United States. Thunder Bay is served by both the Canadian National and Canadian Pacific Railways, has the sixth largest port in Canada, and an international airport which is the third busiest in Ontario [3]. The region has seen millions of dollars in provincial road construction and improvements, including a major divided highway upgrade of Highway 11/17 just east of Thunder Bay, as part of a planned $273-million Northern highways investment initiative.

Air transportation services and winter road infrastructure provide vital links to the **remote First Nations communities** located throughout Northwestern Ontario.

Government Services

Municipalities, universities, school boards, hospitals, nursing homes and long-term care facilities, police, and children's aid societies are referred to as the **MUSH (municipalities, universities, schools and hospitals**) sector and are well established in Thunder Bay. As well, both the federal and provincial governments have a significant presence within the Thunder Bay CMA. Access to most federal and provincial ministries, agencies and programs is available locally. However, there have been criticisms of recent changes, or lack of improvements to access to senior federal and provincial staff and facilities locally. While the centralization of offices and cutbacks in staff may result in lower overall staffing levels, it generally has a disproportionate impact on the communities smaller than Thunder Bay.

Educational Services

As detailed in Section 12 of this report the Thunder Bay CMA provides a full range of education and training services through:

- Anishnabek Employment and Training Services (AETS)
- Confederation College
- Conseil scolaire de district catholique des Aurores boréales
- Fort William First Nation Employment and Training Division
- Kiikenomaga Kikenjigewen Employment and Training Services (KKETS)
- Lakehead District School Board
- Lakehead University
- Matawa Education Department
- Northern Nishnawbe Education Council (Dennis Franklin Cromarty High School)
- Oshki-Pimache-O-Win
- Thunder Bay Catholic District School Board

Some of these organizations operate not only in the Thunder Bay CMA but regionally or in some cases more remote areas of Northwestern Ontario.

Medical and Social Services

Thunder Bay has become a **significant regional medical service centre** for Northwestern Ontario through the establishment of:

- **Thunder Bay Regional Health Sciences Centre**, an acute care facility serving Thunder Bay and Northwestern Ontario
- **Northern Ontario School of Medicine**
- **The Thunder Bay Regional Research Institute,** a bio-medical research business organization
- **Regional Cancer Care** a comprehensive cancer program located at the Thunder Bay Regional Health Sciences Centre
- A mix of public and private homes for the aged and supportive housing options
- Various social services delivery offices, agencies and access points

The **Northern Ontario School of Medicine** opened in 2005. Many of the referrals that once resulted in patients having to access facilities in Winnipeg or southern Ontario, are now treated in Thunder Bay, including cancer care, magnetic resonance imaging (MRI), and an angioplasty centre, established in 2007.

2.5 Thunder Bay as a "Places to Grow" Economic and Service Hub

With a **population of 121,596**, the CMA represents more than **54% of the total population of Northwestern Ontario**.[1] Consisting of the City of Thunder Bay, Fort William First Nation, the municipalities of Oliver Paipoonge and Neebing, and the Townships of Shuniah, Conmee, O'Connor and Gilles, the CMA has historically, and continues to serve as the functional regional

[1] Statistics Canada, 2011 Census. Northwestern Ontario is defined as the Districts of Thunder Bay, Rainy River, and Kenora.

center ("hub") for the distribution of goods and services, federal and provincial government services, and people in and out of communities and businesses located throughout Northwestern Ontario.

Growth Plan for Northern Ontario

The MRS aims to demonstrate viable opportunities to implement and advance the six (6) Guiding Principles of the Provincial Government's *Growth Plan for Northern Ontario, 2011*:

- Creating a **highly productive region, with a diverse, globally competitive economy** that offers a range of career opportunities for all residents;
- **Developing a highly educated and skilled workforce** to support an evolving knowledge-based economy and **excellence in the trades**;
- **Partnering with Aboriginal peoples** to increase educational and employment opportunities;
- **Delivering a complete network of transportation, energy**, communications, social and learning infrastructure to support strong, vibrant communities;
- **Demonstrating leadership** in sustainable growth and environmental management;
- Establishing **innovative partnerships** to maximize resources and ensure this Plan achieves its ambitious vision and is fiscally sustainable.

Strategic alignment to the common, long term economic goals of Northern Ontario, the province as a whole, will result in a unified, focused direction generating stronger results for all.

2.6 References

(1) Tronrud, Thorold J; Epp, Ernest A.; and others. (1995). Thunder Bay: From Rivalry to Unity.

(2) City of Thunder Bay, City Records and Archives, http://www.thunderbay.ca/City_Government/City_Records_and_Archives/Web_Exhibits/Time_Capsule/Industrial_Review_and_Greater_Ontario_Business_Directory_1903.htm

(3) City of Thunder Bay, http://www.thunderbay.ca/Living/About_Thunder_Bay.htm

(4) Ministry of Infrastructure, Ministry of Northern Development, Mines and Forestry, 2011. Growth Plan for Northern Ontario 2011.

3 COMMUNITY AND STAKEHOLDER ENGAGEMENT

The community and stakeholder engagement component of the Mining Readiness Strategy (MRS) is important for a number of reasons:

- **Communities and stakeholders need up-to-date and accurate information** about the potential for mining in the Region;
- **Benefits from mining activities carried out in the Region need to be identified and effectively communicated** in a way that Aboriginal communities, non-Aboriginal communities and other stakeholders understand how they can access and maximize benefits from mining in the region; and
- **Communities, organizations and other stakeholders need to be given the opportunity to work together** to develop a common voice around issues and opportunities in the mining sector.

The intent of the consultation and engagement process was to develop an understanding of the actions currently underway in response to potential mining opportunities and how previous experience with mining are shaping current interest and priorities.

The consultation and engagement process consisted of a number of activities:

- Compiling a list of all stakeholders and refining/updating the list throughout the study as surveys were conducted, and through input received from focus group and public information sessions.
- Organizing and conducting telephone surveys, focus group meetings and public information sessions.
- Conducting community meetings in the City of Thunder Bay and the Fort William First Nation (FWFN) to provide members of the public an opportunity to learn about the potential for mining in Northwestern Ontario, to understand the purpose of the MRS, and to provide input.

The following sections provide a description of the activities conducted during the community and stakeholder engagement process, and a summary of input received. The data collected through this process were provided to MRS study team members and incorporated into their analysis where possible.

3.1 The Value of Stakeholder Engagement

The following sections provide information on the process of data collection and an overview of the findings from the stakeholder engagement process.

The key objectives of stakeholder engagement were:

- To improve the effectiveness of policies and projects, **by explicitly considering stakeholder interests, identifying and dealing with conflicts and assessing the potential for compromise;**

- To address the distribution of the impacts and benefits of policies and projects by assessing separately the interests of, and impacts on, different stakeholders, with consideration also being given to trade-offs between different objectives; and
- To ensure adequate engagement and consultation.

Stakeholder identification and analysis provides essential information about:

- The **individuals, groups and institutions** that could be affected by and benefit from potential mining development;
- The capacities that these individuals, groups and institutions have to **benefit** from potential mining development;
- The people, organizations and institutions which could **influence, and contribute to mine planning and management**;
- The past, current and potential future **relationships between people and natural resources** and the land on which they are located; and
- Current and potential future **resource use and management conflicts**.

In all development processes, not just in natural resource management activities, there is a **need to understand the reality and the complexity of interests and relations, evaluate and predict impacts, and assess human capacity to address the challenges of mining development.**

3.2 Defining Stakeholders

The primary aim of stakeholder identification was to **identify those who could and should have a stake in the planning and management process.**

Key Stakeholders Identified

- **Residents** (City of Thunder Bay and the Region) looking for employment opportunities in the mining industry).
- **First Nations** (FWFN and other First Nations located in the Region). It was important for the MRS to include First Nation participation in the community consultation groups. To identify participants, the study team worked with the Political Territorial Organizations including Nishnawbe Aski Nation, Grand Council Treaty No. 3 and the Union of Ontario Indians. First Nations impacted or active in mining activities directly or through their representative Tribal Council or training organization were also contacted[2]. Potential impacts of the new Ontario Mining Act and the Ontario Far North Act were also documented.
- **Youth** preparing for opportunities in mining through education and training.
- **Businesses** in the City of Thunder Bay, First Nation communities and the Region looking for opportunities to engage and become involved in exploration and mining activities, specifically supply chain.
- **Exploration and mining industry** in the Region that face challenges with labour and infrastructure.

[2] Contact was initiated through email, telephone and when possible in person.

- **City Council, City Administration and CEDC Board** looking to establish a framework and planning to maximize opportunities for Thunder Bay related to mining in the Region.

3.3 Stakeholder Engagement and Analysis

Stakeholder engagement was a critical component in the development of the MRS to **ensure buy-in and thus long term success** of the initiative.

Key informant surveys and focus groups are an excellent way to **get feedback on ideas, plans and strategies.** The information collected filled gaps in secondary data and eventually informed decision-making. Providing these opportunities for input **ensures the community is aware of the process and feels engaged in the process** to develop opinions and provide input on development options.

To engage different interest groups for the MRS the study team organized and conducted telephone surveys with key informants, and held focus group meetings with municipal association representatives, economic developers and local business representatives, First Nations leaders and community members, as well as local, regional, provincial and federal agency representatives and service providers.

3.3.1 Telephone Survey

A telephone survey was conducted with participants located throughout the Thunder Bay, Rainy River, and Kenora Districts[3]. The goal of the survey process was to:

- **Determine any local or regional barriers** to economic success related to mining;
- **Identify local mineral sector studies and initiatives** that support mining development;
- **Document infrastructure or other investments** related to mining activity; and
- **Identify and discuss Regional Mining Strategies** that could be implemented to overcome identified barriers.

The following organizations were contacted:

- Municipalities
- Municipal Economic Development Offices (EDOs),
- Community Futures Development Corporations (CFDC'S),
- Labour Market Planning Boards, and
- First Nation Tribal Councils.

Within the study area there are 37 municipalities (including the City of Thunder Bay). Table 3.1 shows which district the 37 municipalities fall within.

[3] As shown in the above descriptions of the organizations surveyed, in many instances there are areas of overlapping reasonability and/or activity. Because of this, groups often act in cooperation or in coordination. As a result, just because one organization reports not having undertaken a specific activity does not by necessity mean they do not have an interest. Rather it may be that their understanding is that another organization has taken the lead on this issue and are relying on or supporting the results of those efforts. For this reason simple statistical analysis of the responses received should be read with caution and with this awareness in consideration.

Table 3.1

Municipalities and Districts that Comprise the Study Area

Districts	Municipalities
Thunder Bay	Town of Marathon Municipality of Greenstone Municipality of Neebing Municipality of Oliver Paipoonge Municipality of Shuniah Township of Conmee Township of Dorion Township of Gillies Township of Manitowadge Township of Nipigon Township of O'Connor Township of Red Rock Township of Schreiber Township of Terrace Bay City of Thunder Bay
Rainy River Districts	Township of Alberton Town of Atikokan Township of Chapple Township of Dawson Township of Emo
Kenora District	City of Dryden City of Kenora Municipality of Machin Municipality of Red Lake Municipality of Sioux Lookout Township of Ear Falls Township of Ignace Township of Pickle Lake Township of Sioux Narrows-Nestor Falls
Algoma District	Municipality of Wawa Township of White River Township of Hornepayne

Municipal Economic Development Offices

In some instances municipalities have dedicated staff, offices or even separate corporations or commissions with a mandate directed at the **promotion and facilitation of local or community economic development**. Within the study area **10 municipal economic development offices** were identified. These were as follows:

- Dryden Development Corporation
- Economic Development Corporation of Wawa
- Municipality of Greenstone, Economic Development Officer

- Marathon Economic Development Corporation (MEDC)
- Economic Development Office, Township of Manitouwadge
- Sioux Lookout Economic Development Commission
- Township of Sioux Narrows – Nestor Falls, Director of Planning & Development
- Terrace Bay, Community Development Supervisor
- Township of Nipigon, Economic Development Officer
- Township of Red Rock, Economic Development Officer

Community Futures Development Corporations (CFDC'S)

Community Futures Development Corporations (CFDCs) are regional community-based development corporations that **support local economic development** by assisting communities to strengthen and diversify their economies. Sponsored by FedNor in Northern Ontario, the CFDCs offer a wide variety of programs and services supporting community economic development and small business growth. In particular, they provide:

- Strategic community planning and socio-economic development;
- Support for community-based projects;
- Business information and planning services; and
- Access to capital for small- and medium-sized businesses and social enterprises.

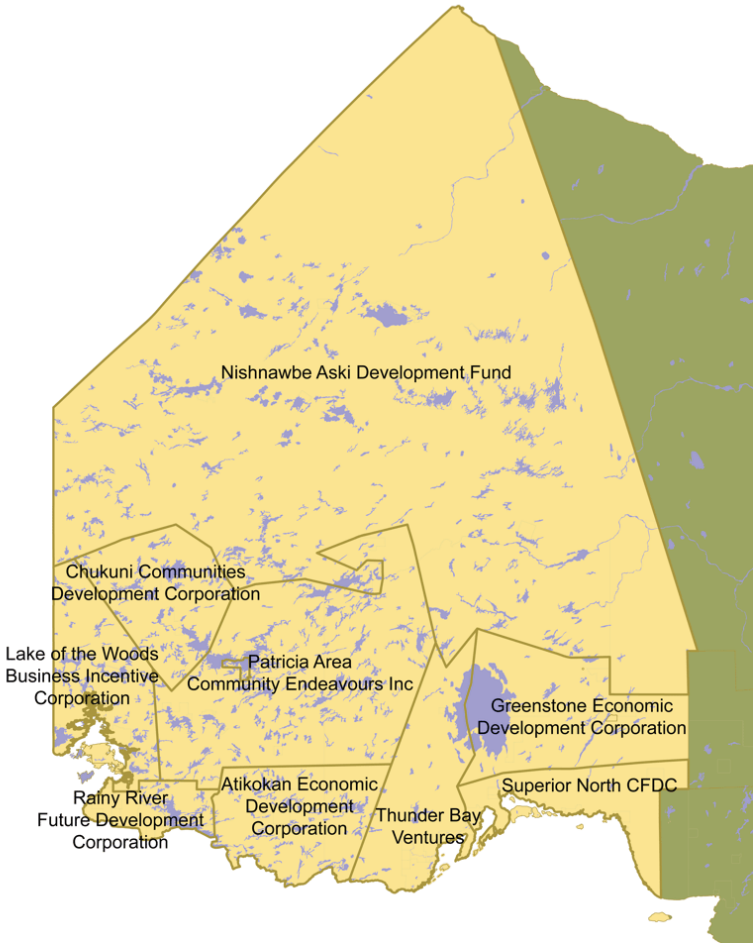
There are **9 CFDCs in Northwestern Ontario**. They are as follows:

- Atikokan Economic Development Corporation
- Chukuni Communities Development Corporation
- Greenstone Economic Development Corporation
- Lake Of The Woods Business Incentive Corporation
- Nishnawbe Aski Development Fund
- Patricia Area Community Endeavours
- Rainy River Future Development Corporation
- Superior North Community Futures Development Corporation
- Thunder Bay Ventures

The service areas of these 9 CFDCs are represented in Figure 3-1 below.

Figure 3-1

Northwestern Ontario CFDC Service Areas [1]



Workforce Planning Boards

Workforce planning boards in Ontario are funded by the Province through Employment Ontario (Ministry of Training, Colleges and Universities). These boards have been established to **conduct localized research and engage organizations and community partners in local labour market projects**. They also work collectively to develop province wide perspectives on labour markets.

There are two workforce planning boards active in Northwestern Ontario. These are:

- **North Superior Workforce Planning Board**, serving the Thunder Bay district; and,
- **Northwest Training and Adjustment Board**, serving the Kenora and Rainy River districts.

3.3.2 Telephone Survey Results

Each of the identified municipalities, municipal economic development offices, Community Futures Development Corporations, and Workforce Planning Boards were contacted by telephone, with follow-up contacts where needed. **Of the 57 organizations identified 33 detailed responses were received**. The City of Thunder Bay was not included in either of these counts.

Many of these organizations provided comments on the MRS development process through **public information sessions and focus group sessions.**

Survey results are presented in aggregate form below. Where useful, individual, local and regionally unique responses are noted.

What are the Local and Regional barriers to benefiting from mineral exploration and/or mining operations?

Responses to identifying local and regional barriers to benefiting from mineral exploration and/or mining operations can be divided into the following themes:

- **Workforce**
- **First Nation Consultation Process**
- **Local Infrastructure**
  - Water, Wastewater, and Roads
  - Available /Appropriate Housing
- **Regional Infrastructure**
  - Electricity
  - Natural Gas
  - Transportation
- **Mining Regulation and Taxation**
- **Economic**
  - Access to Capital
  - Nature of the Mining Sector
- **Geographic Scale / Geographic Reality**
- **Awareness and Communication**
- **Supply and Services**

Each of these is addressed below. It is of note that many of these same categories were also brought up as assets depending on the community questioned. Table 3.2 provides an analysis of data resulting from the above mentioned survey question.

Table 3.2

Analysis of Survey Data

Themes	Analysis of Data
Workforce	A **shortage within the skilled, qualified and available local workforce** needed to fulfill anticipated mining industry demands was the most noted barrier to benefiting on mineral exploration and/or mining operations in the region: • This was **true among both the Aboriginal and non-Aboriginal workforce.** • Concerns were also raised regarding the **capacity of the education and training structures** to respond to this shortage and the short timeframes in which the response must occur. • **Access to adequate funding for training and education** was also raised as a concern.
First Nation Consultation Process	The **consultation processes** between First Nations, the mining sector, and the federal and provincial governments was **cited as a barrier**: • This barrier was **cited from the Nishnawbe Aski Development Fund** as well as other organizations. Nishnawbe Aski Development Fund noted that there were problems with the consultation process and in some instances there is a lack of history or experience in conducting consultations with the mining sector. • Other organizations noted the **lack of clarity in the consultation processes and the protracted timelines**.
Infrastructure	**Local Infrastructure** The **lack of capacity or inadequacy of local infrastructure** was cited by a number of organizations and communities as a barrier. **Water/Wastewater** Water and wastewater system capacity and inadequacy were noted as a barrier to growth in a number of communities: • Water and wastewater system issues were **cited as issues within many First Nation communities both remote and road access**. • Some municipalities also **identified lack of access, capacity or functional issues with water or wastewater systems**. These included communities within Greenstone, Patricia area, Emo, and Ignace. **Available/Appropriate Housing** In some communities **the lack of or low supply of available and/or appropriate housing was noted as a barrier**. These included: • Atikokan • Marathon (Marathon also noted a lack available land) • Red Rock • Machin

Themes	Analysis of Data
	Regional Infrastructure **Electricity, Natural Gas** Concerns over **Electricity and Natural Gas infrastructure were related to capacity, cost and access**. Many communities expressed a general concern over the **cost of electricity to industry as well as the regional capacity to service demand if industrial activity increases**. Region, community or site specific local **lack of access was the main concern regarding Natural Gas.** This was expressed by Sioux Lookout and Ear Falls. **Transportation Infrastructure** Transportation infrastructure was seen as a barrier in the following ways: • Some concerns over the region's **road network being inadequate or at capacity** were brought forward. • The **seasonality and unreliability of the region's winter road network was highlighted.** • Some of the more northerly all season roads were noted as potential barriers. These included the highways to Red Lake/Ear Falls, Sioux Lookout, and Armstrong. • **Changes in the region's rail system** were also cited, including the removal of the Kinghorn Subdivision and the privatization or sale of the rail line servicing Wawa (Algoma Central Railway). • The **difficulty in working with and servicing such broad areas and diversity of communities, often separated by great distances**. • The **transportation costs associated with servicing or supplying mining or exploration sites** located in remote or distant locations.
Mining Regulations and Taxation	Many respondents noted that **government regulations**, both provincial and federal, in all phases of mining development **create complex barriers to getting a mine into production.** It was also noted that the time periods involved for the environmental review processes seem to be a significant barrier to new mine development. The Municipality of Wawa noted that **changes in the provincial mining land tax,** or in how it is applied, have resulted in a **deterrent to exploration activity on private lands**. This was noted in relation to the former Algoma Central Rail lands located in the Wawa area. The province, starting in 2012, will be applying a mining land tax to any exploration companies operating within these recently privatized lands.
Economics	Respondents also cited **economics as a deterrent to capitalizing on mineral exploration and/or mining operations**. **Access to Capital** A **lack of access to capital** faced by regional business was brought forward as a **barrier to the private sector making investments**

Themes	Analysis of Data
	needed to meet the requirements of the mining sector. This was reported for both Aboriginal and Non-Aboriginal businesses. **Nature of Mining Sector** The nature of the mining sector was also raised as an issue. This included: • The **volatility of the commodity markets** and the resulting **lack of predictability related to local development timelines, level of operations, and financial sustainability.** • The practice of **using on-site mine worker camps, and longer shift rotations.** This is expected to result in more **mine workers commuting from outside** of the region and thereby reducing local economic benefit.
Geographic Scale – Geographic Reality	The geographic scale of the region was raised by a number of the respondents. Issues included the following: • The **challenges in fostering cooperation between communities** rather than competition for economic opportunities. Overcoming parochialism and lack of coordination. • The **challenges for those communities** within the region which are **not located in close proximity to current exploration sites or developing mines**. • **Competition from other more developed and historical mining regions** (e.g. Sudbury, Timmins).
Awareness and Communication	Respondents indicated a **lack of understanding, awareness and communication as a deterrent**. This lack of awareness is reported to exist both within organizations and within the general population. Issues include: • A lack of understanding of the **benefits of the mining sector** and its impacts. • A lack of understanding of **economic markets** and their impact on the mining sector. • A lack of knowledge about the **needs of the mining sector** and how these may be addressed locally or regionally. • A lack of **communication and education** about the above issues.
Supply and Services	The current level of involvement of **private nd public sector supply and services firms and organizations** operating in the region was raised as a deterrent. These included: • Geosciences initiatives (e.g. mapping, etc.). • Supply and services firms. • Mining specific infrastructure (e.g. milling).

What are the Local and Regional Assets that will help provide benefits from mineral exploration and/or mining development?

Responses to identifying local and regional barriers to capitalizing on mineral exploration and/or mining operations were divided into the following themes:

- **Education Structures and Institutions**
- **Community Services**
- **Local Infrastructure**
  - Sewer and Water
  - Housing
  - Land
- **Regional Infrastructure**
  - Telecommunications
  - Transportation
  - Power
- **Existing Mining Sector**

Table 3.3 provides an analysis of responses to this survey question.

Table 3.3

Analysis of Survey Data

Themes	Analysis of Data
Education Structures and Institutions	The region's current education structures and institutions were **noted as an asset in preparing a workforce suited to the needs of the mining sector**. This structure includes the local school systems, the College and University, as well as the Aboriginal Training organizations.
Community Services	**Well established community services** such as schools, health care, and recreation facilities were often noted.
Local Infrastructure	While in many instances local infrastructure was noted as a barrier, in other instances local infrastructure was mentioned as an asset. These assets include: • Within the **remote First Nations the presence of airports and heavy equipment was noted**. • In a number of cases the **local road network was seen as an asset.** **Sewer and Water** • Water and sewer capacity was **highlighted as an asset for Terrace Bay.** Water services were **noted as assets in Rainy River, and Ear Falls.**

Themes	Analysis of Data
	Housing • **Affordable** housing was seen as an **asset in Atikokan, w**hile, **housing availability** was seen as an **asset in Emo and Ear Falls**. **Land** The **availability of land for development** was identified as an asset in the following communities or regions: • Patricia area • Greenstone • Terrace Bay • Sioux Lookout • Ear Falls
Regional Infrastructure	Regional telecommunication, transportation and energy infrastructure were **identified as assets** by a number of respondents. **Telecommunications** The **region's telecommunications infrastructure was considered an asset** by a limited number of respondents. These included Greenstone Economic Development Corporation and Sioux Lookout Economic Development Corporation. **Transportation** A large number of respondents noted **access to rail and road networks as an asset**. This largely seemed to be dependent on their geographic location. Respondents who noted this asset included: • Thunder Bay Ventures • Greenstone Economic Development Corporation • Marathon Economic Development Corporation • Sioux Lookout Economic Development Corporation • Nipigon • Red Rock • Dorion • Dawson • Machin • Sioux Lookout Local deep water port or docking facilities were also noted as an asset by the following communities: • Marathon • Red Rock • Nipigon • Wawa

Themes	Analysis of Data
	Power While power, specifically **hydro power, was raised as a barrier by many communities**, many of these same communities cited access to the electrical grid system as an asset.
Existing Mining Sector	The presence of an active existing mining sector was **noted by Wawa as a benefit in capitalizing on new mining activity**.

What actions, if any, are being taken to overcome barriers and/or invite development?

Actions being taken to overcome barriers and/or encourage mining sector related development can be divided into the following themes:

- Organizational
- Strategic Planning
- Increase Quality and Availability of Base Data
- Communication
- Business Support
- Workforce Support and Planning
- Infrastructure Improvements
- Engaging the Mining Sector

Table 3.4 provides an analysis of responses from this survey question.

Table 3.4

Analysis of Survey Data

Themes	Analysis of Data
Organizational	Organizational efforts to **maximize the benefits of new mining activity** in the region included the following: • It was noted that within the First Nations of the region there have been **ongoing political discussions around the possibility for revenue resource sharing between First Nations** related to mining activity on traditional lands. • Many communities identified efforts to **increase inter-community and regional cooperation**, including working with First Nations, to maximize regional benefits from mining development. • Communities are also **working in partnership with educational institutions** to ensure local workforces are able to fill more of the employment opportunities that emerge. • The mining sector is being highlighted or reflected in more **economic development efforts** as they are developed.

Themes	Analysis of Data
Strategic Planning	Strategic planning efforts throughout the region have been or are increasingly reflecting mining sector activity in Northwestern Ontario. These efforts have taken the following forms: • Needs assessments and reports. • Community investment readiness assessments and strategies. • Housing studies. • Community mining readiness studies. • Community and regional strategic plans. • Mining labour force studies. • Business growth and attraction plans. • Feasibility studies related to mining activity and supports. • Official Plan updates.
Increase Quality and Availability of Base Data	Three communities (Atikokan, Dryden, and Greenstone) identified local efforts to **increase the quality and availability of geological and geophysical data.** This was done to encourage and facilitate mining sector exploration activity near these communities.
Business Support	Respondents noted the **need to provide ongoing support to small businesses locally** that may provide supplies or services to the mining sector.
Workforce Support and Planning	Respondents identified efforts to **support the local workforce and plans to strengthen the workforce** through: • Operating employment centres. • Making programs available to under-employed individuals. • Working to establish new skills training facilities (Greenstone and Marathon). • Working with Workforce Planning Boards.
Infrastructure Improvements	Survey respondents have also been making infrastructure improvements, to **increase their ability to attract new investment**, including mining sector investments. • **Sioux Lookout** has **proposed improvements to the hydro lines delivering electricity to the community**. The community is also investigating having a natural gas transfer station to service the community. • **Nipigon** has plans for an **industrial park**. • **Terrace Bay** is pursuing **road improvements** and **sewer and water service upgrades.** • **Emo** has applied for funding to **upgrade sewer and water services.**
Engaging the Mining Sector	Respondents also noted that they have been active in engaging with the mining sector. These efforts are aimed at **increasing understanding and creating ongoing communications between the sector and the communities**.

Current and Expected Benefits of Mining Sector to the Local Community?

Respondents indicated that **population and employment growth are expected to be key benefits of increased mining activity**. Long term growth would stimulate the local economy and contribute to an improved quality of life.

Table 3.5 provides an analysis of data resulting from the above mentioned survey question.

Table 3.5

Analysis of Survey Data

Themes	Analysis of Data
Increased Employment	Respondents expect that **employment growth will result from mining development**. However, there was no certainty as to the extent that local employment would be impacted and to what extent this would impact local population growth.
Infrastructure Improvements	Respondents identified the opportunity for infrastructure improvements within the region based on **investments from senior levels of government and the private sector** in support of mine developments.
Business Opportunities	Opportunities for growth of **businesses providing services or supplies to developing mines** were identified by many respondents. **The potential for increased economic activity resulting from direct and indirect spending** by the mining sector was noted by respondents. The **potential for an increased demand for housing** was also considered an opportunity.
Workforce Training	Increased mining activity was identified by some respondents as an opportunity to **enhance the skill sets and experience within the local workforce.**
Potential to Strengthen Municipal Tax Base	Some respondents identified new housing development and business growth as a way of **strengthening the municipal tax base** for local communities.

Summary of Responses to Selected Survey Questions

Table 3.6 provides a summary of the responses to a number of questions in the telephone survey.

Table 3.6

Summary of Responses to Select Survey Questions

Question	Yes	No or Not Applicable	Percent Yes
Is mineral development and growth of the mining sector identified as a key component of your strategic economic development planning?	16	17	48%
Have you done mining readiness or any other mining sector studies?	6*	27	18%
Are you expecting economic growth from the mining sector?	25	8	76%
Have you made any economic investments due to mining activity?	12	21	36%
Do you have serviced industrial and light industrial land available?	22	11	67%
Have you completed a labour market survey or participated in one in the recent past?	17.5	15.5	53%
Do you expect the mining sector's impact on your community to increase in the near term (next 5 years)?	29	4	88%
**Note: Marathon is in the process of completing its study.*			

As shown in Table 3.6, **48%** of survey respondents have **identified mining as a key sector within their strategic economic development planning** initiatives. Additionally, 18% of organizations have completed mining readiness or mining sector specific studies. And, while **76%** of the organizations **expect economic growth from the mining sector**, only 35% have made investments in order to plan for, facilitate, or encourage local development due to mining activity.

Approximately **67%** of respondents indicated that **serviced industrial and light industrial land is available in their community**. Over the next 5 years, **88%** of the respondents **expect the mining sector will impact their local community.**

3.3.3 Engagement with Mining Companies

As part of the engagement process, mining companies within the Region were consulted with. While mining has a long history in Northern Ontario, it is the active mines that have a present and direct impact on the Region. Information from the mining companies was helpful in assessing the future impacts from developing mining operations. The mining companies that we contacted are as follows:

- Treasury Metals;
- Rockex Mining Corp.;

- Rainy River Resources;
- Bending Lake Iron Group Limited;
- Rubicon Minerals Corporation;
- Osisko Resources Ltd.;
- Rodger Souckey, Barrick Gold Corporation;
- Goldcorp Inc.;
- North American Palladium Ltd., and
- Stillwater Mining Ltd.

Each of the mining companies were contacted via e-mail and each email was followed-up by phone calls. The mining companies were asked to provide information on their human resource patterns, specifically where employees will be coming from and what choices they will make about where to live as well as the supply chain that will service the project. Information from the mining companies was given to project team members for incorporation into their analysis.

3.3.4 Focus Group Meetings

Focus group meetings **provide opportunities for in-depth consultation**. The format used to conduct focus group meetings for the MRS was as follows:

- **Targeted six to ten participants in each session**; some sessions had less than six participants.
- Each session was approximately two hours in duration.
- A Facilitator guided the discussion and probed for answers to a loosely structured list of questions.
- Focus groups were useful for **obtaining in depth responses** and created an environment where people felt comfortable participating. The group meetings also provided opportunities for **deliberation and debate.**

A complete list of all invited to participate in focus group meetings is provided in Appendix A. A total of **8 focus group sessions** were held between October 29, 2012 and November 2, 2012. Participants represented the following interest groups:

- First Nation Organizations
- Municipalities
- Government Institutions
- Industry – Mining
- Suppliers
- Educational Institutions

In every meeting participants were asked the same questions. Please refer to Appendix A for the list of focus group questions.

Table 3.7 below provides a list of focus group meetings participants and the interest group they represented in the meeting.

Table 3.7

Focus Group Participants

Stakeholder Group	Name / Title	Organization
First Nation Organizations	Audrey Gilbeau, Executive Director/Governance	Nokiiwin Tribal Council
	Tara Ingram, Economic Advisor	Nokiiwin Tribal Council
	Jason Paul Rasevych, EDO	Matawa First Nation
	Kathy Brady, Mining Advisor	Matawa First Nation
	Robert Ostamas, Logistics Officer	Matawa First Nation
	Brian Ludwigsen, Consultation Advisor	Fort William First Nation
Municipalities / EDO	Dennis Brown, Mayor	Municipality of Atikokan
	Colleen Martin, General Manager	Nishnawbe Aski Development Fund
	Gord Knowles, Community Development Advisor	Municipality of Atikokan
	Cal Southall, Councillor	Municipality of Sioux Lookout
	Florence Bailey, Economic Development Officer	Municipality of Sioux Lookout
	Brian Davey, Special Initiatives Officer	Nishnawbe Aski Development Fund
	Royden Potvin, Manager	Thunder Bay Ventures
	Dina Quenneville, Executive Director	Greenstone Economic Development Corporation
	Armand Giguere, Counsellor	Municipality of Greenstone
	Lucy Kloosterhuis, Mayor	Municipality of Oliver Paipoonge
	Aaron MacMillian, EDO	Township of Schreiber
	Jonathan Hall, Deputy Treasurer/Clerk	Township of Schreiber
	Bob Hancherow, General Manager	Marathon Economic Development Corporation
Industry	Scott Jacob, Manager Community Relations	Noront Resources Ltd.
	Michael MacIsaac, VP Exploration	Metals Creek Resources
	Erik Johansson, Site Manager	Osisko Resources Ltd.
	Kevin Sherlock, Manager Community Relations	North American Palladium Ltd. - Lac Des Iles Mine

Stakeholder Group	Name / Title	Organization
	Christine Sibley, Regional HR Manager	North American Palladium Ltd. - Lac Des Iles Mine
	Jim Garber, Exploration Manager	Metal Corp Ltd.
Government	Jamie Taylor, Initiative Officer	FedNor
	Peter Hinz, Team Lead, Exploration and Mineral Development	Ministry of Northern Development and Mines, Ring of Fire Secretariat
	John Guerard, Thunder Bay Area Team Manager, Regional Economic Development Branch	Ministry of Northern Development and Mines
	Harold Wilson, President	Thunder Bay Chamber of Commerce
	Paul MacInnis, Northern Development Advisor, Regional Economic Development Branch	Ministry of Northern Development and Mines
Educational Institutions	Madge Richardson, Executive Director	North Superior Workforce Planning Board
	Gerry Cornies, Student Success Resource Teacher	Lakehead Public Schools
	John DeGiacomo, Proposal & Partnership Development Officer	Anishinabek Employment & Training Services (AETS)
	John Hatton	Director, Training & Development, Confederation College
	Dr. Peter Hollings, Chair of Geology Department	Lakehead University
Suppliers	Michael Thompson, President	Fladgate Exploration
	Caitlin Jeffs, Vice President	Fladgate Exploration
	David Hunt	Sharpstone Geoservices
	Tere McDonald	MGM Electric Limited
	Barbara Courte, President	Northstar Drilling
	Ian McCormack	Tetra Tech
	Larry George	George Contracting Group
	Dave Bradley	Outland

3.3.5 Focus Group Results

Appendix A provides detailed notes taken in each focus group meeting. Table 3.8 provides a summary of common themes identified in all focus group sessions.

Table 3.8

Common Themes Expressed in MRS Focus Group Sessions

Theme	Common Trends
Education (Students and Teachers)	• **Educate students about mining in high school** – educate students that there are a number of careers in mining such as environmental, engineers, truck drivers, drillers, etc. • **Educate the teachers** on available jobs in mining. • **Educate students on skilled trades** and that it is acceptable to go into skilled trades.
Training	• Need to **implement more and broader skills training**. • Important to **train First Nations on life skills** to be ready for employment. • Educate First Nations community members about money management and home management. • **Develop more training facilities/centers.** • **Need to develop more transferable skills training** – ie. Operations workers from the forest products sector that could re-train to work in the mining sector. • Concern that employers often train workers (ie. Drillers) themselves, sometimes resulting in a disconnect between what training institutions are doing and what mining companies are doing with respect to training. • **Train more field technicians and geologists**.
Labour Shortage	• **Immigration vs. Aboriginal workforce** – future of mining is with foreign workers. • Mining industry is lacking people with experience in mining. • **Lack succession planning** – current mining sector workforce is aging and retiring; need to replace them with experienced younger workers. • **Lack of skilled tradesmen.** • Challenge of enticing skilled labour to Northwestern Ontario. • **Challenge of retaining skilled workers in Ontario** – many skilled workers are going to the western provinces for employment.
Entrepreneurships / Apprenticeships	• Need to **encourage** entrepreneurship and apprenticeships. • Need a **competitive apprenticeship program in Ontario** in order to deter people from looking at getting their apprenticeship papers from another province.
Housing	• **Lack available housing** to accommodate people working in the region.
Selling a Quality of Life	• Make Thunder Bay attractive for people to live and work in the region.
Partnerships	• Improve partnerships **between municipalities and First Nation communities.**

Theme	Common Trends
	• Network **to build relationships.** • **Increase cooperation** between municipalities. • Create joint ventures (JVs) with First Nations – they are well positioned to be trained for mining. • Need JVs between First Nations and companies to access contracts. • Partner with Universities and Colleges for apprenticeship programs.
Government	• Start **negotiating with government** to find ways to use money effectively and create partnerships. • Government needs to start **strategic planning**. • Government needs to start playing a **bigger role**. • Government needs to **increase dialogue with educational institutions**. • Challenge of obtaining government funding.
Cultural Training	• Need to increase **awareness about the history of First Nations in Northwestern Ontario**. • Mining companies, governmente agencies and other businesses need training on **treaty and Aboriginal rights** – people need to be **educated** on this before building relationships with First Nations.
Infrastructure	• **Northern communities are without adequate infrastructure** – many are remote fly-in communities. • **Not enough power in remote communities** – often diesel run – reliable, green and cost-effective electricity needs to be supplied to remote communities. • Need to invest in a **transportation corridor into the Ring of Fire**. • **Power is a big issue** – a provincial issue. Northwestern Ontario could produce more and more cost-effective power but lacks the necessary infrastructure. • Need reasonably priced and **accessible power**. • **Infrastructure growth** will result in impacts from increased traffic volume and access into remote areas. • Insufficient food services and hotel capacity in the rural areas. • Need improvements to **telecommunications infrastructure.**
Industry	• Companies identified that shareholders are anxious to see development occur. • Have to balance development schedules with community engagement and time required to address community issues.

In focus group meetings, participants representing municipalities and economic development organizations were asked to identify challenges and opportunities they expect as a result of growth in the mining sector. Municipal participants identified general **opportunities for community and economic growth within the region**. To capture these opportunities, municipal representatives

indicated that it is **important to build partnerships and strategic relationships with other communities** (Aboriginal and non-Aboriginal).

Municipal representatives at the focus group sessions also indicated that education is a way to capture opportunities associated with mining. It was indicated that there is a need to **educate community members** so as to increase awareness of the types of opportunities that will be available, and to advise of the levels and types of education and training required to access employment and business opportunities.

Table 3.9 below summarizes the challenges and opportunities from a municipal perspective.

Table 3.9

List of Perceived Opportunities and Challenges during Focus Group Sessions with Municipal Representatives

Opportunities	Challenges
Income and wealth creation within the region through increased employment and business opportunities.	**Attracting and retaining** a local workforce. With an **aging skilled workforce** the challenge is attracting workers with training and experience.
Infrastructure development – transportation, energy and telecommunications.	**Lack of social fabric** – important to "**sell"** a great **quality of life** in Northwestern Ontario, based on high quality education, health and other services, public amenities, adequate housing, etc.
Education tailored to prepare the workforce for employment opportunities that will be created and made available to all residents of Northwestern Ontario, including people in remote communities.	**Regulatory framework** – there are issues arising from the Far North Act and the revised Mining Act that make it more challenging and time consuming to develop mining projects.
Partnering within and between communities.	**Lack of government funding** specifically for infrastructure and education/training programs.
Development of strategic economic development plans that characterize economic and business opportunities and help to identify capacity and other needs to be filled to maximize the opportunities.	**Uncertainty** of how a community can best prepare for mining sector growth and development of specific projects. Also difficult to predict when specific investments and activities should be undertaken without a clearer idea of when the mining growth will occur.
Growth of small-medium sized enterprises.	

First Nations

One of the **most significant direct community benefits** of mining sector growth to the Aboriginal community is perceived to be increased opportunities for **employment**. However, while efforts are being made to increase Aboriginal inclusion in mining and related employment, historically non-Aboriginal workers from outside the Region have **occuppied the positions of highest rank and**

compensation. Without adequate training, entry level, unskilled labour positions with a low opportunity for advancement will be the most common jobs for most residents of Northwestern Ontario, in particular the Aboriginal people. This pattern can only be changed with a significant increase in skills training.

Fort William First Nation focus group participants indicated that employment opportunities are not easily accessible to Aboriginal people. Participants of the First Nation political organization focus group indicated there is a **challenge of engaging Aboriginal people, helping them increase their awareness of the various job opportunities** that are available and helping them access these opportunities. Aboriginal people and communities **lack of information about available job opportunities,** job requirements and salary level [2]. Some Aboriginal people are not accustomed to working away from home [2].

To increase Aboriginal employment there has to be an increase in **training and education for the types of jobs that are available, and an increase in exposure of Aboriginal community members to training and education.** Currently, the training and education that is geared towards Aboriginal people is mainly focused on essential skills development which does not lead to certification recognized by industry. Furthermore, **Aboriginals are faced with challenges of accessing the training and education** that they require as many training programs are offered outside their communities, which adds costs. Without funding for travel, many community members do not have the means to travel to attend training programs. Elders, women, youth, and First Nation political organization participants unanimously indicated that training and employment opportunities are not easily accessible to people living in the remote communities.

Benefits from mining have tended to **favour communities close to the mines**, largely through Impacts and Benefits Agreements (IBAs). Members of communities further from the mine are often a lower priority for mine employment. Employment opportunities also tend to go to the people with the highest levels of education and experience. Also, due to the time demands and remote locations associated with shift work and mine operations, **mining employment is more suited to those with the least financial responsibilities: people without families**. Focus group participants also indicated that their communities lack adequate training facilities.

The remoteness of many Aboriginal communities in Northwestern Ontario was a theme in the First Nation political organization and Fort William First Nation focus group sessions. It is recognized there is a lack of transportation and energy infrastructure. Participants **recognized that building this infrastructure will result in a number of opportunities and community benefits**.

Due to their remoteness, Aboriginal communities experience a number of social issues. that could increase with increased mining activity and increased interconnection from roads. These issues include increased cash, alcohol and drugs, influx of workers from outside areas, shifting lifestyles to a wage economy, loss of or change in traditional culture, and decreased community cohesion and attachment.

Increased mining activity coming in close vicinity to their communities adds pressure on Aboriginal communities. It was indicated that when community members are unfamiliar with the wage economy and **require money management and life skills training** to ensure they manage their pay-check to the benefit of their family. Also, mining operations are often located in remote areas where workers are required to work on a rotational schedule, living in camp for several weeks, then returning home for a week or two. Aboriginal community members may not be familiar with this type of work format and their family members will need to learn how to cope with the employed family member being away from the family for periods of time. This can disrupt community cohesion.

3.4 Public Consultation and Disclosure

Consultation with interested members of the public and agencies was a fundamental part of the Strategy. In addition to key informant interviews and focus group sessions we consulted with the public via public information sessions held in Thunder Bay and at Fort William First Nation.

The ultimate goal of the public consultation process was to inform stakeholders of the MRS, gather feedback, respond to stakeholder comments and questions, and incorporate the outcome of this process through the development of the Study.

More specific objectives of the Public Information Sessions (PIS) were the following:

- **Engage residents of the City of Thunder Bay, Fort William First Nation** and the region to provide input in the development of the MRS.
- **Seek input on challenges and opportunities** associated with growth in the mining sector.
- **Encourage businesses to participate** on regional and local levels by providing input and feedback on how the growth of the mining sector will affect economic and community development.

To develop the consultation program for the Strategy we began by developing a stakeholder/interest group list first through a review of secondary data and in discussion with MRS study team, please refer to Appendix A for the stakeholder/interest group list. The stakeholder/interest group list was revisited throughout the study to ensure that any newly identified stakeholders and groups were added to our list.

The first rounds of PIS were held September 17, 2012 in Fort William First Nation's Bingo and Community Hall and on September 18, 2012 in the City of Thunder Bay at the Italian Cultural Centre. The purpose of the first round of consultation was to introduce the Strategy to the public, answer questions, collect any feedback or suggestions on the study and the process. For the implementation of the study it is paramount that the public feels they have a stake in the process.

Photo 1 & 2 Public Information Sessions September 18 and 19, 2012

A great deal of planning took place prior to the PIS:

- A brochure highlighting key elements of the study was created

- Display panels were developed – each panel outlining the various stages of the study and the overall purpose of the study
- The PIS held in the City of Thunder Bay included a panel discussion with 4 expert members.

To ensure that we adequately informed the public of the PIS we:

- Advertised the PIS in the following newspapers: Chronicle Journal, The Source, and Wawatay News;
- Provided press release;
- Emailed all companies, groups, and people listed on our stakeholder list with details of the event; and
- Follow up calls to all companies, groups and people listed on our stakeholder list.

The second rounds of PIS were held on April 9, 2013 at the Thunder Bay Community Auditorium and on April 15, 2013 in the Fort William First Nation's Bingo and Community Hall. Receiving public input on the draft of the MRS was an important step to ensuring the relevance and applicability of the Strategy. The purpose of the second rounds of PIS was to:

- Present and discuss key project findings and recommendations of the MRS;
- Collect additional feedback/comments from the public regarding results of the MRS; and
- Answer questions the public may have regarding the MRS.

The second rounds of PIS had the same planning process as the first round. The planning process included: public notices in newspapers (Chronicle Journal, The Source, and Wawatay News), media release and public service announcements, and preparation of display panels and handouts outlining key project findings and recommendations.

Photo 3 & 4 Public Information Sessions April 9, 2013 and April 15, 2013

3.5 Other Similar Studies

3.5.1 Mining Readiness or Mining Sector Specific Studies

A number of community or regional organizations have already completed mining readiness or mining sector specific studies, either individually or jointly with partner organizations. Based on the telephone survey responses these include:

- **Atikokan** Economic Development Corporation
- **Greenstone** Economic Development Corporation and the Municipality of Greenstone
- **Superior North Community Futures** Development Corporation
- **Marathon** Economic Development Corporation (in progress)
- Municipality of **Wawa**
- City of **Dryden**
- Municipality of **Sioux Lookout**

3.5.2 Labour Market Studies

Similarly, a number of community or regional organizations have already completed labour market studies, either individually or jointly with partner organizations. This includes the 2012 *"Custom Labour Market Report: Thunder Bay District Mining Industry"*, completed by the North of Superior Workforce Planning Board, which exclusively **addressed the projected mining sectors labour market needs in the district.** Based on the telephone survey responses, current labour market studies include those prepared by:

- Chukuni Community Development Corporation
- Atikokan Economic Development Corporation
- Thunder Bay Ventures
- Greenstone Economic Development Corporation
- Superior North Community Futures Development Corporation
- Economic Development Corporation of Wawa
- Municipality of Greenstone
- Marathon Economic Development Corporation
- Township of Nipigon
- Township of Red Rock
- North Superior Workforce Planning Board
- Northwest Training and Adjustment Board
- Municipality of Wawa

- Township of Dorion
- Township of Nipigon
- Township of Terrace Bay
- Town of Rainy River (in progress)
- City of Dryden
- Municipality of Sioux Lookout
- Township of Ear Falls

3.6 Reference

(1) Source: Community Futures Development Corporations in Ontario, http://www.ontcfdc.com/frame3c1map.asp?Member_Region=Northwest&numrecs=9

(2) Ambassador's Northwest (2012) Mining in Northwestern Ontario: Opportunities and Challenges. This report was supported by the city of Thunder Bay, Thunder Bay CEDC, Thunder Bay Ventures, Thunder Bay Chamber of Commerce, Northwestern Ontario Municipal Association, Lakehead University and Confederation College of Applied Arts and Technology

4 MINING

4.1 Mining Characterization

4.1.1 Mining Projects Covered in the Study

All technical data collected as well as all analyses generated in this Strategy are based on **10 mining projects that are anticipated to become operational over the next 5 years**. These are shown on Figure 4-1. Nine of these are advanced exploration projects that have had studies completed ranging from resource estimates through to full feasibility studies. The other is a proposed expansion to an existing mine. The nine potential new projects studied are:

- Cliffs Natural Resources Inc. – Black Thor Chromite Project (Ring of Fire area)
- Noront Resources Ltd. – Eagle's Nest Nickel, Copper, Platinum, Palladium Project (Ring of Fire area)
- Rainy River Resources Ltd. – Richardson Twp. Gold Project (Kenora)
- Rubicon Minerals Corporation – Phoenix Gold Project (Red Lake)
- Osisko Resources Ltd- Hammond Reef Gold Project (Thunder Bay South)
- Stillwater Mining (Canada) Ltd. – Marathon copper-PGE Deposit (Thunder Bay South)
- Bending Lake Iron Group Limited – Bending Lake Iron Property (Kenora)
- Treasury Metals Inc. – Goliath Gold Project (Kenora)
- Goldcorp Inc. – Cochenour/Bruce Channel Gold Project (Red Lake)

The project expansion studied is:

- North American Palladium Ltd. – Lac des Iles Project (Thunder Bay South)

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 economic 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 plentiful for many years to come.**

Figure 4-1

Northwestern Ontario Mining Projects

" ….. It's not enough to have the resources. You have to do something with them … "

Honourable Joe Oliver
Federal Natural Resources Minister
"Natural Resources: Canada's Advantage, Canada's Opportunity". Sept. 4, 2012

4.2 Potential Future Mining Projects

4.2.1 Current Exploration Projects

Mining activity in Northwestern Ontario was examined in the *Mining in Northwestern Ontario: Opportunities and Challenges* report prepared by Ambassadors Northwest (2012) [1]. This report provides good summaries of active mine and exploration projects.

The key source of the information contained in the Ambassadors was cited to be the **Reports of Activities, 2011 Resident Geologist Program** published by the Ontario Geological Survey (OGS). Separate reports are produced for each of the four regions (Thunder Bay North, Thunder Bay South, Red Lake and Kenora) designated by the OGS. [2][3][4]. At the time of writing this report, the 2012 OGS regional reports were being prepared but were not yet available to the public. Communications with the OGS [5] suggest that the 2012 reports will not be significantly different from those of 2011.

For the purposes of this Strategy the OGS data was reviewed, and combined for all four regions, as the geographic basis of the regions is not relevant for analytical purposes. Table 4.1 summarizes the mining activity analyzed under the following categories:

- **Active Mines**: Five mines in Northwestern Ontario – (1) Barrick Williams Mine (gold), (2) Barrick David Bell Mines (gold), (3) Lac des Iles Mine (North American Palladium Ltd.) (palladium), (4) Goldcorp Red Lake Mine (gold), and (5) Goldcorp – Musselwhite Mine (gold).
- **Mature Exploration Projects:** (the 10 projects listed in Section 4.1 above)
- **Second Tier Mature Projects:** (Projects not included in our list for economic analysis but could be easily included in that category within 2013) These projects are being developed by the following companies:
    - Northern Iron Corp. – Griffith Mine
    - Claude Resources Inc. – Madsen Mine
    - Premier Gold Mines Limited – Hardrock Project
    - Rockex Mining Corporation – Lake Ste. Joseph
    - Panoramic Resources – Thunder Bay North
    - PC Gold Inc. – Pickle Crow Project

- **Developed Exploration Projects:** (defined as those projects upon which diamond drilling has been or is being carried out)
- **Other Exploration Projects:** (defined as those listed in the OGS reports but upon which no diamond drilling activity has been reported)

Mines in the Wawa area were not included as this is considered outside of the Thunder Bay South region as defined by the OGS. Two active mines are operated by Wesdome Gold Mines in the Wawa area: Eagle River and Mishi.

Table 4.1

Summary of Mining Activity in Northwestern Ontario

Active Mines	Mature Exploration Projects	Second Tier Mature Exploration Projects	Developed Exploration Projects	Other Exploration Projects
5	**10**	**6**	**123**	**141**

The metals of interest in the first four categories of projects listed in Table 4.1 are:

- **Gold:** **93 projects**
- Chromite: 4 projects
- **Base Metals:** **34 projects** *(Note the polymetallic and PGE projects have been listed under this category as most have significant base metals content)*
- Lithium: 5 projects
- Rare Earths: 1 project
- Iron: 6 projects
- Diamonds: 1 project

It should be noted that **many projects are polymetallic** (more than one target metal). The listing above is based on the principle metal of interest.

As shown, it is evident that **potential gold mining projects form the majority of exploration targets** (gold is also present in most of the polymetallic projects). The price of gold discussed in section 4.4 below will have a **significant influence on future exploration activity** and project development in the region.

4.2.2 Geological Potential of Northwestern Ontario

Future mining exploration activity in Northwestern Ontario will depend on the geological potential of the region. It is beyond the scope of this report to discuss this point in great detail. The brief characterization presented is taken from a presentation made by Dr. James M Franklin of Franklin Geosciences in 2011 [6].

In his 2012 presentation, Dr. Franklin concludes that at minimum there is over $300 billion in unlocked metal value to be found in the Ring of Fire and Far North of Ontario alone. He noted that what is needed to "make it happen" is compilation of the extensive geosciences data that has been collected, and investment in transportation infrastructure to increase access to areas that are currently costly to access for exploration activity.

If Northwestern Ontario had the same power supply and transportation infrastructure that exists in Northeastern Ontario there would likely be a proliferation of exploration, followed by mining activity in the region that could provide **major economic benefits to the province of Ontario and to Canada for many decades.**

4.3 Commodity Prices

One of the most important factors affecting the feasibility of a mining project is the estimation of long term prices for the commodity to be mined. Long term commodity price estimates are not always, but are usually lower than current spot prices. **Prices used in the economic analysis of a potential mining project must be carefully studied to understand the feasibility of the project, to attract financing.**

One of the easiest ways to establish a reliable range of long term prices that are currently being used by industry experts is to research Technical Reports posted on SEDAR for various commodities. This will allow the analyst to review and compare the opinions of a large number of experts who prepare these reports and to compare prices used by large mining companies (usually more conservative) with those being used by smaller "junior" mining companies (usually more aggressive).

Commodity prices used in the technical reports for the 10 selected projects for this Strategy were reviewed in this manner. **No significant anomalies** were identified between the various commodity prices being used by the Owners of these projects and their experts.

As a majority of the potential new **mining projects in Northwestern Ontario are gold projects** the trend for the price of gold for 2013 and beyond was examined. Interestingly, **the price of gold has risen every year for the decade leading up to 2012**.

The following paragraphs are summarized from an article published by **Trustable Gold, *Gold 2013 – What is the Trend for the Gold Price in 2013 and Beyond?*** [7].

> *As for any commodity, **gold price is driven by supply and demand**. Central banks are major players in the supply and demand scenario and since 2010 they have become net buyers of gold. Emerging countries such as China, India and Russia have a much lower percentage of their foreign reserves allocated to gold than developed countries such as most of Europe and the United States. This suggests there **could be significant potential for gold purchases by the developing nations with subsequent price increases**. On the other hand, the increase in gold price has reduced, and will continue to reduce, demand from the jewelry and industrial sectors.*
>
> *The **demand from the investment sector** accounts for more than **40% of total demand for gold**. The money and debt creation by major economies following the financial crisis of the late 2000's has increased and will likely continue **to increase the demand for gold as an investment**.*
>
> *The **main driver of the gold price** for the year 2013 and beyond will be the development of the **global financial crisis**. The levels of debt accumulated by Western governments*

seem not to be decreasing and could eventually lead to inflation levels significantly above recent inflation rates. ***Higher inflation will potentially preserve gold as an attractive insurance asset*** *or store of value for many conservative investors in 2013 and beyond.*

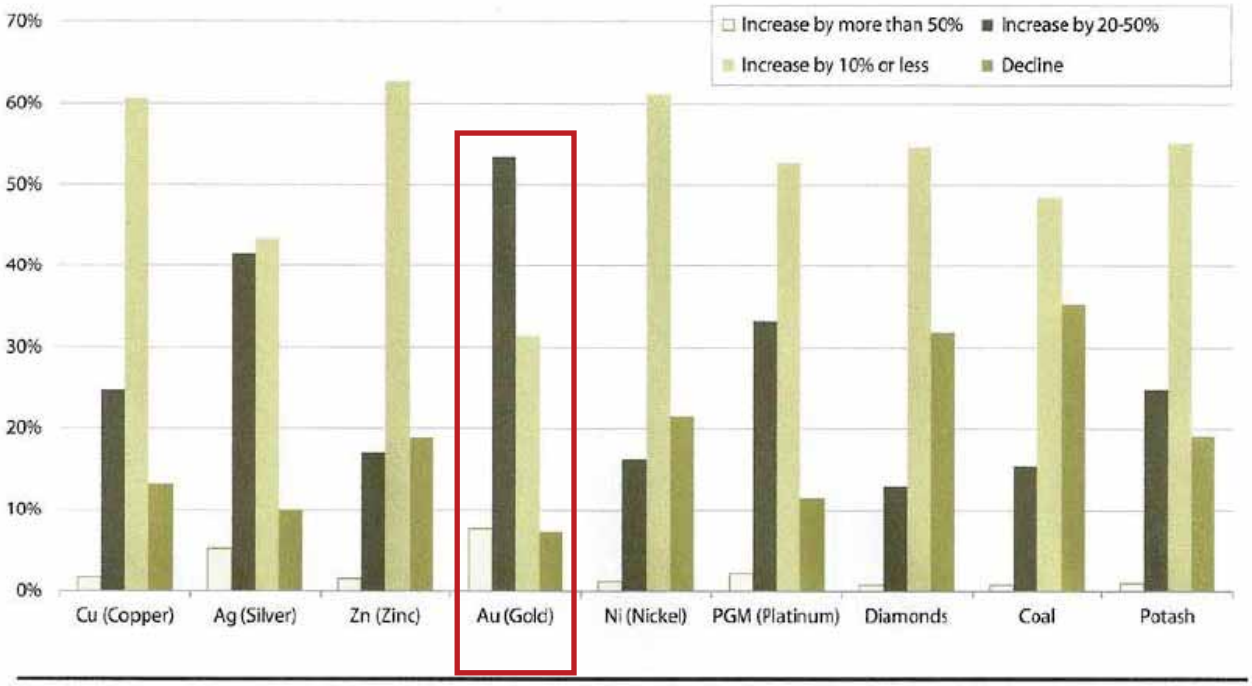
Many major commercial banks, gold mining executives and competent analysts are ***predicting that the price of gold will rise well above $2,000/oz in 2013****. Uncertainties in global markets could last for many more years and should support the high gold prices we are seeing today.*

Chinese demand *will particularly affect world demand (and prices) of all commodities.* ***China consumes some 40% of worldwide commodity output****. With a* ***growth rate of close to 8% in 2012*** *and similar figures expected in 2013 most commodity prices should improve.*

Since 1997, the **Fraser Institute** has conducted a **survey of Senior Managers of mining and exploration** companies to identify the effects of public policies on mining investment, investment patterns and commodity price expectations. Their recently released Survey of Mining Companies for 2012/13 published a comprehensive assessment of issues encouraging or dissuading mining decisions in **96 jurisdictions around the world**. The following chart identifies price trend expectations for a number of key minerals from that survey.

Figure 4-2

Commodity Price Trends for Selected Metals



The Survey of Mining Companies 2012/2013
Fraser Forum March/April 2013

As shown, **gold price projections are the most positive**:

54% of respondents

*"thought they [gold prices] would **increase by 20% - 50%** over the next two years, while 7.7% expected increases of more than 50%"*

Given the positive price expectations for gold, it is not surprising that **gold is the commodity assigned the largest proportion of capital investment budget** reported by survey respondents.

4.4 Steps from Exploration to an Operating Mine

4.4.1 Economic and Feasibility Studies

Following a successful exploration program which results in the identification of sufficient resources in the "measured" and "indicated" category, mining companies must go through a number of steps before a mine will be built and operated. Typically engineering studies to determine the economic potential of the mining project are carried out in the following phases:

- A Preliminary Economic Assessment (PEA) sometimes called a Scoping Study
- A Pre-feasibility Study
- A Feasibility Study

Progression from one phase to the next is, of course, dependent on positive findings from the previous phase. **Typically these three phases are not completed in less than 2 years**. In many cases mining projects are shelved, waiting for higher commodity prices. It is not unusual for projects to be active for many years before construction finally proceeds.

A positive Feasibility Study is usually the trigger for a mining company to proceed with financing, permitting, construction (usually using an EPCM (Engineering, Procurement, Construction Management approach)), commissioning, and start of operations. Depending on the size of the project these steps could take several years but would rarely be less than 2 years.

The following sections describe the permitting process required to construct and operate a new mine.

4.4.2 What Licenses and Permits Are Required?

The following is reproduced from Natural Resources Canada's publication *Mining Sequence Mining Information Kit* for Aboriginal Communities [8].

Permit and license requirements, and their application processes, vary in different regulatory jurisdictions in Canada. Provincial and territorial regulatory authorities generally administer mining permits.

Several federal departments also issue permits, licenses or authorizations that apply to mining projects. Key federal permits include those related to land and water use, mine closure and

reclamation plans, and camp construction permits. Table 4.2 outlines the general licenses and permits required during mine development.

Table 4.2

Key Development Permits

	Key Development Permits
Water	Provincial and territorial agencies (guided by the Council of Ministers of the Environment [CCME] guidelines) generally control water discharge criteria and water licences Water crossings permits are issued under the *Navigable Waters Protection Act*
Fish	Authorization under Section 35 of the *Fisheries Act* is required if impacts on fish habitat are expected Fisheries and Oceans Canada (DFO) has developed various guidelines to make sure that there is no net loss to fish habitat
Wildlife	In the case of potential effects on migratory wildlife, the *Canadian Migratory Bird Convention Act* applies and, in the case of endangered and threatened species, the *Canadian Species at Risk Act* applies The provinces and territories also have a range of policies and legislation addressing wildlife and species at risk issues
Mine construction and development	Construction permits for buildings Explosives permits Authorization from provincial/territorial departments to allow excavation to go ahead

4.4.3 Relevant Regulatory Issues in Ontario

The exploration, development and production of mineral resources in Ontario has been **undergoing a number of regulatory changes** that have impacted the exploration, development and operation of mineral production in Northern Ontario and more specifically the Far North. Decisions on the Crown's constitutional duty to consult and accommodate with impacted First Nations are an underlying tenet of changes to the Mining Act and the introduction and passing of the Far North Act. While a complex legal issue, it is important to have an understanding of how these regulations interact and the impact they have on mine development.

Duty to Consult and Accommodate

The common law duty to consult is based on judicial interpretation of the obligations of the Crown (federal, provincial and territorial governments) in relation to potential or established Aboriginal or Treaty rights of the Aboriginal peoples of Canada, recognized and affirmed in Section 35 of the Constitution Act, 1982. The duty cannot be delegated to third parties.

Section 35 of the Constitution Act, 1982 provides that:

- **The existing Aboriginal and Treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed**.

- In this Act, "Aboriginal peoples of Canada" includes the Indian, Inuit and Métis peoples of Canada.
- For greater certainty, in subsection (1) "**Treaty rights**" includes rights that now exist by way of land claims agreements or may be so acquired.
- Notwithstanding any other provision of this Act, the Aboriginal and Treaty rights referred to in subsection (1) are guaranteed equally to male and female persons.

In the Haida and Taku River decisions in 2004, and the Mikisew Cree decision in 2005, the Supreme Court of Canada (SCC) held that the Crown has a duty to consult and, where appropriate, accommodate when the Crown contemplates conduct that might adversely impact potential or established Aboriginal or Treaty rights. This duty has been applied to an array of Crown actions and in relation to a variety of potential or established Aboriginal or Treaty rights.

In these decisions, the **SCC determined that the duty to consult stems from the Honour of the Crown** and the Crown's unique relationship with Aboriginal peoples. The Court explained that it will look at how the Crown manages its relationships with Aboriginal groups and how it conducts itself when making decisions that may adversely impact the rights recognized and affirmed by Section 35. In the more recent decisions of Rio Tinto and Little Salmon Carmacks, the Court has further explained that the duty to consult is a constitutional duty that invokes the Honour of the Crown and that it must be met. The context will inform what is required to meet the duty and demonstrate honourable dealings.

The duty to consult and, where appropriate, accommodate is part of a process of fair dealing and reconciliation that begins with the assertion of sovereignty by the Crown and continues beyond formal claims resolution through to the application and implementation of Treaties. The Crown's efforts to consult and, where appropriate, accommodate Aboriginal groups whose potential or established Aboriginal or Treaty rights may be adversely affected should be consistent with the overarching **objectives of reconciliation**.

Reconciliation has two main objectives:

- **The reconciliation between the Crown and Aboriginal peoples and;**
- **The reconciliation by the Crown of Aboriginal peoples and other societal interests.**

Consultation and accommodation play a key role in the fulfillment of these two objectives. [9]

Mining Act

On November 1, 2012, new regulations under **Ontario's Mining Act** took effect. The province states that the changes reflect key components of the modernized Mining Act that was passed in 2009 to **promote mineral exploration and development** in a manner that **recognizes Aboriginal and Treaty rights**, is more respectful of private landowners and minimizes the impact of mineral exploration and development on the environment.

The new rules and tools try to provide clarity and certainty to industry, ensure ongoing engagement by industry with affected Aboriginal communities and attempt to build positive relationships with surface rights owners. The changes identified below will be fully implemented by April 1, 2013.

Additions to the Mining Act

Mining Act Awareness Program:

The program provides basic information on the mining sequence, staking claims, early exploration and Aboriginal consultation requirements at the various stages of the process, with an emphasis on the changes that have been made to the regulations. The program, which will be delivered on-line, will also raise awareness of the importance of considering other users of public land. Effective November 1, 2012, anyone wishing to apply or renew a prospector's license must complete the program. By November 1, 2014, every current holder of a prospector's license will be required to have completed the program.

Sites of Aboriginal Cultural Significance

Effective November 1, 2012, Aboriginal communities will be able to apply to have sites of Aboriginal cultural significance withdrawn so mining claims cannot be staked.

Exploration Plans

In order to undertake certain early exploration activities, an exploration plan must be submitted, and any surface rights owners must be notified. Early exploration activities include geological mapping, line-cutting and airborne geophysics. Aboriginal communities potentially affected by the exploration plan activities will be notified by the Ministry of Northern Development and Mines (MNDM) and have an opportunity to provide feedback before the proposed activities can be carried out. Submission of an exploration plan is voluntary beginning November 1, 2012. Exploration plans will be mandatory as of April 1, 2013.

Exploration Permits

Mechanized activities including diamond drilling and power-stripping will require an exploration permit. Those activities will only be allowed to take place once the permit has been approved by MNDM. Surface rights owners must be notified when applying for a permit. Aboriginal communities potentially affected by the exploration permit activities will be consulted and have an opportunity to provide comments and feedback before a decision is made on the permit. Submission of an application for an exploration permit is voluntary beginning November 1, 2012. Exploration permits will be mandatory as of April 1, 2013. Permit applications will be posted on the EBP (Environmental Registry).

Changes to the Act

Voluntary Rehabilitation

Effective November 1, 2012, provisions were implemented to allow individuals or companies to apply to voluntarily rehabilitate an existing mine hazard that they did not create on Crown-held land, and without becoming liable for pre-existing environmental issues on the site.

Claim-staking

Effective November 1, 2012, if you ground-stake a mining claim, you must include global positioning system (GPS) geo-referencing data on the application to record the claim. MNDM will provide a set of standards to follow. This requirement will only apply to ground staked mining claims on lands that are unsurveyed (not surveyed into lots and concessions).

Assessment Work Credits

Effective November 1, 2012, changes to the assessment work regulation will make Aboriginal consultation costs and the cost of providing GPS data for existing claims eligible for assessment credit. Monetary payments in lieu of assessment work will be accepted under certain conditions.

Bulk Samples

Effective November 1, 2012, the process for obtaining permission to test mineral content has changed and thresholds have been set for the amount of material that will be considered a bulk sample. Both a bulk sample permit and an exploration permit will be required to extract a sample and test mineral content on a mining claim.

Closure Plans

Effective November 1, 2012, the rules for Aboriginal consultation have been formalized. Aboriginal consultation is required prior to the submission of a certified closure plan or closure plan amendment. There are also provisions for facilitation (if required) to assist with the process [10].

Far North Act

On June 2, 2009, the **Ministry of Natural Resources** (MNR) introduced proposed legislation that would allow for sustainable development of the region's natural resources and protect at least half of the Far North of Ontario in an interconnected network of protected areas.

The Far North Act received Royal Assent on October 25, 2010 and is the legislative foundation for land use planning in the Far North. The purpose of the Act is to **provide for community based land use planning** in the Far North that:

- Sets out a **joint planning process between the First Nations and Ontario**;
- Supports the environmental, social, and economic objectives for land use planning for the peoples of Ontario; and
- Is done in a manner that is consistent with the recognition and affirmation of existing Aboriginal and Treaty rights in Section 35 of the Constitution Act, 1982, including the duty to consult.

As set out in the Act, the objectives of land use planning include the following:

- A significant role for First Nations in the planning;
- The protection of areas of cultural value and protection of ecological systems by including at least 225,000 square kilometers of the Far North in an interconnected network of protected areas designated in community based land use plans;
- The maintenance of biological diversity, ecological processes and ecological functions, including the storage and sequestration of carbon in the Far North; and
- Enabling sustainable economic development that benefits the First Nations.

Another important part of the Act is the development of the Far North Land Use Strategy. The strategy is the foundation of policy and information that provides the big-picture, broad-scale land use interests to support community based land use planning. It also guides the integration of matters that are beyond the geographic scope of individual community based land use plans.

The strategy will include all policy statements issued under the Act and may also contain policies related to:

- The requirements and restrictions for amending community based land use plans;
- Categories of land use designations; and
- Categories of protected areas.

The Far North Act is intended to work hand-in-hand with other government priorities such as **Open Ontario, Northern Growth Plan** and the **Mining Act**. Community based land use plans will be initiated by individual or paired First Nation communities and will be jointly developed and approved by Ontario and First Nations. Once a First Nation Community agrees to participate, the First Nation and the Ministry of Natural Resources work together to gather background information, including Aboriginal traditional knowledge, science, land and resource information.

Led by First Nations working together with Ontario, a joint planning team is then created to establish roles and responsibilities for their community based land use plan. Following this, the planning area of interest is defined considering current uses of the land, historical relationships and dialogue with other neighbouring First Nations [11].

Progress to Date

Prior to the passage of Bill 191 and The Far North Act, there was opposition from individual First Nations, Tribal Councils and Nishnawbe Aski Nation on the basis that it contravened their Treaty rights. This was based on a claim that there was inadequate consultation and that it allowed industry free access to the land with the Minister of Natural Resources having an override of the agreements.

At the present time there have **been four land use plans approved**.

- **Pikangikum's Whitefeather Forest** - Land Use Strategy for the Whitefeather Forest
- **Cat-Lake Slate Falls** Community Based Land Use Plan
- **Pauingassi** Community Based Land Use Plan
- **Little Grand Rapids** Community Based Land Use Plan

Of these, two (Paungassi and Little Grand Rapids) are located primarily in Manitoba, the other two, (Pikangikum and Cat Lake/Slate Falls), were started and functionally completed under the previous MNR land use planning program the Northern Boreal Initiative. There are, however, a **significant number of First Nations working with MNR to collect their traditional ecological knowledge (TEK)** under a transfer payment agreement. To date none have signed a Terms of Reference with the province.

Canadian Environmental Assessment Act (CEAA)

The Canadian Environmental Assessment Act, 2012 (CEAA 2012) and its associated Regulations came into force on July 6, 2012. The Regulation Designating Physical Activities lays out the physical activities that constitute "designated projects" may require an environmental assessment (EA) under CEAA 2012. This change is intended to eliminate the current uncertainty associated with "triggering" under Section 5 of the current CEAA. The Minister of the Environment will also have the power to require a CEAA 2012 assessment for non-listed projects. An interesting point to note is that this Regulation is essentially a repurposed version of what used to be the Comprehensive Study List. Essentially, only project categories that would previously have been

assessed as comprehensive studies will be assessed under CEAA 2012. In addition to those specified in this Regulation, designated projects also include other physical activities that are carried out in Canada or on federal lands, or are linked to certain federal authorities specified in the Regulation.

The definition of "environmental effects" under the older version of the Act was very broad, and did not restrict the definitions of changes and effects to only changes and effects occurring within Canada. Under CEAA 2012, however, "environmental effects" is limited to the effects on a prescribed list of areas of federal jurisdiction, including fish, aquatic species under the Species at Risk Act, migratory birds, federal lands, Aboriginal peoples, and changes to the environment that are directly linked or necessarily incidental to a federal authority's power to issue permits/approvals (Section 5, CEAA 2012). This will greatly limit the assessments that may be conducted under CEAA 2012 to a shortlist of matters of federal jurisdiction.

With regards to Ontario's Mining Act, on November 1, 2012, new rules under this Act became effective, one of the intentions being to promote mineral exploration and development in a manner that recognizes Aboriginal and Treaty Rights and minimizes the impact of mineral exploration and development on the environment. The new rules and tools aim to provide clarity and certainty to industry and ensure ongoing engagement with affected Aboriginal communities. One of the more significant changes pertains to consultation requirements with regards to certain exploration activities.

To facilitate the mineral development permitting and approvals process, a "One Window" Coordination Process has been initiated, which essentially coordinates the activities of all parties involved in the mineral development, permitting and approvals processes and provides timelines that do not alter pre-existing regulatory and approval timelines. It should be noted that the administration coordination framework does not bestow new legal powers or duties on participants or provide legal advice to Proponents.

Throughout this process, a project coordinator from MNDM will work closely with other participating ministries in the coordination process. It is this Project Coordinator who will work with the Proponent and provide it with preliminary information on the permitting and approvals process.

4.5 Responsible Growth

Clearly, the development of the mining resources in Northwestern Ontario will have to be achieved in a responsible manner. **The challenge for all the parties contributing to these exciting opportunities is to "do it right". Historically, junior exploration companies drive the sector and make the majority of discoveries.**

In the mining industry, few projects are developed by inexperienced junior exploration/development companies and virtually all major developments migrate (often through several stages) to the major companies such as Barrick, Goldcorp, Cliffs, BHP Billiton, Xstrata, Vale and RTZ. **Likely many of the potential developments in Northwestern Ontario will end up being developed by the majors or emerging mid-tiered firms, a trend over the last decade**.

One great advantage is that all of the major mining companies have sophisticated environmental and sustainability policies, including Aboriginal relations.

As outlined in **Canada's Economic Action Plan** *Strengthening Environmental Protection*, responsible resource development will strengthen Canada's world-class environmental standards through effective measures that:

- Focus assessments on the major projects that have a greater potential for significant adverse environmental affects;
- Introduce enforceable environmental assessment decision statements to ensure proponents of resource projects comply with required mitigation measures to protect the environment;
- Provide federal inspectors with authority to examine whether or not conditions of a decision statement are being met;
- Authorize the use of administrative monetary penalties for violations of the *Canadian Environmental Assessment Act*;
- Provide for enforceable conditions in *Fisheries Act* authorizations.

4.6 Conclusions

The conclusions that can be drawn from the above brief review of the mining industry of Northwestern Ontario are as follows:

- The **majority of the 10 projects selected as the basis for the economics presented in this study are those most likely to proceed into construction and operations**.
- If any of the projects are **cancelled or delayed** there is a **high probability that they would be replaced by other projects** not currently in the advanced exploration phase.
- Minerals including chromium and nickel-copper (both of which have been discovered in the Ring of Fire) and platinum group elements, copper and iron throughout Northwestern Ontario, contribute substantially to the economics covered in this study. However, **gold mining projects predominate in both existing mining projects in the region and potential future projects.**
- **Prospects for increased gold prices are strong**, **leading to increased mining activity in the gold mining sector –** including increased mining activity in Northwestern Ontario.
- The **long term mining potential in Northwestern Ontario is enormous** but **needs planning and large investment in the energy transmission and transportation sector** to reach its full potential.
- **Permitting regulations are formidable and must be accounted for in scheduling** new mining developments, particularly in respect of Treaty and Aboriginal rights.
- The January 2013 report prepared by the **Conference Board of Canada**, *The Future of Mining in Canada's North* [12] (Conclusions and Recommendations) states the following:
  - **Communities and Industry can benefit enormously from Canada's mining potential through responsible and sustainable practices. However, all proponents must work together to address outstanding challenges,**
  - Addressing some or all of the priorities can **significantly improve the outlook for the future of mining in Canada**, for the industry and communities alike.
  - Findings suggest **six key areas for policy** development to support future sustainable mining development in Canada's North:
    - Support a **competitive business environment** for the mining industry;

- Ensure **infrastructure gaps and needs are met in a timely manner**;
- Advance **recruitment initiatives** aimed at women, new Canadians, youth and Aboriginal workers;
- Ensure federal and provincial governments conduct **meaningful community** consultations and ensuring the implementation of Aboriginal land claims and resource development agreements;
- **Lobby governments to improve regulatory processes** and personnel turnover in government regulatory bodies; and
- Lobby federal and provincial governments to ensure further investments in **geosciences**.

Although most of this report had been drafted before the Conference Board's report had been published (January 28th, 2013) the **conclusions from both studies are remarkably similar.**

4.7 References

(1) Ambassador's Northwest (2012) Mining in Northwestern Ontario: Opportunities and Challenges. This report was supported by the city of Thunder Bay, Thunder Bay CEDC, Thunder Bay Ventures, Thunder Bay Chamber of Commerce, Northwestern Ontario Municipal Association, Lakehead University and Confederation College of Applied Arts and Technology.

(2) OFR 6272, Report of Activities 2011, Resident Geologist Program, Thunder Bay North Regional Resident Geologist

(3) OFR 6271, Report of Activities 2011, Resident Geologist Program, Red Lake Regional Resident Geologist Report

(4) OFR 6273, Report of Activities 2011, Resident Geologist Program, Thunder Bay South Regional Resident Geologist

(5) Personal Communications: Mark C. Smyk, Regional Manager Northwest Resident Geologist Program, Ministry of Northern Development and Mines and Minerals Division, Ontario Geological Survey February 8th, 11th, 2013.

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(7) Trustable Gold, Gold 2013 – What is the trend for the gold price in 2013 and beyond? www.trustablegold.com

(8) Natural Resources Canada's publication Mining Sequence Mining Information Kit for Aboriginal Communities

(9) Haida Nation v. British Columbia (Minister of Forests), 2004 SCC 73

(10) Ontario Ministry of Natural Resources Website

(11) Ministry Of Natural Resources Website

(12) The Conference Board of Canada Report January 2013, "The Future of Mining in Canada's North"

5 AN ESTIMATE OF THE ECONOMIC IMPACT OF ANTICIPATED MINING DEVELOPMENT AND EXPANSION IN NORTHWESTERN ONTARIO: 2013-2022

This Section provides an analysis of the **economic impact (economic growth) that can realistically be realized in Northwestern Ontario and the Thunder Bay region** as a result of the development of mines which have measured and indicated resources, and are in the advanced stages of engineering, economic feasibility and environmental assessment.

The economic impact of mine development will not only result from expenditures around initial construction and operation, but also from the "spin-off" spending that will occur as a result of indirect and induced economic activity.

To estimate the value of this economic impact, an economic multiplier analysis was conducted to estimate the direct, indirect and induced economic benefits that will result. The **economic impact of mine development includes the employment that will be created** as a result of mine construction and operation and related activities. Many jobs will be created directly in the mining sector, and many additional jobs will be created in related and support businesses which provide goods and services to mining and mine employees. The "spin-off" benefits of mine development and operation into the regional economy from what is commonly referred to as the "**supply chain**" are described further in Section 6.

A **key objective** to maximizing the economic benefits of mining in Northwestern Ontario is to **maximize the retention of economic activity in the region**. This includes maximizing opportunities for "supply chain" businesses to locate in Northwestern Ontario, as well as maximizing the number of employees throughout the regional economy that work, reside, and spend their income in the region.

5.1 Approach to Economic Impact

There are different methods of calculating economic impact. The **income-expenditure** approach estimates impact by multiplying successive rounds of consumption and saving as income circulates through the economy. Of every dollar spent in the local or regional economy, a portion is spent and a portion is saved. Dollars that are spent have a continuous effect that becomes a multiple of the original expenditure. This is referred to as the "**multiplier effect**".

Total economic output (Y) can be expressed as a function of the expenditure base (E) where (Y) is a multiple of the expenditure activity multiplied by the economic expenditure multiplier (k) or:

$$(1) Y = kE$$

The **change or growth** in economic activity **results from changes in the two key variables – the initial expenditure change (E) and the multiplier (k)**. The larger the initial expenditure and the larger the multiplier, the greater will be the economic growth. Also, the more goods that are consumed locally (the more spending that occurs locally)[4], the more dollars that will be circulated locally, resulting in larger growth in the local or regional economy.

[4] This is implemented in the analysis via the assumptions of an initial leakage rate on expenditure and then differences in the size of the multiplier. Larger multipliers imply higher marginal propensities to consume out of subsequent income increases.

To conduct economic impact analysis using the income-expenditure approach, all of the expenditures (E) must be categorized and valued, and an economic multiplier that is reasonable must be selected and applied to the estimated expenditures to calculate the total economic impact.

As any estimate of economic impact is sensitive to the assumptions used, selecting a "reasonable" economic multiplier is important. Economists generally agree that larger multipliers tend to be more accurate when applied to the analysis of large, relatively self-sufficient economies, whereas smaller multipliers have proven to be more accurate for regional and local economies that are more dependent on other economies. In addition to growth in economic activity (dollars and jobs in the economy), economic growth also results in income and revenue that governments can tax, thereby generating tax revenues.

5.2 Background for Constructing Economic Impact Estimates

Expenditure data for forecasting growth in the economy of Northwestern Ontario from projected mining development and related expenditures was developed for the forty year **period 2013 to 2051**, based on the **anticipated capital and operating expenditures reported for ten projects**[5] including:

Pre-construction Period	between 2013 and 2015
Construction Period	between 2013 and 2017
Operating Period	between 2013 and 2051

If other projects come on stream in the future, the **economic impact will be greater than what is estimated** using only the projects selected and included in the analysis. Similarly, if any of these selected projects do not go to development and operation in this timeframe, the economic impact analysis will be lower than what was calculated.

The **total disbursements** (capital, wages and salaries, materials and supplies, etc.) in **2012 dollars** for all of the anticipated projects, across all of these phases of activity, and within the estimated timeframes, were estimated to be approximately **$36 billion**. The estimate of the economic impact of these expenditures was then calculated for the period 2013 to 2051. However, results of the multiplier analysis are presented only for the period 2013-2022, as most of the impact is expected to occur during this period. Given that forecasts become less reliable and more uncertain over time, a more qualitative estimate of economic impact is presented for the period 2023 to 2051.

The economic impact on the regional gross domestic product (GDP) was calculated by totaling the value of disbursements and applying the selected economic multipliers. Values are expressed in 2012 dollars to provide an estimate of the total economic impact of the project at the present point in time. To account for inflation, a standard adjustment was applied to the analysis equal to an annual inflation rate of 2 percent.[6]

Because of the sensitivity of the economic impact analysis to the selection of the multiplier, **several multipliers were used in the analysis**, which **range from 1.25 to 1.75**. These represent

[5] These projects are: Cliffs Natural Resources-Black Thor, Noront Resources-Eagle's Nest, Rainy River Resources-Rainy Rivers Gold, Rubicon Minerals-Phoenix Gold, Osisko Resources-Hammond Reef, Stillwater Canada-Marathon, Goldcorp-Red Lake, Bending Lake-Bending Lake, Treasury Metals-Goliath Gold and North American Palladium-Lac Des Isles.

[6] Inflation in both Canada and Ontario using the Consumer Price Index has been approximately 2% for a number of years. The Bank of Canada's inflation control policy in place since 1991 is not expected to change and the target range is set a 1 to 3 percent with the aim of keeping inflation at the 2 percent midpoint. See: www.bankofcanada.ca/monetary-policy-introduction/framework/inflation-control-target/

lower and upper estimates of the potential economic impact of the projects [2].[7] This range of multipliers is considered reasonable in that they are consistent with those applied in other estimates of the effect of mining activity on economic impact. For example, a **study conducted for the Province of British Columbia in 2001** found that each dollar of expenditure resulted in **1.73** dollars of total economic activity [3]. Another study conducted on the mining sector in the **State of Minnesota** – a region adjacent to Northwestern Ontario – demonstrated an effective **multiplier of 1.61** [4]. The United States Federal Bureau of Economic Analysis estimated multipliers for mining activity in **Alaska** and demonstrated a **multiplier of 1.6** [5].[8] Another study for the **United States** estimated the value of the multiplier for mining at **1.6** at a county level of economic activity [6]. A respected 'representative mine' study conducted for the Province of Ontario by **Dungan and Murphy** (2007) [7] applied a multiplier of **1.5** for a producing mine.[9] A study of regional multipliers for British Columbia by **H. Craig Davis (1986)** [7], applied multipliers that **ranged from 1.19 to 1.49**. Based on these previous estimates, for the purposes of estimating the economic impact of anticipated and potential mining development and expenditure in Northwestern Ontario, **multipliers ranging from 1.25 to 1.75 were applied**.

Direct, Indirect and Induced Impacts

There **are three categories of activity** that impact the economy: direct, indirect and induced. The **direct impact includes the direct expenditure on wages and salaries for the project**. This represents a direct injection of expenditure into the economy. The **indirect impact includes wages and economic activity created by businesses which provide goods and services** to the initial project. These expenditures include capital, supplies, materials and equipment. The **induced impacts result from the spending and the resulting recirculation of employee incomes**. Direct and indirect expenditures are categorized and valued from engineering estimates of potential expenditures. Induced spending is calculated using multipliers. The resulting total of all spending (direct, indirect and induced) results in the total economic impact of the project.

Economic Activity "Leakage"

In addition to selecting a reasonable multiplier, it is also important to estimate the proportion of the **direct and indirect expenditures that will remain (will be spent) within the economy**. The rate of leakage of initial expenditures outside the economy can have a significant effect on the estimated growth of the economy. It is generally accepted that a capital and skill intensive industry like mining can result in a substantial portion of expenditures being made not only outside the immediate region of the project, but also outside the province and even the country.

For the purposes of estimating economic growth for this Strategy, a **leakage rate of 25 percent** was selected based on the leakage assumption applied in the well respected **Dungan and Murphy** study (2012). Dungan and Murphy maintain that well over 70 percent of the value of mining supplies and services is provided from within the province of Ontario, implying a leakage rate on expenditures of approximately 25 percent. Leakage is **not something that is absolute**. Leakage rates can be reduced by a community or region's efforts to retain or maximize local expenditures. These efforts could include measures such as preparing and planning for anticipated future economic activity through efforts such as this Strategy.

[7] Generally, they tend to be between 1 and 3 across various industries. The ones in mining mentioned by Wen-Huei Chang tend to be between 1.5 and 2.

[8] This is a payroll expenditure multiplier. Employment multipliers in this study were also provided and were closer to 2.6.

[9] This was calculated based on the information in Tables 1 and 2 of the study. Employment costs are estimated at $69.5 million and purchased input and production costs at $119.5 million for total expenditures of $189 million. Total GDP from direct, indirect and induced impacts sums to $277.8 million yielding a 'multiple' of 1.47.

Employment Growth Estimates – Two Approaches

Expanding economic activity also generates employment growth. The impact of economic activity on employment creation can be calculated in two ways.

One method is based on **directly applying a range of employment multipliers to the direct and indirect mining expenditures**. For example, H.C. Davis (1986) [7] estimates regional employment generated per $1 million of wages and salaries ranges from 44.8 to 54.5 jobs. Walden argues that most employment multipliers are in the range of 20 to 40 employees per $1 million of expenditure and places the value of the mining employment multiplier at 20.4 [9]. *Mining in Northwestern Ontario: Opportunities and Challenges* by Ambassador's Northwest (2012) also used an employment multiplier approach.

A **second method** of estimating the employment impact is to **estimate GDP dollars produced per employee/job and then use that estimate in the economic multiplier analysis**. The advantage of this approach is that it combines the GDP and employment estimates rather than treating them as separate and even unrelated components of the economy. **Dungan and Murphy** (2012) [10] was used to reflect the specific impact of mining GDP on employment in Ontario. This study **resulted in an estimate of $169,152 average real mining GDP per employee during the period of 2013 to 2051** [10][10]. In calculating these estimates, one person working full-time person working for one year is considered a person year of employment, and one person year of employment is assumed to be equivalent to one full time job.[11]

This second method of estimating employment growth, using GDP per employee, was applied to the estimate of economic growth in Northwestern Ontario for the purposes of this Strategy. In the calculation of GDP per employee, average productivity of an Ontario worker is another important variable. For this calculation, a higher estimate of productivity was used derived primarily from mining employment data and the known contribution of mining activity to the Ontario GDP.[12]

Government Revenues

Government revenue as a result of the **ten mining projects** was estimated using the **Dungan and Murphy** (2007) representative mine study. The implied government revenue ratios (government revenue to GDP) were applied to the annual average GDP estimates in this Strategy. To ensure conservatism was employed in calculating estimates, the lower revenue to GDP ratio (that occurred in the operating phase of the representative mine) was used [8].

This procedure results in an **overall government revenue to GDP rate of 30.2 percent** and allows for government revenues to be broken down into federal, provincial and municipal revenues. The procedure is summarized in Figure 5-1.

"The Natural Resources sector accounts for close to 20% of all economic activity in Canada and contributes to meeting Canada's social priorities"

Honourable Joe Oliver
Federal Natural Resources Minister
Ontario Mining Association. Nov. 16, 2012

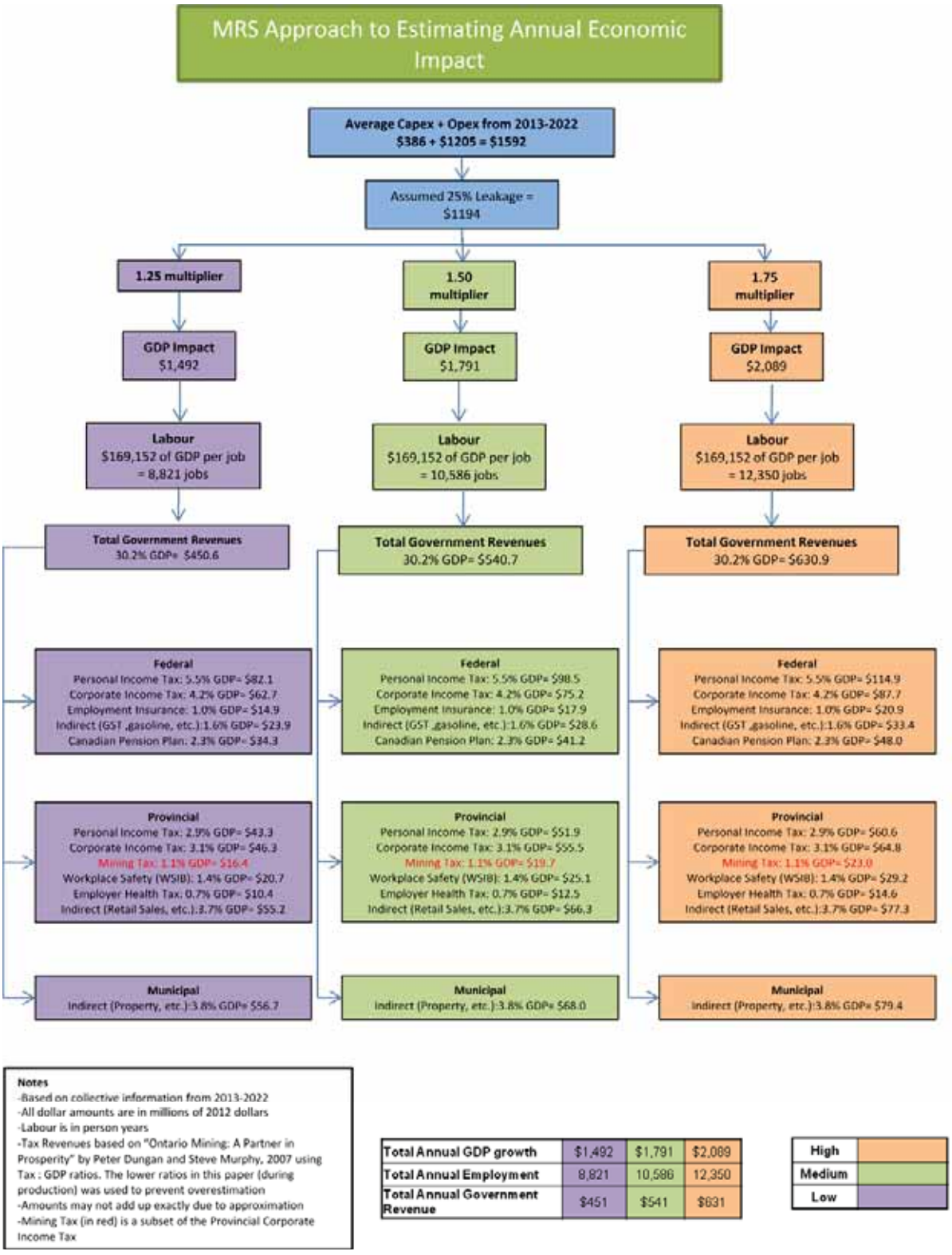
[10] The Dungan and Murphy estimate for 2012 was extrapolated forward based on based on 3 percent annual GDP growth and inflation of 2 percent for real growth of 1 percent and an average taken for the 2012 to 2051 period.

[11] Definitions of person years can vary but a person working full-time for forty hours a week for 4 weeks a month for 11 months a year (assuming four weeks for vacation) would generate 1,760 hours of work. Thus a person-year can be estimated as someone working full-time for 1,760 hours per year.

[12] As noted, Dungan and Murphy (2012) provide estimates of GDP output from mining and employment creation that generate a much higher GDP per employee estimate.

Figure 5-1

MRS Approach to Estimating Annual Economic Impact



Tables 5.1 and 5.2, below, provide **estimates of the economic growth of the Northwestern Ontario economy for the period 2013 to 2022**, based on growth in the mining sector, by GDP as well as by employment. Growth was estimated using the range of economic multipliers discussed above, plus a leakage rate on initial expenditure of 25 percent. A lower leakage rate combined with a larger multiplier results in a higher estimate of economic growth. Conversely, a higher leakage rate combined with a lower multiplier will result in lower estimates of economic growth.

Table 5.1

Estimates of Average Annual Ontario Economic Impact - Mining Development Period 2013-2022

Mining Development Period (2013-2022)	
Annual Ontario Economic Impact	
Millions of 2012 dollars	
Assuming Initial Leakage Rate of 25%	GDP
Multiplier=1.25	$1,492 million
Multiplier=1.50	$1,791 million
Multiplier=1.75	$2,089 million

Table 5.2

Estimates of Average Annual Ontario Employment Impact - Mining Development Period 2013-2022

Mining Development Period (2013-2022)	
Average Annual Ontario Employment Impact	
Millions of 2012 dollars	
Assuming Initial Leakage Rate of 25%	Jobs[13]
Multiplier=1.25	8,821
Multiplier=1.50	10,586
Multiplier=1.75	12,350

Tax revenues resulting from these estimates of economic growth were calculated using the implied revenue ratios from the Dungan and Murphy representative mine study and applying them to the annual average GDP estimates.

[13] In person years. It should be noted that in terms of measuring employment, one full-time person working for one year is set as a person year of employment and a person year of employment will be assumed approximately equal to one full time job.

Summary Discussion of Results

Ontario Economic Impacts – GDP - Total

- Based on the annual average estimate, the **total economic impact on the Ontario economy from 2013-2022 could range from a total of $14.92 to $20.89 billion** (2012 dollars).
- The **average annual increase in Ontario GDP in 2012 dollars, for the same period is estimated to range from $1.492 to $2.089 billion**.

Northwestern Ontario and Thunder Bay Impacts – GDP - Total

- Of the estimated Ontario economic impacts, **79 percent** (based on Dungan and Murphy (2007) mine study) has been assumed **to be retained within the regional economy**; and of that about **60 percent**[14] is expected **to remain in the Thunder Bay economy** based on Thunder Bay's historic share of economic activity in the Northwestern Ontario economy.
- Based on these assumptions, it is estimated the **Northwestern Ontario economy** will realize **economic growth** of between **$11.8 and $16.5 billion** over the course of the period **2013 to 2022.**
- Based on the same assumptions, it is estimated the **Thunder Bay economy** will realize **GDP growth** between **$7.1 and $9.9 billion** over the **same 10 year period**.

Northwestern Ontario and Thunder Bay Impacts – GDP - Annually

- The economy of Northwestern Ontario could realize an **increase in GDP of between $1.2 and $1.7 billion annually**.
- The **Thunder Bay economy** could realize an **increase in GDP of between $0.71 and $0.99 billion annually**, representing an annual increase in GDP over the 10 year period between **15.0 percent and 20.9 percent**.

Ontario Employment Impacts - Total

- Total employment generated in Ontario from mining activity in Northwestern Ontario for the ten year period from **2013-2022**, is estimated to range from **88,212 jobs to 123,497 jobs.**

Ontario Employment Impacts - Annual

- Average annual employment impacts in Ontario are estimated to **range from 8,821 to 12,350 jobs.**

Northwestern Ontario and Thunder Bay Employment Impacts

- Dungan & Murphy (2007) estimate that **66 percent** of the economic activity generated from this employment **will be retained in the local and regional economies**. This is estimated to result in the creation of between 58,220 and 81,510 jobs in Northwestern Ontario from 2013-2022.
- Based on the Thunder Bay's historic share of economic activity within the region (60%), it is estimated that between **34,930 and 48,910 jobs will be created in Thunder Bay** from 2013-2022.

[14] Calculation based on employment data for Northwestern Ontario and Thunder Bay from Statistics Canada.

- Employment generated annually is estimated at:
  - **5,822 to 8,151** jobs in Northwestern Ontario
  - **3,493 to 4,891** jobs in Thunder Bay

Government Revenues: Federal, Provincial and Municipal

- The average annual **total government revenues** generated in Ontario from mining activity in the ten year period (2013-2022) is estimated to be between **$451 and $631 million** (2012 dollars).
- The average annual **federal government revenues** generated in Ontario is estimated to be between **$218 and $305 million** (2012 dollars) from mining activity in the ten year period (2013-2022)
- The average annual **provincial government revenues** generated in Ontario is estimated to be between **$193 and $270 million** (2012 dollars) from mining activity in the ten year period (2013-2022)
- The average annual **municipal government revenues generated** in Ontario is estimated to be between **$57 and $79 million** (2012 dollars) from mining activity in the ten year period (2013-2022)

5.3 Analysis and Discussion of Results

The recent study, *Mining in Northwestern Ontario: Opportunities and Challenges* (2012) prepared by Ambassadors Northwest and conducted by faculty of the Business Administration school at Lakehead University and professors from Confederation College, estimated that over the period 2013-2031, the total impact of mining would be to create a total of 13,149 new positions in Northwestern Ontario over 17.5 years [11].[15] This works out to 751 jobs per year on average, compared to the low scenario annual estimate of 8,821 jobs[10] presented in this analysis. There are a number of reasons for the differences between their estimates and those of this Strategy.

First, the Ambassadors study estimate was calculated using a **different time period** and considering **nine rather than 10 mining projects**.[16] Second, **different methodologies** were used to estimate economic impact as the economic impact estimates generated by the Ambassadors are based on employment creation, using employment multipliers applied to direct employment estimates for construction and mining production activity.[17] The estimates calculated for this Strategy are based on the economic impact of estimated mining expenditures (construction and operating) on GDP. Employment estimates are directly linked to the expansion in economic output. As well, the Ambassadors report applied a **higher leakage rate**, assuming that only **48 percent of economic output** would stay within Northwestern Ontario [11], compared to the assumption applied in the current analysis that **79 percent of the GDP impact** and 66 percent of the employment impact would be retained in Northwestern Ontario.

[15] As stated in the executive summary: "*Employment growth is expected to be significant. The direct, indirect and induced employment created for the Province of Ontario is expected to total 23,588 new positions (8,107 from construction and 15,481 from mining operations over an average mine life of approximately 17.5 years). A total of 13,149 of these new positions are expected to remain in NWO (5,719 during construction and 7,430 from mining operations)*." The economic impact in terms of employment impact and derivation assumptions are provided on pages 32-38 of the report.

[16] Ambassador's time span was 17.5 years while our study calculated initial impacts over a 39 year period.

[17] They apply a multiplier of 3.67 to every direct operating mining job created and 1.05 to every direct construction job in mining created.

Although the estimate of impacts in this Strategy may seem high, the methodology **ties GDP economic impact estimates directly to employment generation** using an economic multiplier that is directly tied to the output derived from the estimate as well as the average productivity of Ontario mining workers in terms of their estimated contribution to economic output. Given the circulation effects of mining expenditures through the economy and the effect of this spending on other economic activities and sectors, it is considered that the application of an average GDP per employee is a reasonable approach to the estimate of employment impacts.

Two mining impact studies conducted for the **Ontario Mining Association** by Dungan and Murphy estimate GDP and employment impacts of mining in Ontario using an **input-output analysis** [12].[18] In the 2012 study, they estimate that the direct and upstream aggregate impacts of one billion dollars of expenditures in mining production in Ontario (with total output estimated at $10.7 billion in 2011) will range between $0.858 billion to $1.04 billion with corresponding increases in employment between 4,418 and 6,360 jobs. Although the Dungan and Murphy methodology is different from that employed in this Strategy the results for estimates of growth of the Ontario economy are similar for both studies ($1.18 billion to $1.65 billion in this Strategy, compared to $0.858 billion to $1.04 billion in the Dungan and Murphy study; and average annual employment estimates between 5,822 to 8,151 jobs for the Strategy compared with between 4,418 and 6,360 jobs by Dungan and Murphy).

The recently released report prepared by the **Conference Board of Canada** on mining in Canada also provides economic growth estimates based on the mining sector in Northern Ontario [13]. According to this report, **Northern Ontario's mining output will expand 66% from 2011-2020** at compound annual **growth rate of 5.8%,** resulting in employment growth of 6,964 (on 2011 mining employment of 11,155) in Northern Ontario by 2020 as a result of growth in the mining. However, the study unfortunately did not analyze growth on a regional basis, therefore estimates for Northwestern Ontario overall are not available. However, they do **forecast considerable economic growth from mining activity**, even though they are considered relatively conservative estimates [13].[19]

The question to be asked is, which of the estimates generated should form the basis for strategic planning when it comes to future economic development in general and mining development in particular? There are benefits and costs to either underestimating or overestimating the potential economic impacts of future mining development when it comes to investment in infrastructure and the associated risks of either under- or over-investing.

The result of over-estimating could be underutilized services, facilities and infrastructure that are provided at great expense with no direct social or private benefit in the near term, and potentially requiring maintenance and often debt servicing costs that can strain the public purse. On the other hand, if one uses a more conservative economic impact scenario, there is a risk that investment in infrastructure, services and facilities could be too low to match growth, potentially resulting in capacity shortages and growth constraints that could limit future economic development. Inadequate investment in infrastructure, services and facilities could result in attracting fewer new businesses and ventures that could lead to a higher leakage estimate, further constraints on economic growth and reduced tax revenues.

[18] Income-expenditure impact studies provide results at an aggregate level. Input-output impact studies by their nature also model the interactions between sectors based on a model of the structure of the relationships.

[19] Conference Board of Canada (2013: 16): *"The mining outlook to 2020 and its total economic impact estimates assumes a "business as usual" situation. That is, the fiscal environment and regulatory regimes and approval processes do not change, and the lack of infrastructure and skilled workers in Canada's North remain key challenges for mining companies. This assumes that the business environment does not improve or deteriorate over the forecast period."*

To place this **potential employment creation in historical context**, Figure 5-2 shows the average annual monthly employment in Thunder Bay from 1996 to 2012. As the figure illustrates, there have been substantial fluctuations in average annual monthly employment over time, but the overall trend is slightly negative with a loss, on average, of about 56 jobs a year over this time period. This trend, while negative, is relatively modest given the severe impact of the forest sector crisis in the period since 2003. However, it should be realized that the negative trend could have been worse in the absence of mining development that has been underway in the region for the last decade.

Based on employment estimates for 2014, the **lowest economic impact scenario represents an addition of 3,493 jobs annually** to the Thunder Bay economy or an employment increase of **5.7 percent** over 2012. The **highest impact scenario results in an employment increase of 8.0 percent** over 2012 levels. Assuming that trend, employment would remain flat, with rising employment levels from 2013 to 2022 as demonstrated in Figure 5-3. Although the chart does not show employment beyond 2022, it should be remembered that exploration and the **development of new mining projects is expected to continue** after the development of those that were included in the analysis for this Strategy.

While the economic impact of mining employment even at the highest scenario might seem disappointing, it should be kept in mind that the **addition of between 3,493 and 4,891 jobs to Thunder Bay's employment base is substantial given its size and trends over the last decade**. Moreover, even the lowest end scenario with an addition of 3,493 jobs to Thunder Bay's economy is not an inconsequential contribution to the employment base. As well, the projection to 2022 assumes that trend employment will be at best flat (rather than declining) and with a growing Aboriginal population and Thunder Bay's continuing role as a regional hub, growth rates can be **expected to remain at, or above historical trend levels**.

Estimates of the overall economic impact on the Ontario and Thunder Bay economies provided in this Strategy can be divided into three distinct scenarios - low, medium and high growth rates based on the three multipliers of 1.25, 1.50 and 1.75, and based on a static leakage rate of 25 percent. However, sensitivity analyses on these estimates using varying leakage estimates results in another set of estimates as provided in Table 5.3.

If **leakage rates** as low as **20 percent** are applied to the low scenario, there would be a **total contribution to local GDP** of as high as **$7.544 billion and 37,261 jobs** over the period 2013-2022 compared **to $4.715 billion and total employment as low as 23,288 jobs** with an applied **leakage rate of 50 percent.** In reality, the difference in estimates is not that significantly different, providing confidence that the estimates are within a reasonable range of predictability. What the future economic impact and employment contribution of the mining sector will depend on future market conditions and commodity prices. Nevertheless, given rising economic development in the Asia-Pacific Region and their demand for resource products, one can anticipate a **steady growth in demand for mineral resources**.

Figure 5-2

Thunder Bay Employment 1996-2012

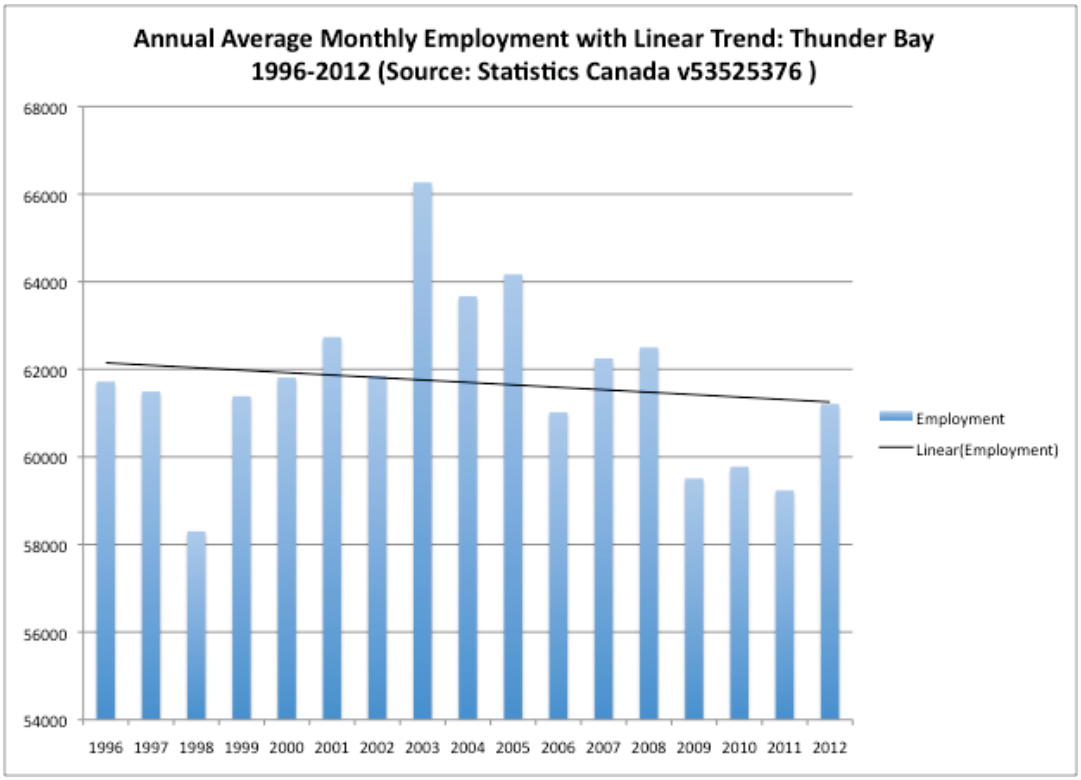


Figure 5-3

Thunder Bay Employment 1996 to 2012 Plus Projection to 2022

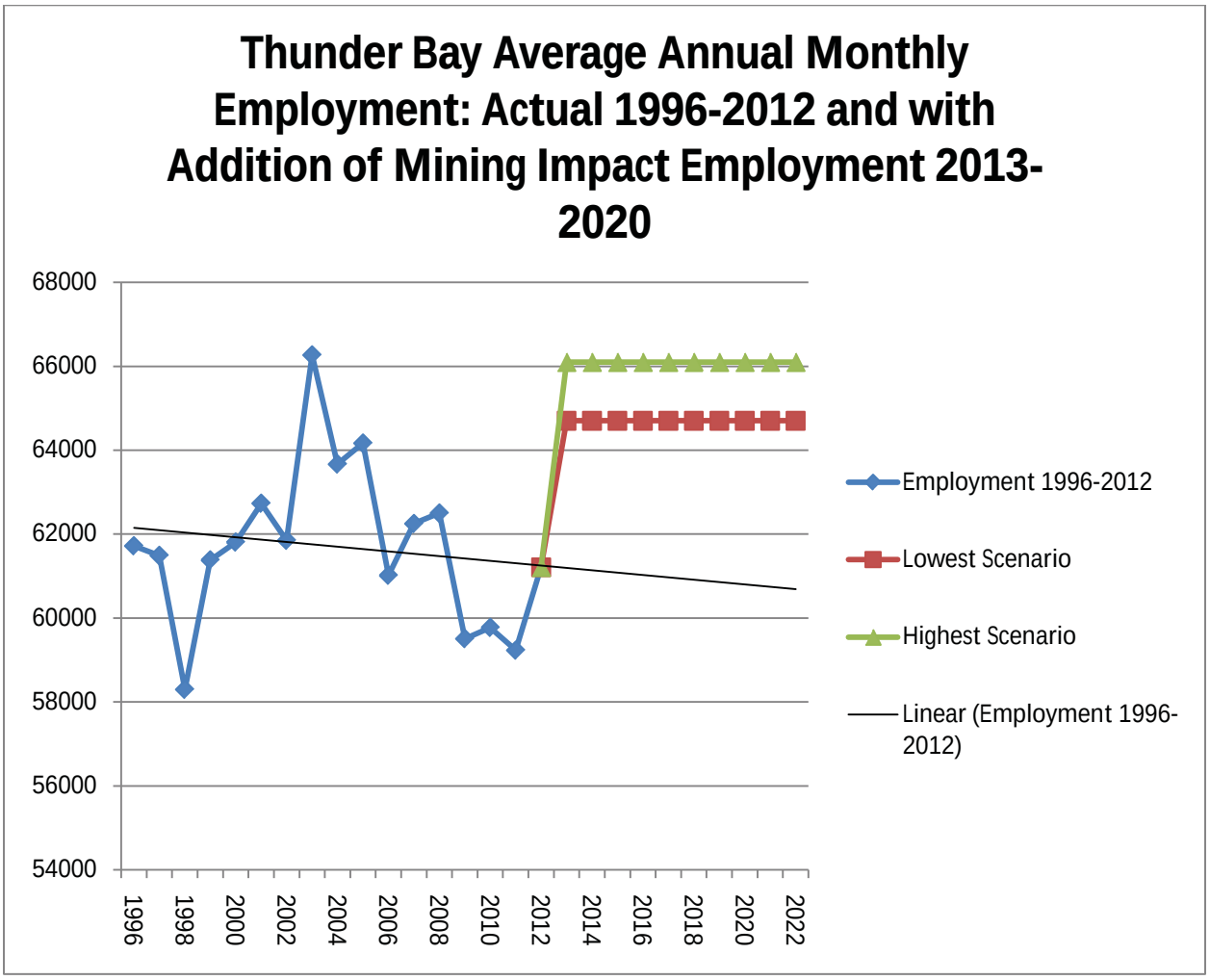


Table 5.3

Ranked Estimates of Total Ontario and Total Thunder Bay Economic and Employment Impact with Leakage Sensitivity Analysis- Mining Development Period 2013-2022

Ontario			
Scenario	**Leakage**	**Total GDP Impact (in millions)**	**Employment**
High - 1.75 multiplier	20%	$22,282	131,730
	25%	$20,890	123,497
	50%	$13,927	82,332
Median - 1.5 multiplier	20%	$19,099	112,912
	25%	$17,906	105,855
	50%	$11,937	70,570
Low - 1.25 multiplier	20%	$15,916	94,093
	25%	$14,921	88,212
	50%	$9,948	58,808

Thunder Bay			
Scenario	**Leakage**	**Total GDP Impact (in millions)**	**Employment**
High - 1.75 multiplier	20%	$10,562	52,165
	25%	$9,902	48,905
	50%	$6,601	32,603
Median - 1.5 multiplier	20%	$9,053	44,713
	25%	$8,487	41,919
	50%	$5,658	27,946
Low - 1.25 multiplier	20%	$7,544	37,261
	25%	$7,073	34,932
	50%	$4,715	23,288

Note that in order to simplify subsequent sections of this report we are only presenting the median scenarios when discussing GDP or job growth.

5.4 References

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6 IMPACT OF MINING DEVELOPMENT ON THE SUPPLY CHAIN

6.1 Introduction

Mining and exploration companies operating in Ontario **require a wide range of products, expertise and services from suppliers in commercial, industrial and consumer sectors** of the economy. The mining supply chain describes the system involved in moving these products and services from a supplier to the mining operations [1]. There will be considerable opportunities for suppliers to support the potential mining projects in Northwestern Ontario since investment in mining will result in creating quality jobs and GDP growth in upstream sectors.

Major mining companies currently operating in Northwestern Ontario (eg., Barrick and Goldcorp) have **procurement strategies at international, national, provincial and regional levels** which may limit opportunities for new local suppliers to enter their supply chains. However, mid-tiered and junior companies in Northwestern Ontario will provide opportunities for local/regional buying.

Identification of the supplies needed for the prospective mining and exploration projects in Northwestern Ontario provides insight into the potential for local suppliers to enter the mining supply chain. The objectives of Thunder Bay and Northwestern Ontario should be to **maximize the supplies purchased from local sources and thus minimize economic leakage**.

This section discusses the opportunities available to suppliers and has used the study *Mining: Dynamic and Dependable for Ontario's Future* prepared for the Ontario Mining Association in December 2012 [2] as a source of much of the data. This study used the **input/output data system and models** maintained by Statistics Canada to demonstrate the relationship between mining investment and resultant activity in other sectors. It illustrates the upstream sectors that benefit from being suppliers to the mining sector. By identifying the impacted sectors and quantifying the cumulative benefits they receive, expressed as GDP growth and employment, the opportunities available to existing suppliers and prospective suppliers within the region are presented.

6.2 Thunder Bay's Current Role as a Supplier to the Mining Industry

6.2.1 General

According to the *Thunder Bay- Mining Sector Goods and Services Directory*, prepared by the Thunder Bay Community Economic Development Commission (CEDC) [3], there are currently 416 businesses within Thunder Bay that can be considered part of the local mining supply sector. Table 6.1 below lists these companies by sector of activity.

Table 6.1

Mining Sector Goods and Services Directory Thunder Bay

Sector of Activity	Number of Companies
Assay Firms	5
Camp management/ camp supplies	10
Consulting	20
Drillers/ Drill Suppliers	18
Electrical Contractors & Supplies	48
Engineering	12
Equipment Rentals	40
Exploration / Mining Companies	22
Industrial Suppliers	10
Machine Shop Fabricators	18
Medical	1
Meeting and Conventions	24
Mining Services	23
Mining Supplies	10
Office Equipment and Supply	11
Plumbing	27
Storage	32
Towing	16
Trailers, ATV's, Marine, Snow Machines	29
Transportation Air	6
Transportation Ground	41
TOTAL	**423**

Source: "Thunder Bay- Mining Sector Goods and Services Directory" by Thunder Bay CEDC [3]

Northwestern Ontario provides support to business owners and prospective entrepreneurs in the region through several **Community Futures Development Corporations** (CFDC's) and **Economic Development Offices** (EDO's). These organizations assist in providing financing, business support, and economic development services for clients to successfully establish, expand and manage their business. CFDC's and EDO's located in Northwestern Ontario communities are listed in Table 6.2.

Table 6.2

CFDC's and EDO's in Northwestern Ontario

Community Futures Development Corporations (CFDC's)	Economic Development Offices (EDO's)
Chukuni Communities Development Corporation	Dryden Development Corporation
	Economic Development Corporation of Wawa
Lake Of The Woods Business Incentive Corporation	Municipality of Greenstone
Rainy River Future Development Corporation	Marathon Economic Development Corporation (MEDC)
Patricia Area Community Endeavours	Economic Development Office Township of Manitouwadge
Atikokan Economic Development Corporation	Sioux Lookout Economic Development Commission
Thunder Bay Ventures	Township of Sioux Narrows – Nestor Falls
Greenstone Economic Development Corporation	Terrace Bay
Superior North Community Futures Development Corporation	Township of Nipigon
	Township of Red Rock

6.2.2 First Nations Business

It is clear that **mineral development and the subsequent economic activity will create economic opportunities for First Nations** close to the mine site as well as in other areas in the region. Some First Nations are already preparing for these opportunities through the creation of new businesses, joint ventures and strategic business relationships. A description of some of the First Nations businesses in Northwestern Ontario supporting the mining industry, are provided in the following paragraphs.

Wasaya Group

The **largest (100%) First Nations owned businesses** in the region is the Wasaya Group. It is the primary provider of **passenger, cargo and charter air transportation throughout the North** in addition to the operation of seven other separate businesses. These include:

- **Wasaya Petroleum**: Bulk Fuels, Regional
- **Metal Ahnokeewin**: Industrial Fabrication & Repairs for Mining, Forestry, Construction
- **Wasaya Airways**: Passenger, Cargo, Bulk Fuel Delivery, Charters, Scheduled Service
- **Wasaya Prop Shop**: Propellor Repairs,
- **Global Wascan Terminal Inc**: Bulk Fuels, Bio Blends, Thunder Bay Terminal
- **Wasaya Wilderness Adventures**: Tourism Development

- **Wasaya Dowland Contracting**: Heavy Construction: Hotels, Arenas, Mines, Hydro Corridors, Schools
- **Ohtebon Trucking**: Bulk Fuel Delivery
- **Windigo Catering**: Winner of the 2013 Shookum Jim Award (PDAC Aboriginal Business Award)
- Additional Investments in **Bamaji Air Inc**., **Landmark Inn**, & **Eastman Bio-Fuels**.
- Wasaya Communities are also members of **3 non-profit corporations**.

Wasaya Group is **currently owned by 12 First Nations in Northwestern Ontario**, none of which are located in the Ring of Fire area. However, the Wasaya Group established an internal **Ring of Fire team** in October of 2012.

Nishnawbe Aski Development Fund

Nishnawbe Aski Development Fund (NADF) is a **not-for-profit Aboriginal financial institution** providing commercial financing, leasing and business support services to Aboriginal entrepreneurs to establish, expand or acquire a business in remote, rural and urban communities across Northern Ontario. NADF's **service area covers 49 First Nations** in Treaty No.5 (Ontario portion) and Treaty No.9, Treaty No.3 and the Robinson Superior 1850 Treaty. It **provides financing through loans and contribution agreements** (grants) and provides Community Future Development Services to western Nishnawbe Aski Nation (NAN) First Nations.

NADF has partnered with Aboriginal Affairs and Northern Development Canada (AANDC) and FedNor to provide contributions (grants) to eligible Aboriginal business activities in Northern Ontario. These contributions are generally non-repayable.

- Aboriginal Business Canada (AANDC): Funding is available to Aboriginal entrepreneurs and businesses. Individuals may be eligible for up to $99,999 and First Nations or community-owned businesses may be eligible for up to $1,000,000.
- Local Initiatives Contribution (FedNor): Funding is available to not–for–profit organizations which support community economic development projects/initiatives. Applicants may be eligible for up to $5,000.

Other Services include:

- Winter Road Financing
- Leasing
- Appraisal Services
- Business Support Services
- Community Strategic Planning
- Resource Development
- Mining Training Course

NADF has been proactive in assisting its client base and recognizes mining opportunities through its annual **Mining Ready Summit** and their **Strategic Mineral Exploration** and **Mining Training Course** which run concurrently. This course is geared to **First Nation** representatives that play an active role in engaging mineral exploration and mining companies in their traditional territories. The

course is a 1-week accelerated learning program that teaches core aspects on the business of mining and the mining cycle. This may include:

- Business opportunities,
- Mine construction and operations,
- Consulting First Nations,
- Capitalizing on business opportunities,
- Land use planning, and
- Communications training.

Matawa First Nations Council

The Matawa First Nations Council represents the First Nations situated closest to the Ring of Fire area. They have had a Mining Coordinator in place for a number of years and appointed a Ring of Fire Coordinator in 2011. The Matawa First Nations have their own economic development corporations and has established a complementary Regional Development Corporation as an investment vehicle for its member communities. The Ring of Fire provides an opportunity for these corporations to expand their business portfolios through new businesses and joint ventures.

Summary

Throughout Northwestern Ontario, First Nations are investing in existing businesses, or start-up businesses. Investments include hotels, real estate, air services and retail in almost every larger community. Included in this is the Fort William First Nation with a sizable real estate portfolio, including a 1,000 acre industrial park proximate to their reserve lands, as well as a number of other investments. These types of **collaborative First Nations investments will continue** in order to take advantage of the mining opportunities as they come available.

6.3 Indirect and Induced Economic Impact

6.3.1 Overall Impact on GDP

Chapter 5 provides an estimate of the total GDP and employment impact as a result of mining investment (capital expenditure + operating expenses). However, in order to quantify sector specific impacts, there is a need to evaluate overall GDP growth from the **upstream sectors**.

These impacts were estimated using the **Input-Output** data system and models maintained by Statistics Canada presented by Dungan and Murphy in the study *Mining: Dynamic and Dependable for Ontario's Future* prepared for the Ontario Mining Association in December 2012 [2]. This report identifies the upstream sectors that benefit as suppliers to the mining sector. By identifying the impacted sectors and quantifying the cumulative benefit they each receive, expressed as GDP growth, the opportunity available to current suppliers and prospective new suppliers within the region is demonstrated.

The Input-Output tables quantify impact across 59 sectors which are listed in Appendix B.

It should be noted that while the impact among upstream sectors was calculated using ratios in the Input-Output tables maintained by Statistics Canada, the calculation for total impact on GDP was derived using the multiplier analysis described in Chapter 5.

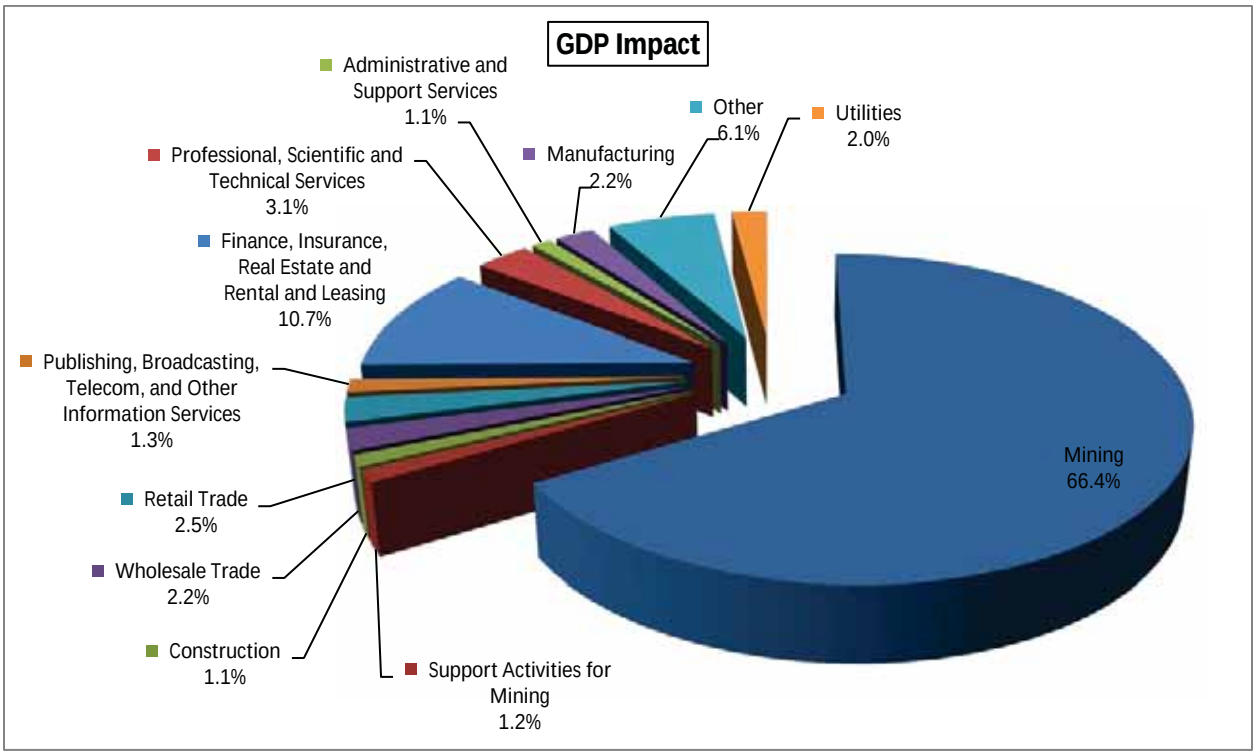
The procedure followed was:

- Ratios of GDP growth in an individual sector to the total Ontario GDP growth were calculated for each of the 59 subsectors.
- These ratios were then applied to the annual average GDP growth.

Figure 6-1 shows the results of this analysis.

Figure 6-1

Distribution of Direct, Indirect and Induced Annual Ontario Impact to GDP



Source: Dungan, Murphy. 2012 [2]*. Additional calculations applied (using Multiplier Analysis).*

By applying the proportions in Figure 6-1 to the data in Table 5.1, estimates of economic impact to the supply chain were developed as described on Table 6.3.

Table 6.3

Ontario Impact to Sector Specific GDP (in $millions)

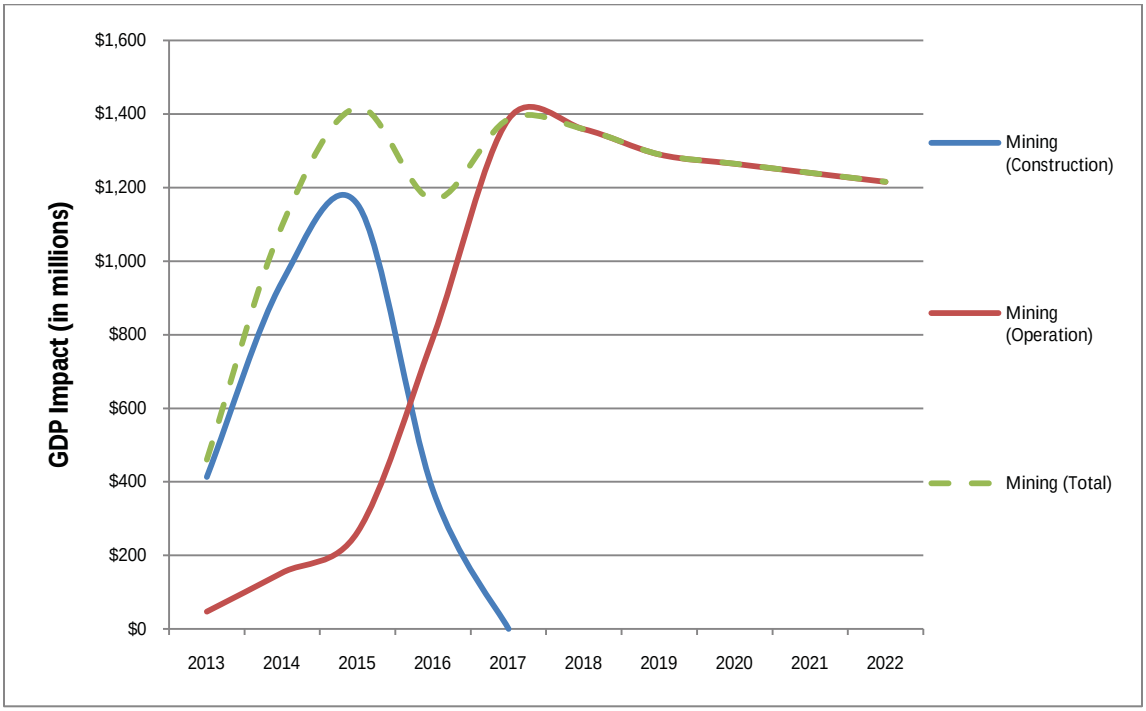
Sector	Total GDP Impact (2013-2022)	Peak GDP Impact (2015)
Mining	**$11,896**	**$1,417**
Support Activities for Mining	$223	$27
Construction	$200	$24
Wholesale Trade	$386	$46
Retail Trade	$441	$53
Publishing, Broadcasting, Telecom, and Other Information Services	$239	$28
Finance, Insurance, Real Estate and Rental and Leasing	**$1,917**	**$228**
Professional, Scientific and Technical Services	**$556**	**$66**
Administrative and Support Services	$201	$24
Manufacturing	$395	$47
Other	**$1,095**	**$130**
Utilities	$358	$43
All sectors (direct, indirect and induced)	$17,906	$2,133
Indirect and Induced	$6,010	$716

Three types of economic impact are expected to occur as a result of mining investment: direct, indirect and induced. **Direct impact** in our analysis is related to impact to GDP that occur in the "mining" sector. This **accounts for 66.4% of all GDP impact**.

Table 6.3 illustrates the enormous economic potential in the mining sector. Due to the relative size of the "Mining" GDP impact, which relates to the construction and operation of mines and associated facilities it is important to describe its distribution. **Roughly 24% of the mining GDP is related to mine construction** and the remaining 76% accounts for mine operations. Thus $2.86 billion in GDP growth is due to mine construction and $9.01 billion in GDP growth due to mine operation forecasted over the ten year period (2013-2022). The distribution of direct GDP impact, i.e. mining GDP impact, is illustrated in Figure 6-2.

Figure 6-2

Distribution of Direct Annual Ontario GDP Impact from Mining Activity



6.3.2 Indirect and Induced Impact on GDP

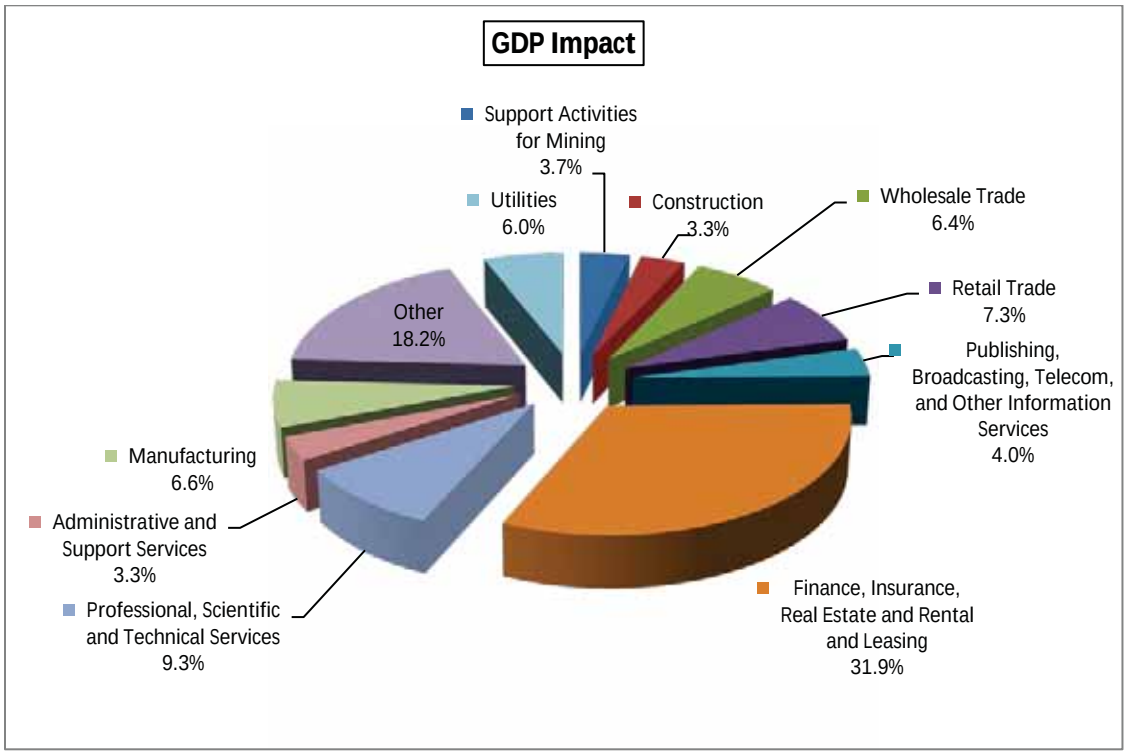
Indirect impact to GDP occurs as a result of **mine purchases during the course of its operations** which include a variety of replacement equipment, manufactured supplies and materials and professional services. Investment, through purchases, in these upstream sectors results in additional GDP growth.

Induced impacts occur as a result of **employees in mining and upstream sectors spending their income on consumer goods and services within the region**. This creates additional growth in GDP and jobs, particularly in the wholesale and retail trades.

Impacts from indirect and induced activity have not been separated for this analysis. Instead, impacts were combined to provide a cumulative forecast. By removing “mining” from the impact to GDP, the indirect and induced impact can be seen more clearly. This is illustrated in Figure 6-3.

Figure 6-3

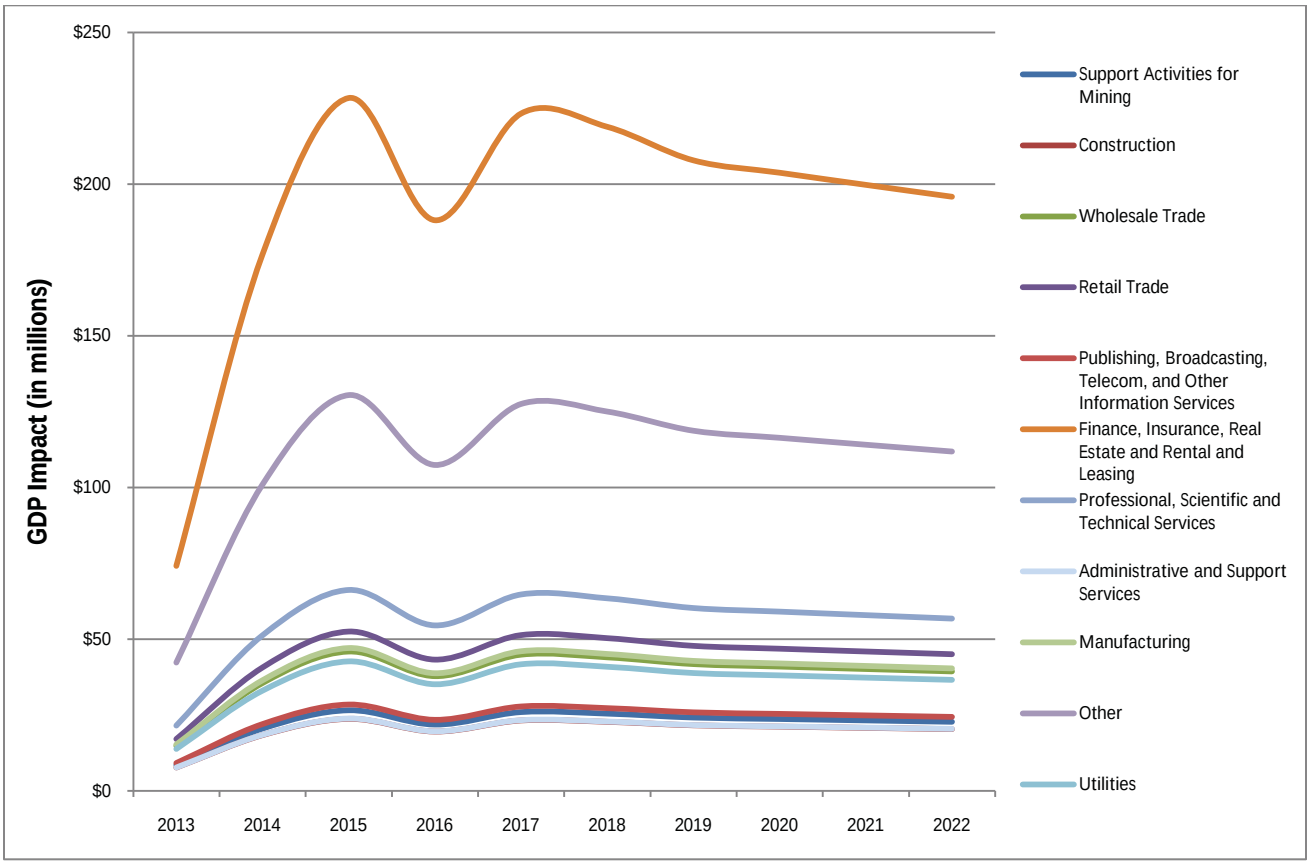
Distribution of Indirect and Induced Annual Ontario GDP Impact from Mining Activity



Source: Dungan, Murphy. 2012. Additional calculations applied (using Multiplier Analysis).

Figure 6-4

Distribution of Indirect and Induced Impacts to GDP (2013-2022)



The **largest indirect and induced impact on GDP occurs in the "Finance, Insurance, Real Estate and Renting and Leasing**". This is largely made up of services such as financial services, insurance, real estate, automotive and other equipment leasing, and management of companies and enterprises [2]. This sector accounts for **31.9% ($1.92 billion) of the indirect and induced GDP impact**. This is followed by "**Professional, Scientific and Technical Services", at 9.3%** ($556 million) and "Retail Trade" at 7.3% ($ 441 million) of the indirect and induced GDP impact.

Industries in the "**Support Activities for Mining**" subsector group primarily provide support services, on a contract or fee basis, required for the mining of minerals. Companies performing exploration (except geophysical surveying and mapping) for minerals, on a contract or fee basis, are included in this subsector. Exploration includes diamond drilling, geological mapping and prospecting [4]. This category accounts for $223 million in GDP growth over the ten year period from the ten mines being analyzed. However, **due to the massive investment in ongoing mineral exploration within Northwestern Ontario, this sector may see much higher levels of GDP growth within the near future**. Since our analysis was based entirely on mining investment of the ten projects going into production, this impact is not quantified. However, it is estimated that almost $400 million is being spent annually on exploration in Northwestern Ontario (2012) [5].

The **"Construction" category accounts for 3.3%** ($200 million) of all indirect spending. Additionally, $2.86 billion of GDP from the mining sector occurs due to construction activities.

The "Other" category comprises of health, government, agriculture and hospitality services which individually still achieve significant benefit from GDP growth, however not quite as large as the categories listed. A full list of categories and their impact is outlined in Appendix B-4.

6.4 Opportunities

6.4.1 Ontario

Based on the impacts described in Section 6.3, the **opportunities that will occur in Ontario as a result of the potential for mining projects are substantial across a variety of sectors**. Total Ontario GDP impact reaches $17.91 billion for the analyzed **ten year period (2013-2022).**

Indirect and induced impacts account for a total Ontario GDP impact of $6.01 billion.

The distribution of annual average Ontario impact into various sectors is summarized in Table 6.3. The variety of impacted upstream sectors as well as the size of that impact shows the possibilities for prospective suppliers to enter the mining supply chain or increase their participation at a number of levels.

Many of these **upstream sectors have the ability to supply multiple industries**. For instance, there is the potential for businesses to adapt to regional GDP growth and **be in a position to market themselves to other mining regions within Canada, internationally** and possibly other industrial sectors.

6.4.2 Northwestern Ontario

From Chapter 5, it was assumed that **79% of Ontario GDP Impact will be retained within Northwestern Ontario** as shown in Table 6.3.

Table 6.4

Average Annual Northwestern Ontario Impact to Sector Specific GDP (in $ millions)

Sector	Total GDP Impact (2013-2022)	Peak GDP Impact (2015)
Mining	**$9,397**	**$1,120**
Support Activities for Mining	$176	$21
Construction	$158	$19
Wholesale Trade	$305	$36
Retail Trade	$349	$42
Publishing, Broadcasting, Telecom, and Other Information Services	$189	$22
Finance, Insurance, Real Estate and Rental and Leasing	**$1,514**	**$180**
Professional, Scientific and Technical Services	**$439**	**$52**
Administrative and Support Services	$158	$19
Manufacturing	$312	$37

Sector	Total GDP Impact (2013-2022)	Peak GDP Impact (2015)
Other	$865	$103
Utilities	$283	$34
All sectors (direct, indirect and induced)	**$14,145**	**$1,685**
Indirect and Induced	$4,748	$566

Based on Table 6.4, the **total Northwestern Ontario GDP direct impact is $14.15 billion** for the analyzed ten year period **(2013-2022).** Indirect and induced impacts account for a further GDP impact of $4.75 billion.

6.4.3 Thunder Bay

From the analysis described in Section 5, it was assumed that **60% of Northwestern Ontario GDP impact will be retained within Thunder Bay** as shown in Table 6.5.

Table 6.5

Average Annual Thunder Bay Impact to Sector Specific GDP (in $ millions)

Sector	Total GDP Impact (2013-2022)	Peak GDP Impact (2015)
Mining	**$5,639**	**$672**
Support Activities for Mining	$106	$13
Construction	$95	$11
Wholesale Trade	$183	$22
Retail Trade	$209	$25
Publishing, Broadcasting, Telecom, and Other Information Services	$113	$14
Finance, Insurance, Real Estate and Rental and Leasing	**$909**	**$108**
Professional, Scientific and Technical Services	**$264**	**$31**
Administrative and Support Services	$95	$11
Manufacturing	$187	$22
Other	**$518**	**$62**
Utilities	$170	$20
All sectors (direct, indirect and induced)	$8,487	$1011
Indirect and Induced	$2,849	$339

Total Thunder Bay GDP direct impact is forecast to be $8.49 billion for the analyzed ten year period **(2013-2022).**

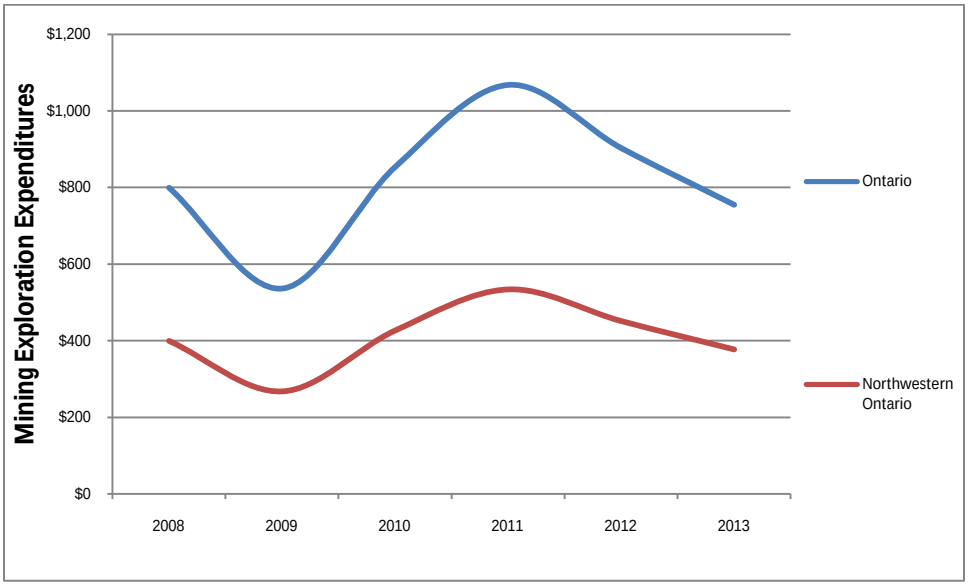
Indirect and induced impacts are estimated to account for an annual average Thunder Bay GDP impact of $2.85 billion, assuming leakage rates described previously. However, GDP growth is not limited to this leakage estimate. If, in reality, retention of business of activity in Thunder Bay and Northwestern Ontario is higher than the assumed leakage rate, the share of economic benefits will also be higher. There is a **significant potential for new suppliers to enter the supply chain and increase the local capture of mining investment** (thus lowering the leakage rate).

6.4.4 Mine Exploration

The economic analysis conducted for this Strategy was based largely on the projected economic activity projected to result from the development of the **10 mining projects which are at the most advanced stages of exploration**. However, mining exploration within Northwestern Ontario is also making significant contributions to the local economy. Exploration expenditures [5] from 2007-2013 are shown in Figure 6-5.

Figure 6-5

Distribution of Exploration Expenditures from 2008 to 2013 ($ millions)



Exploration expenditures are forecast to be approximately $377 million in Northwestern Ontario in 2013 [5]. It is conceivable that as infrastructure in the region improves and exploration projects move into the construction and operations phase, investment in mine exploration will also increase. This shows the opportunities for the local service and supply sectors to provide all of the services required by the mining sector to maximize retention of economic benefits in the region.

6.4.5 Industrial Clusters

An industrial sector cluster **provides individual supply companies opportunities such as knowledge sharing, personal relationships and a motivating environment for long term benefits** [6]. An individual company in a cluster can operate on a larger scale through access to key inputs such as employees and suppliers, specialized knowledge, public infrastructure and

goods and even financing [6]. Clustering allows a relatively small firm to attract and service larger customers through relationships with other businesses. While clustered firms may be competitive individually, they can **cooperate together to address collective issues—such as skills shortages and productivity** or a lack of key infrastructure - that threaten the competitiveness of an entire business sector that can not be adequately addressed by an individual business operator [6].

Clusters also **foster innovation**. The competition that occurs within clusters provides additional incentives to try **new technologies** and business practices, while their **collaborative aspect facilitates the exchange of ideas**. Through relationships and face-to-face contact between businesses, suppliers and service providers can help each other to highlight opportunities to introduce innovative products, processes or practices. The proximity of suppliers and other partners can help innovators source new materials or equipment more quickly, and makes it easier to get input from a broader range of partners [6].

Plans are currently underway to **establish an industrial cluster at Innova Business Park in Thunder Bay** [7]. This municipally-owned business park is centrally located on 71 prime acres within the a **regional commercial centre**. Lots ranging from “small single-use” to “large multiple-use”, provide opportunities for a wide variety of collaborative ventures, including research and development, technology, service-based, and light industrial enterprises.

Another effective means of promoting innovation and a collaborative service sector is by creating a **Service and Supply Association for Northwestern Ontario**. This approach has been undertaken in Northeastern Ontario with the formation of Sudbury Area Mining Supply and Service Association (SAMSSA). Creating a similar association for Northwestern Ontario will improve the ability of local businesses to become successful suppliers to the mining industry. Sales opportunities domestically and globally would be maximized by developing a comprehensive catalogue of member suppliers/products and services, creating a comprehensive interface for mining and related clients. Members would be encouraged to develop product and service enhancements through continual research and development.

6.5 First Nations Opportunities

There are a **number of opportunities for First Nation communities and businesses** as a result of the indirect and induced impacts on the supply chain. These opportunities will provide significant economic development for the First Nations communities and businesses. Specifically the following opportunities should be of interest to First Nations:

- **The Fort William First Nation (FWFN) can become a mining development hub for other First Nation communities** in Northwestern Ontario and Thunder Bay region. This will allow for remote or smaller First Nation communities to gain better access to supplier services and government services.
- **Prospective entrepreneurs from remote First Nation communities can partner with individuals in the FWFN hub** to be able to enter the supply chain.
- First nations in Northwestern Ontario should work cooperatively with the **Matawa First Nations Council** and their Regional Development Corporation to **maximize business opportunities that will be provided by mining activity in the Ring of Fire** through new businesses and joint ventures.

- **Individuals from remote First Nations communities** who wish to fill the job openings presented by the expanding mining supply chain should increase their attendance in training courses and obtain funding through **Aboriginal Training Institutions** such as (Anishinabek Employment and Training Services; Kiikenomaga Kikenjigewen Employment and Training Services; Sioux Lookout Area Aboriginal Management Board; Shooninyaa Wa-Biitong Training and Employment Centre for Treaty #3 Area; Oshki-Pimache-O-Win; or Fort William First Nation Employment and Training Division) .
- **Partnerships between First Nations entrepreneurs or start-up companies** with supplier companies when tendering – this not only presents opportunities for First Nations, but for suppliers. This also encourages using local services.

6.6 Conclusions and Recommendations

There is **massive potential for current as well as prospective new supply services** to enter or expand their involvement in the mining supply chain and achieve substantial growth. Communicating the available benefit effectively, building relationships and providing clear pathways will prove to be key measures to ensure businesses are attracted to Thunder Bay. This in turn will help to **reduce the amount of "imported" goods and services required for mining development** which in turn will allow Thunder Bay to retain as much of the benefit from mining development as possible.

Exploration activities in Northwestern Ontario will continue to require specialized mining support services underlining the **need for a well-connected local supply and services sector**.

It is recommended that the CEDC, the City of Thunder Bay, local and regional Chambers of Commerce, the provincial government and local businesses:

- **Initiate the development of a mining supply chain industrial cluster** through the establishment of a Northwestern Ontario Mining Service and Supply Association, made up of representatives from mining companies, key supply chain companies, the CEDC, the Thunder Bay Chamber of Commerce and Northwestern Ontario Associated Chambers of Commerce (NOACC) and the provincial government (Ministry of Northern Development and Mines and/or Consumer and Commercial Relations). Among other things, this Association would:
  - help promote collaboration between mining companies and supply chain companies
  - provide a forum for the exchange of commercial and technological innovation
  - Provide a forum for communicating market intelligence between and among mining companies and suppliers to ensure local businesses are aware of upcoming opportunities and market changes
  - Provide opportunities to foster strategic business partnering to enhance opportunities for creative business and project financing
  - Provide knowledge of regulatory changes and challenges
  - Provide a forum for advocating to local, provincial and federal government agencies about issues related to and affecting mining supply chain businesses
  - Enhance competitiveness of the Northwestern Ontario mining supply chain

- Provide a conduit for discussions with the education sector around innovative technologies and business practices, including the opportunity for collaborative research and development.

6.7 References

(1) March Consulting Associates, 2012. “How to Successfully Access the Mining Supply Chain”. Saskatchewan Ministry of the Economy.

(2) Dungan, P., Murphy, S. 2012. “Mining: Dynamic and Dependable for Ontario’s Future”

(3) Thunder Bay Community Economic Development Commission (CEDC) “Thunder Bay-Mining Sector Goods and Services Directory”

(4) North American Industry Classification System 2007.

(5) Natural Resources Canada, “Exploration and Deposit Appraisal Expenditures: 2007-2013”

(6) The Canadian Chamber of Commerce, January 2013. “Mining Capital: How Canada has transformed its resource endowment into a global competitive advantage”

(7) City of Thunder Bay
http://www.thunderbay.ca/Doing_Business/Realty_Services/Innova_Business_Park.htm

7 ENERGY

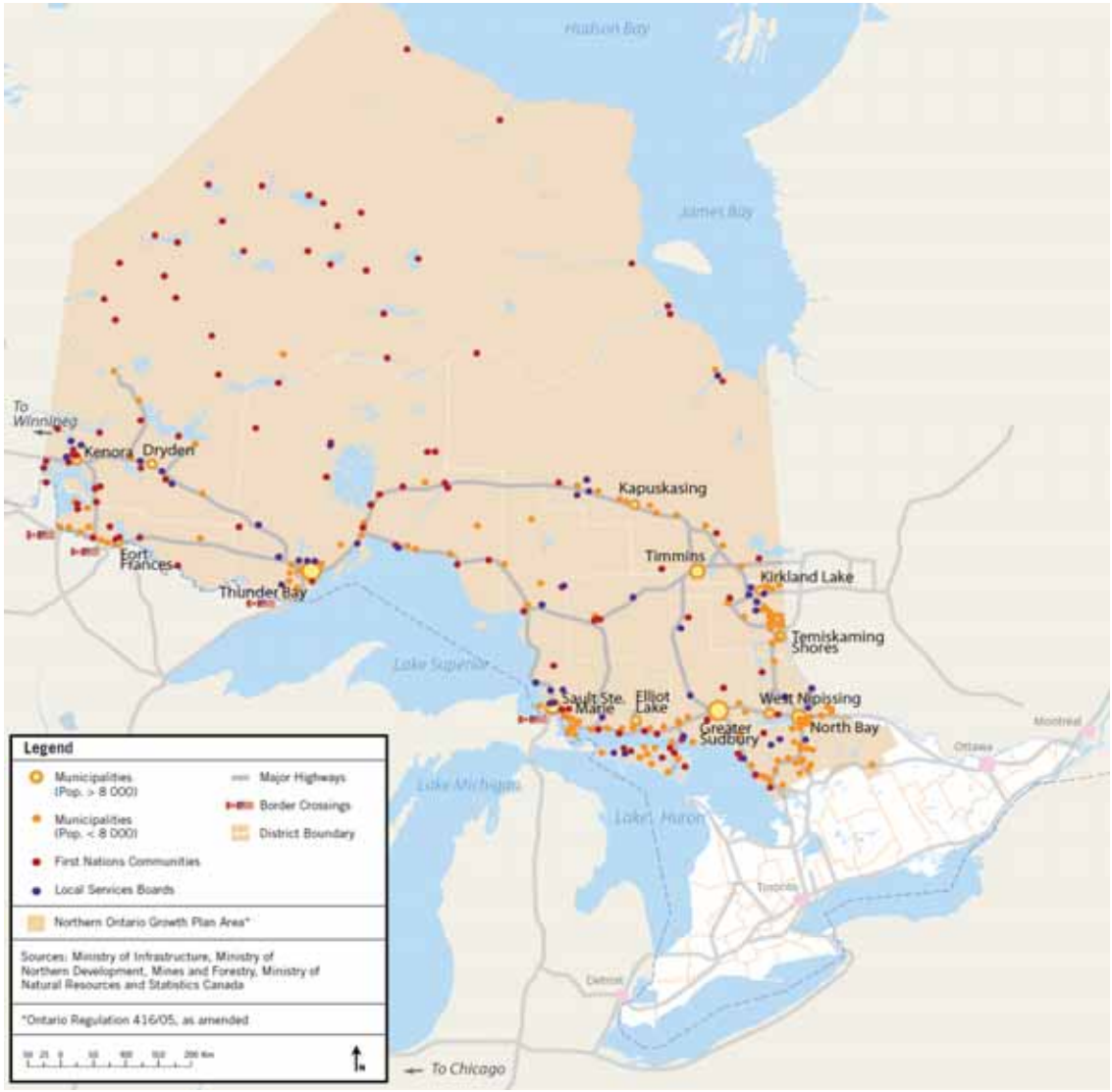
7.1 Introduction

This Section describes the **electricity generation and transmission infrastructure** in Northwestern Ontario. The objective of the analysis conducted for this Strategy was to assess readiness of the electricity system and its adequacy to support the forecast growth in the mining sector in the coming years.

Northwestern Ontario accounts for approximately 60% of the land area in Ontario, but only 2% of the total population for the province. Approximately half of the population in Northwestern Ontario resides in the City of Thunder Bay and the remaining population resides in rural and remote communities across the region. Figure 7-1 shows the communities in Northern Ontario.

Figure 7-1

Northern Ontario Communities



Source Ontario Government: "Growth Plan for Northern Ontario 2011 [1]

7.2 Electricity Demand in Northwestern Ontario

7.2.1 Historic Electricity Demand

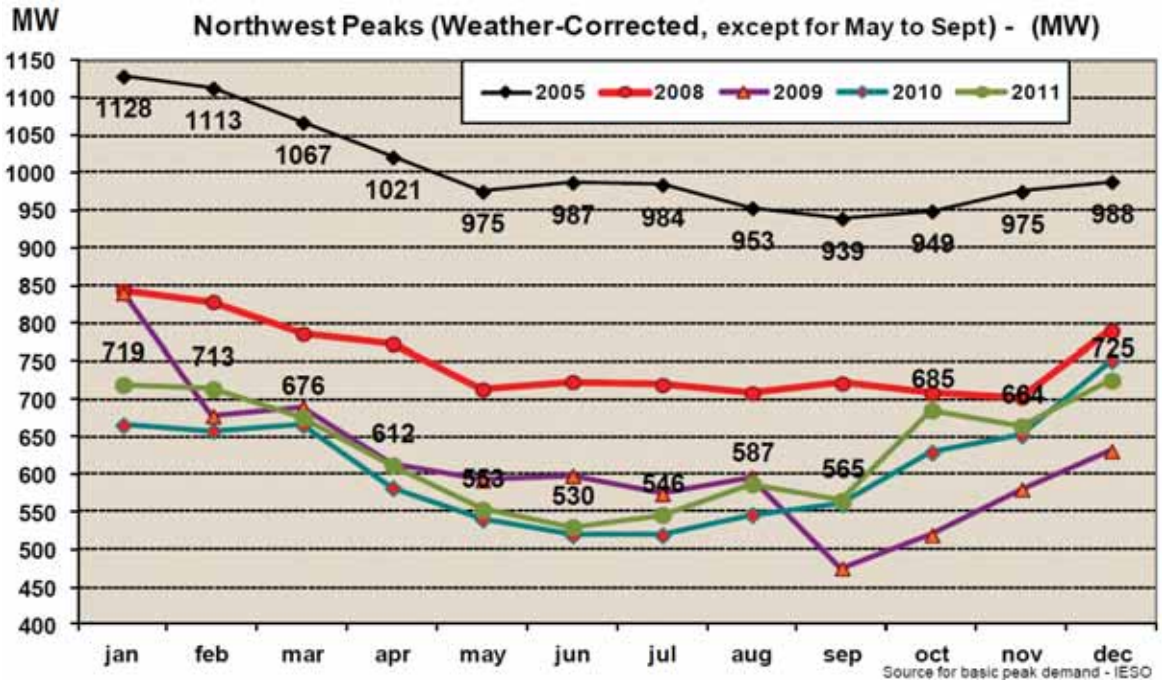
Between **1985 and 2005**, the **annual energy requirements** and peak electricity demand in Northwestern Ontario have been in the **range of 6.5 to 8.0 TWh and 950 to 1,150 MW**, respectively. Since 2005, there has been a significant decline in demand, due primarily to a downturn in the pulp and paper and forest product industries. Between 2005 and 2010, annual energy demand in the region declined by 45% (from 7.7 to 4.2 TWh) and peak demand declined by 35% (from 1,150 MW to 730 MW).

However, the system experienced an increase in peak demand in 2010 and 2011 compared to 2009 peak demand. This increase in demand is expected to continue rising as a consequence of development in the mining sector plus, to a lesser extent, a return of the forest industry.

Figure 7-2 illustrates that the electrical system in Northwestern Ontario is a winter peaking system.

Figure 7-2

Northwestern Ontario Peak Electricity Demand



OPG: "Update on Developments in Ontario", November 2012 [2]

7.2.2 Electricity Demand from Remote Communities

Over 20 remote communities are dispersed along an 800 km arc from about 90 km north of Red Lake to about 160 km east of Pickle Lake. These communities are considered remote because none have access to all-season transportation or utility corridors.

The demand forecast of the remote communities is currently about 15MW. This demand is expected to reach 20MW by 2020. According to the Ontario Power Authority (OPA), if these communities are connected to the grid, this growth rate would rise by about 4% per year which would double the load demand within the coming 20 years to approximately 40MW [3].

Growth in economic development activity, resulting from growth in the mining industry, would lead to much higher load growth estimates in these communities.

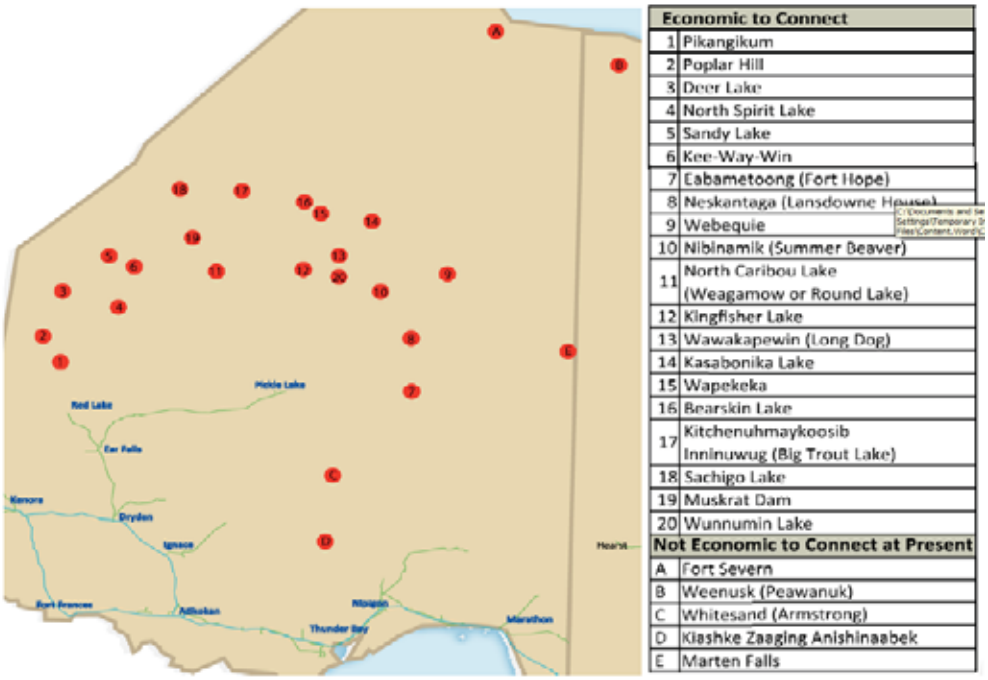
Most remote communities are served by Hydro One Remote Communities Inc. (HORCI), a wholly owned subsidiary of Hydro One. Communities not served by HORCI are served by First Nation owned Independent Power Authorities (IPAs). Each IPA is owned and operated by, and serves a single community. Both HORCI and IPAs are dependent on **diesel generation as the prime source of electricity generation**. In addition to diesel, HORCI is operating two **run of river mini-hydro electric generation** facilities and four demonstration project windmills.

Figure 7-3 shows a map of the remote communities in Northwestern Ontario. OPA performed an economic analysis of the feasibility of connecting these remote communities to the Ontario grid via extension. Their study concluded that there is a **strong economic case for connecting 20 out of the 25 remote First Nation communities** in Northwest Ontario to the Independent Electricity System Operator (IESO) controlled grid. Sharing transmission facilities between mining sites and First Nations communities will reduce the transmission development costs for both parties [5] [6].

The findings of the OPA study are consistent with results of an earlier study carried out by SNC-Lavalin [3]. The SNC-Lavalin study showed that **connecting a majority of the remote communities is technically and economically feasible**, and would result in significantly **lower operation costs** when compared to the cost of the diesel generation system.

Figure 7-3

OPA Map for the First Nation Communities in Northwest Ontario [4]



Economic to Connect	
1	Pikangikum
2	Poplar Hill
3	Deer Lake
4	North Spirit Lake
5	Sandy Lake
6	Kee-Way-Win
7	Eabametoong (Fort Hope)
8	Neskantaga (Lansdowne House)
9	Webequie
10	Nibinamik (Summer Beaver)
11	North Caribou Lake (Weagamow or Round Lake)
12	Kingfisher Lake
13	Wawakapewin (Long Dog)
14	Kasabonika Lake
15	Wapekeka
16	Bearskin Lake
17	Kitchenuhmaykoosib Inninuwug (Big Trout Lake)
18	Sachigo Lake
19	Muskrat Dam
20	Wunnumin Lake
Not Economic to Connect at Present	
A	Fort Severn
B	Weenusk (Peawanuk)
C	Whitesand (Armstrong)
D	Kiashke Zaaging Anishinaabek
E	Marten Falls

Source: OPA Technical Report for the Connection Of Remote First Nation Communities In Northwest Ontario [2]

7.2.3 Mining Electricity Demand Forecast

For the purposes of the analysis conducted for this Strategy, low, medium and high mining growth scenarios were analyzed. These scenarios were formulated and analyzed based on publicly available data.

The low growth scenario was based on OPA's "Estimate B" presented in their *Long Term Electricity Outlook for the Northwest and Context for the East-West Tie* [4]. The medium growth scenario was based on current available data for the 10 selected mining projects discussed in Section 4 (9 mining exploration projects and one mine expansion project). The high growth scenario includes the 10 projects assessed in the medium growth scenario plus an additional six projects representing second tier exploration projects, also as discussed in Section 4 of this report.

Analysis of both the medium and high growth scenarios indicate a steep growth in mining load demand. Table 7.1 lists the forecasted mining loads for the medium and high growth scenarios.

Table 7.1

Mining Load Forecast for Northwestern Ontario

	Mining Company	Planned Operation Date	Power Required (Medium Forecast)	Power Required (High Forecast)
Mature Exploration Projects (1-10)				
1	Cliffs Natural Resources (Ring of Fire)	2016/2017	35 MW	35 MW
2	Noront Resources (Ring of Fire)	2016	25 MW	50 MW
3	Rubicon Minerals Corp. (Red Lake)	2014/2015	10 MW	15 MW
4	Rainy River Resources Corp. (NW of Fort Frances)	2016	61 MW	61 MW
5	Osisko Resources, (North of Atikokan)	2016	100 MW	100 MW
6	Stillwater Canada Ltd. (North of Marathon)	2016/2017	50 MW	50 MW
7	Goldcorp Inc. (Red Lake)-Cochenour/Bruce Channel deposit	2014	60 MW	80 MW
8	Bending Lake Iron Corp. (South West of Ignace)	2016	50 MW	50 MW
9	Treasury Metals (Dryden)	2015	20 MW (approx.)	20 MW
10	North American Palladium – Lac des Iles Project	2012	6 MW	6 MW
A	Total Mature Exploration Projects		417 MW	467MW
Second Tier Mature Exploration Projects (11-16)				
11	Claude	TBD		15 MW
12	Northern Iron (former Griffith Mine)	TBD		80 MW
13	Premier Gold (Greenstone)	TBD		20 MW
14	Rockex Mining Corp. (South of Pickle Lake)	TBD		100 MW
15	Panoramic Ltd. (North of Thunder Bay)	TBD		30 MW
16	PC Gold Inc. (Pickle Lake)	TBD		20 MW
B	Total Second Tier Mature Exploration Projects			265MW
	Total Load (A+B)		417 MW	732 MW

Figure 7-4 shows the major mining exploration programs expected to go into production by 2017. Figure 7-5 presents mining peak demands for high, medium and low growth scenarios. The total load estimate for the high growth scenario is shown in Table 7.2.

Figure 7-4

Proximity of Communities to Future Mining Projects, Electricity Generation and Transmission Infrastructure

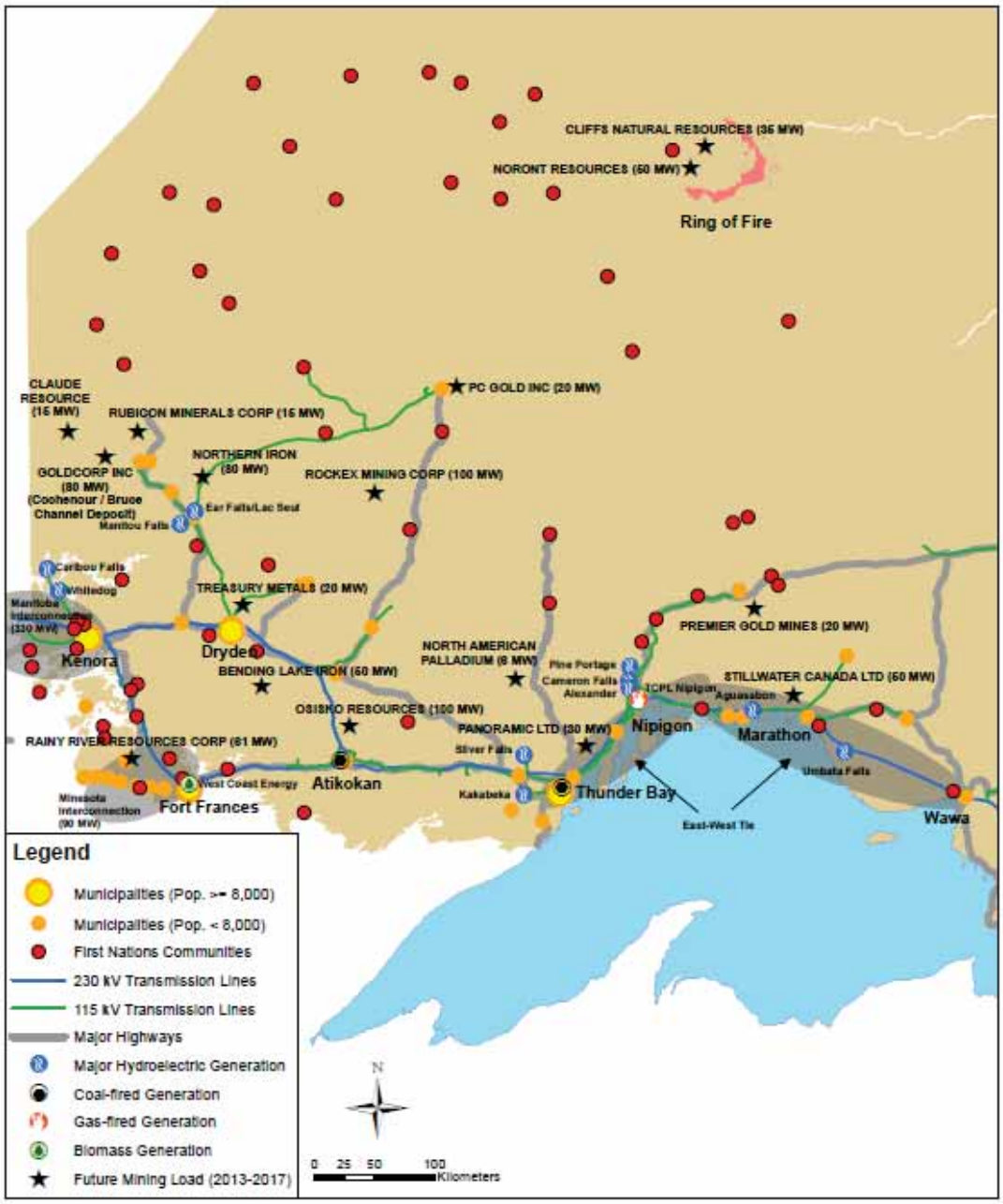
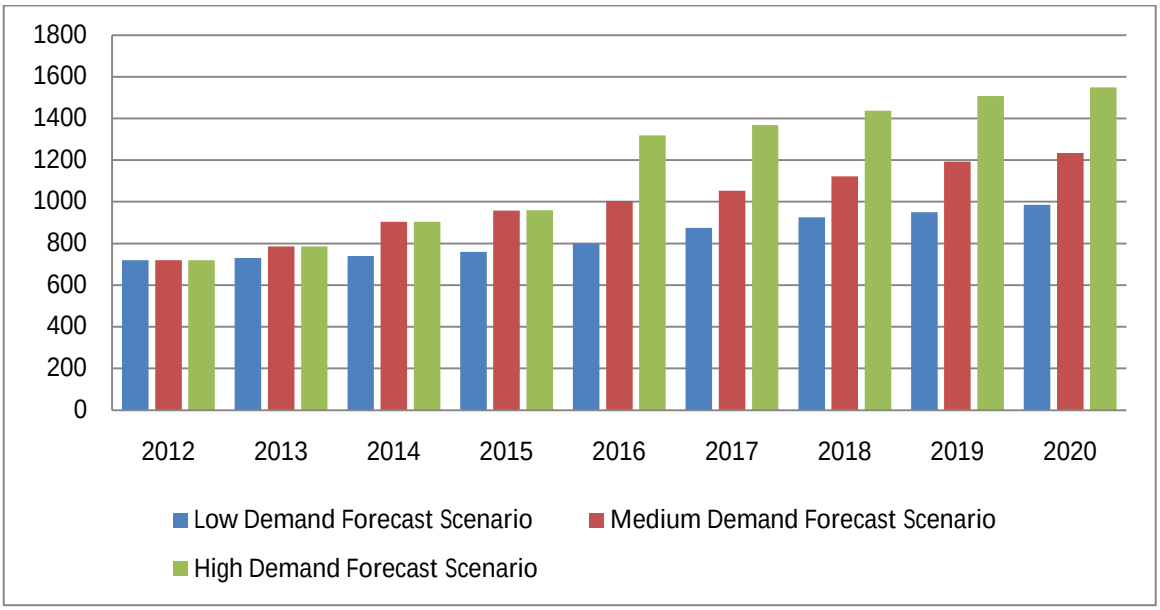


Table 7.2
Detailed Estimate of the High Growth Scenario

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Existing Peak Load	710	710	710	710	710	710	710	710	710
Mining Expansion - Existing Mines		54	54	54	54	54	54	54	54
Forestry Expansion - 2013-2016		6	15	17	18	18	18	18	18
Mining Load			145	145	541	591	640	711	732
First Nations joining after 2016							20	20	20
First Nations expansion									20
TOTAL LOAD	710	770	924	926	1323	1373	1442	1513	1554

Figure 7-5
Mining Peak Demand Forecast for Low, Medium and High Growth Scenarios



7.3 Energy Supply in Northwestern Ontario

7.3.1 Regional Resources

Currently, the mix of electricity generation/supply in **Northwestern Ontario is predominantly based on Regional resources of electricity generation** (hydro, coal, gas, other renewable energy systems and off-grid diesel generation for the remote communities), due to the limited reliability of transmission interconnections in Northwestern Ontario with neighboring areas which are external to the Region.

Hydroelectricity and coal generation account for 90% of the area's regional electricity supply. Most of the hydroelectric facilities in the Northwest are run-of-river plants with no storage capability. This results in large annual/seasonal variation in energy production. Due to its nature,

run-of-river generation cannot be relied upon alone to reliably meet the load demand in the winter when demand is high, and/or in low water years.

The total installed capacity of hydro generation in Northwestern Ontario was 55% (800 MW) of total installed capacity in the region in 2010. There are currently two coal-fired generation stations in the region, namely the Atikokan Generating Station (210 MW) and the Thunder Bay Generating Station (310 MW). **Coal-fired generation is flexible, and therefore complements the output of hydroelectric facilities** during low-water years, and in future, when supply from the planned East-West tie transmission line, plus transmission from the west (Manitoba), is unavailable.

Coal-fired generation in Ontario, including Northwestern Ontario, is scheduled to close down by the end of 2014 in accordance with Ontario Regulation 496/07. According to the Ontario Independent System Operator (IESO), after that date, total electricity generation capacity in Northwestern Ontario could be as low as 390 MW during low water periods [5].

Conversion of the Atikokan GS from coal to biomass fuel is underway. The current OPA plan is to convert the Atikokan GS from coal to biomass fuel. Initially, the Atikokan conversion was expected to generate 150 MW of renewable energy. However, due to the limited availability of biomass fuel, **the converted Atikokan GS will now only run at a fraction of its current capacity.**

In addition to Atikokan, plans were made to convert the coal-fired Thunder Bay Generating Station (TBGS) to a natural gas-fired plant. This plan was included in the 2007 Provincial Integrated Power System Plan (IPSP). **The TBGS conversion was later re-visited in November 2012 and put on hold by the Province in favor of other power supply sources from outside the Northwestern Ontario Region.** These included an expansion of the East-West transmission interconnection between Wawa and Thunder Bay (East-West Tie), and importing power from Manitoba.

According to OPA estimates, **development of the East-West tie transmission line would save the Province about $400 million** in capital costs compared to conversion of the Thunder Bay GS. Despite initial capital estimates, relying on supply from outside the Region will result in the loss of important local and regional generation sources that currently complement the seasonal variability of the Region's hydroelectricity plants and provide flexible generation for peaking operation.

At present, **natural gas-fired plants and biomass plants account for only a small portion of the region's energy supply mix**. Two natural gas-fired stations near Nipigon and Fort Frances have, until recently, supplied approximately 150 MW of capacity. However, the OPA has indicated that as of 2010, the Fort Frances facility had been converted to biomass operation and its installed capacity was reduced by approximately 50 MW [2]. As such the available capacity from the Fort Frances facility after conversion is about 100 MW.

According to the OPA, **approximately 200 MW of new renewable resources have been contracted in the Northwest through the RESOP, RES and FIT Programs** [2]. These new resources **consist primarily of wind and solar resources**, but also include some hydroelectric and biomass generation. The capability of these resources to sufficiently provide the flexibility and capacity of retired coal and gas stations remains uncertain. This is particularly significant when it is considered that reliable power must be available to maintain system supply at times when wind and sun energy is not available.

The "demand resource responses" program provides an opportunity for end-use customers to play a significant role in the operation of the electricity system by reducing or shifting their electricity usage to off-peak (lower demand) periods in parallel to time-based rates and other forms of financial incentives which promote **energy conservation** [10]. Demand response programs are being used by OPA as a method of balancing electricity supply and demand in Northwestern Ontario. **Currently, demand response contracts with large industry users in Northwestern**

Ontario have eliminated the need to generate an additional 50 MW of electricity. The OPA estimates that **demand response resources in Northwestern Ontario are expected to total a savings of approximately 90 MW [10].**

According to current OPA plans, it appears that the future of the energy supply mix in Northwestern Ontario will not be reliant on local/regional electricity generation as the capacity and generation flexibility of these resources is considered unreliable. As a result, it is expected that growth in demand will be met through the additional capacity provided by expansion of the East-West tie transmission line and other import options.

7.3.2 Resources External to the Region

Current Resources

Electricity supply from outside the Region is limited by the capacity and capability of transmission interconnections between the Region and neighboring areas. Figure 7-6 shows the three interconnections with neighboring areas. These are detailed in Table 7.3 [2]. It should be noted that while the combined import capability is 570 MW, this import capacity is subject to the following limitations:

- The **nominal westbound limit of 350 MW for the East-West tie does not conform to current reliability standards** of the IESO. Operating in compliance with the reliability standard (i.e. the loss of both East-West Tie circuits) would reduce its transfer capability from 350 MW to 175 MW.
- **Loss of the East-West Tie while it is transferring 350 MW to the west could lead to the interruption of load west of Wawa to the whole Northwestern system**.
- **Interconnections with Manitoba and Minnesota cannot be relied upon for planning purposes to meet the Northwest's supply needs in a reliable manner**, as there are currently no firm import arrangements in place, nor will Manitoba have any exportable power before 2020. In addition, reinforcement of the Northwestern Ontario transmission system would be required to accommodate significant imports from these jurisdictions.

While the interconnections with Manitoba and Minnesota cannot be used to plan firm capacity and energy imports, they are **crucial to the security and robustness of the Northwest system operationally**, because they provide the only connection with the rest of the North American grid when the East-West tie is out of service.

Table 7.3
Existing Interconnection Capability between Northwest Ontario and Neighboring Areas (Measured at Wawa TS)

Interconnection	Capability to Transmit (MW)	
	Into Northwest	Out of Northwest
East-West Tie	350	325
Manitoba Interconnection	330	262
Minnesota Interconnection	90	140
Total Simultaneous Capability with Sufficient Standby Generation	Up to 570	Up to 490

Source: IESO

Figure 7-6

Transmission System in Northwest Ontario

Future Resources

Recently the Ontario Energy Board (OEB) invited submissions from the private sector to build, own and operate a 400 km expansion to the 230 kV double circuit **East-West tie (overhead) transmission line.**

Submissions received by the OEB can be viewed on the OEB web site [6]. From a review of these submissions it can be seen that the transmission line **will not be in service until early 2019 at the very earliest.**

Incorporating both the old and new circuits and respecting applicable reliability standards, expansion of the East-West transmission line will boost the westward capacity of the East-West tie transmission line from 350 MW to a capability limit of 650 MW, as measured at Wawa TS. Using the IESO method of assessment, transmission losses for the expanded East-West tie line are estimated to be approximately 40 MW. With line losses factored in, the maximum transmission capability limit of **the expanded transmission line will provide approximately 610 MW, measured at Lakehead TS**.

Figure 7-7 shows the nominal power flow during maximum transmission capability of the expanded East-West tie line. The tie is fed electricity from the Sudbury interface plus other sources of local generation northwest of Sudbury. A **maximum of approximately 350 MW of the total transmission capacity of 650 MW can be fed from the Sudbury interface** (operating in compliance with the reliability standard). The remaining power must therefore be fed from other sources of generation northwest of Sudbury (Wells, Clergue, Lake Superior Power and Aubrey Falls).

It should be noted that the **available power supplied by the East-West transmission tie line expansion can further be restricted** by double circuit contingency conditions on the westbound transfer. These types of conditions have been studied in detail and are reported in the IESO assessment as summarized in Table 7.4 [5]. For each contingency condition, transfer capability is given before and after the phase shift at the Manitoba and Minnesota interconnection. Detailed power flow diagrams for these conditions are given in the IESO assessment report [5].

Table 7.4

Restricted East-West Power Transfer Capability during Circuit Contingencies between Mississagi and Wawa [5]

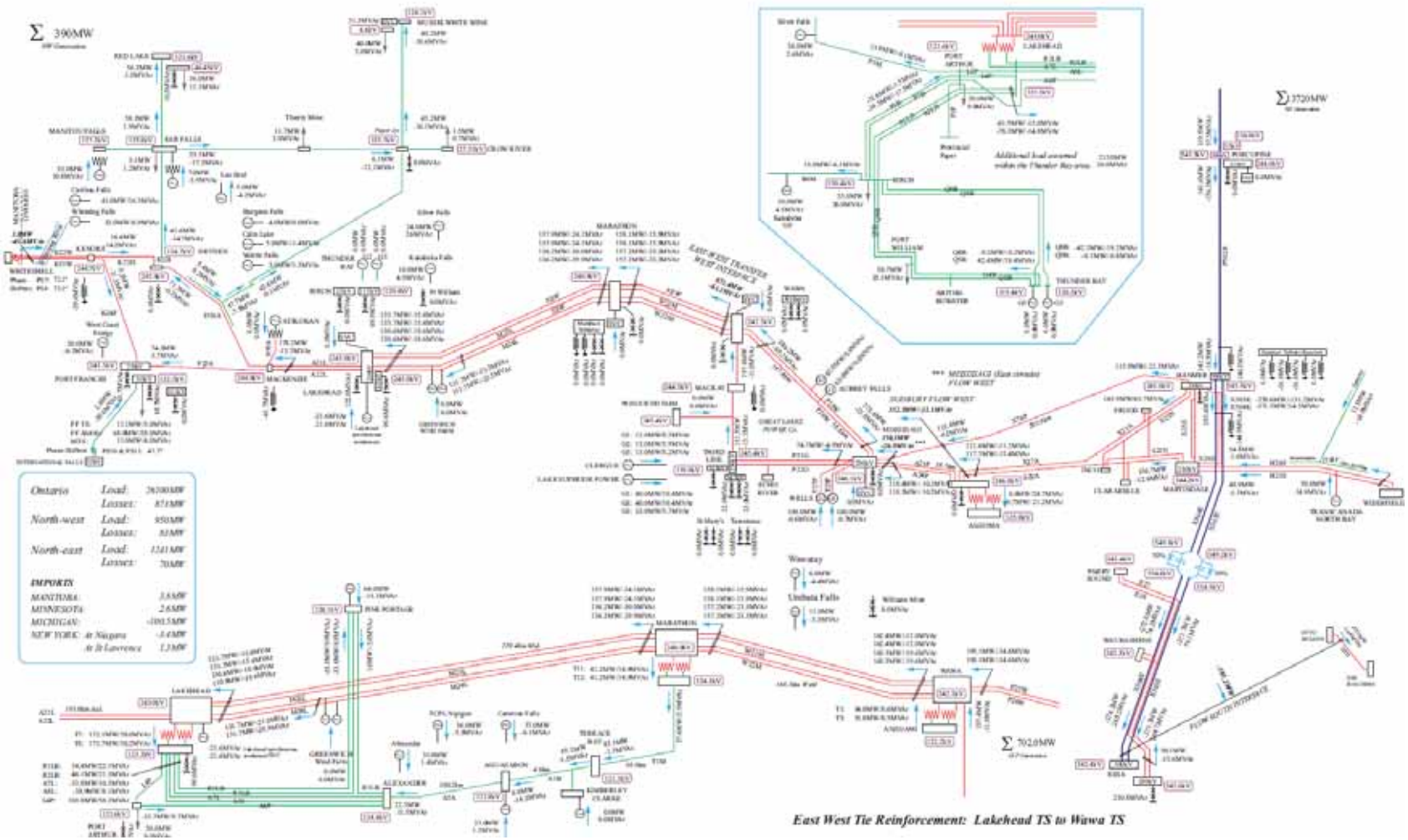
Contingency	Case Condition	Restricted Transfer Capability for the Expanded East-West Tie
Double Circuit Contingency: Existing Mississagi to Wawa circuits P25W + P26W	No Phase Shifter action	427 MW
	With Phase Shifter action	465 MW
	Voltage Stability Limit of the East-West tie	**500 MW**
Double Circuit Contingency: Existing Mississagi to Third Line circuits P21G + P22G	No Phase Shifter action	456 MW
	With Phase Shifter action	488 MW
	Voltage Stability Limit of the East-West tie	**562 MW**
Single Circuit Contingency: Existing Wawa to MacKay circuits W23K	No Phase Shifter action	490 MW
	With Phase Shifter action	517 MW
	Voltage Stability Limit of the East-West tie	**569 MW**

7.3.3 Security of Supply for Future Mining Demand

According to Hydro One outage statistics, the existing East-West tie transmission line experienced a 16 day outage due to an ice storm in 2009 [7]. This raises **concerns regarding the security and reliability of supply** to serve the forecast load demand in Northwestern Ontario. Supply security is considered to become **even less certain following the planned closure of the coal-fired Thunder Bay Generating Station (TBGS) by 2014.** This leaves a particularly risky situation between the years 2014 (TBGS shutdown) and 2019 (earliest in-service date for the expanded East-West tie transmission line). The supply security concern will be further deepened if the region faces a low water year period during the time period 2014-2019. Options to secure supply during this short to medium term is needed to ensure a reliable supply of electricity to the growing mining sector. **Without a secure supply, the Region could experience load-shedding and brown-outs, and may even see delays in new project development.**

Figure 7-7

Power Flow Case Study During the Maximum Transfer Limit of the Expanded East-West Tie[5]



7.3.4 Status of Existing Transmission System

The transmission system in Northwestern Ontario consists of a 230 KV backbone circuit with 115 KV radial circuits. The system offers no transmission redundancy in most load centers at the end of the 115 kV radial lines, significantly restricting extension potential. Some of these lines are serving locations where new mining projects are in the mature exploration stages (e.g. Red Lake, Pickle Lake and Greenstone areas). Other major mining development areas such as the Ring of Fire are located far away from the transmission infrastructure. In addition, the **transmission system is beyond the reach of 25 remote First Nations communities** in Northwestern Ontario, as well as a number of potential hydroelectric and wind generation sites. **Significant investment is required to further develop the transmission system** in Northwestern Ontario in order to overcome its current limitations and meet the objectives of Northern Ontario's Growth Plan [1].

As discussed previously, the **existing East-West tie transmission line has a nominal westbound transmission capability limit of 350 MW**. However, this limit does not conform to current IESO reliability standards. To meet current reliability standards for double circuit contingencies along the East-West tie, between Wawa TS and MacKenzie TS, including the "storm limit", **transfers would be restricted to approximately 175 MW.**

7.3.5 Future Transmission Infrastructure for Remote Communities

The OPA and the IESO have both conducted studies examining the potential for, and feasibility of, connecting the remote First Nation communities to the provincial transmission system [8] [9]. These communities can be grouped into two geographic clusters as shown in Figure 7-8 namely the Pickle Lake Cluster and the Red Lake Cluster.

The Red Lake cluster includes 6 communities with a total existing load of 6 MW, and forecast **growth to 13 MW by 2033**. The Pickle Lake cluster includes 14 communities with a total existing load of 10 MW and forecast **growth to 20 MW by 2033**.

Transmission connection into the two clusters can be developed in a manner which results in **sharing transmission facilities between mine sites and First Nations** to increase efficiencies and reduce line lengths, environmental impacts and costs. To enable this type of system extension, the line and substation capacities at **both Pickle Lake and Red Lake must be reinforced,** as the existing 115 kV radial transmission lines lack capacity and reliability to connect future loads. OPA's recent assessment identified one option which would connect the Pickle Lake cluster and the Ring of Fire mineralized zone via a strengthened system (230 kV) at Pickle Lake, as shown in Figure 7-9. This option would also facilitate economic connection **of several potential hydro generation** sites in the area.

Figure 7-8

Red Lake and Pickle Lake Remote Community Clusters

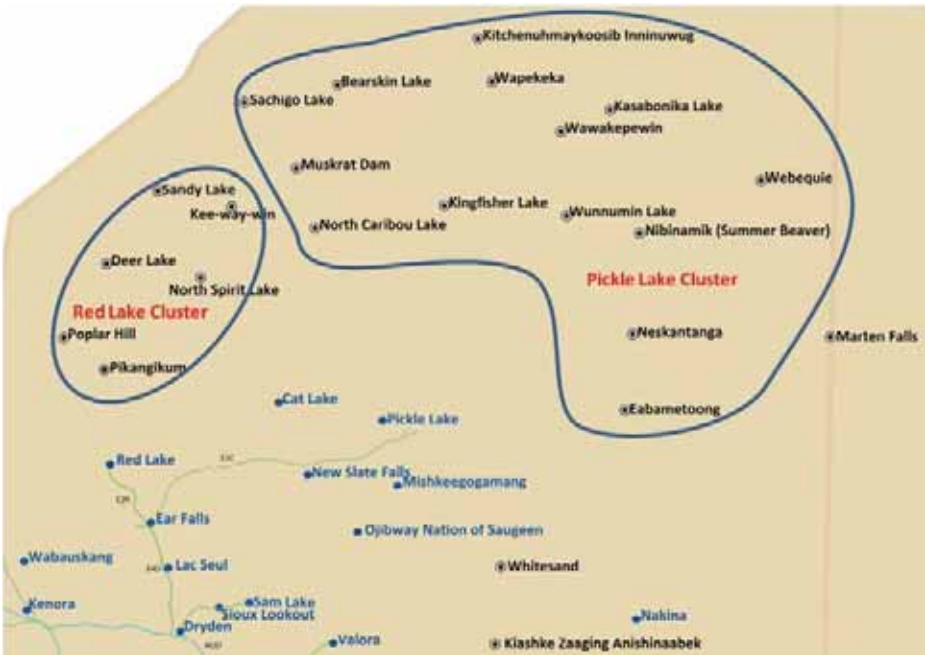
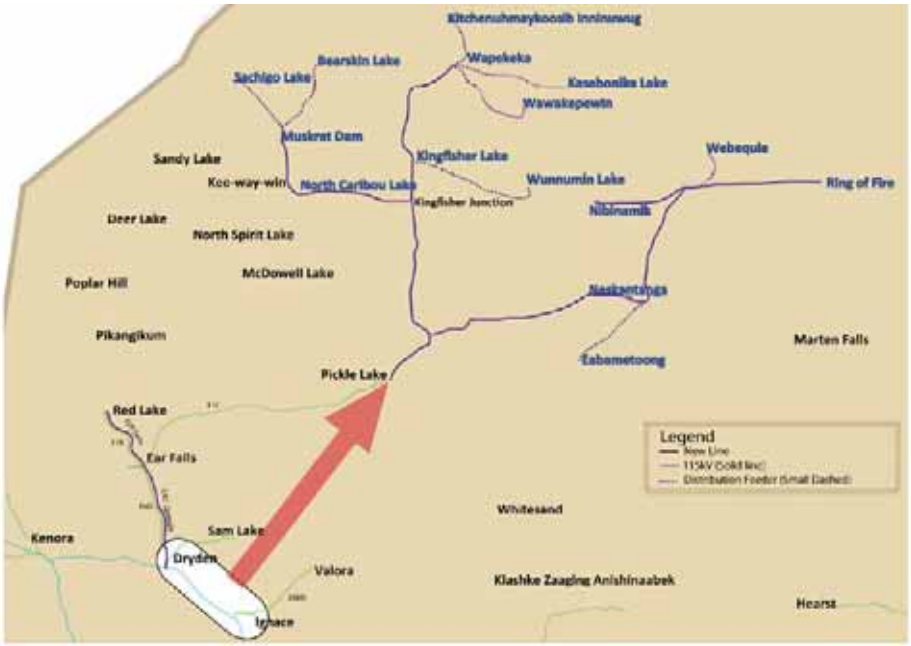


Figure 7-9

Potential Connection Option to Pickle Lake and the Ring of Fire



7.3.6 Future Transmission Infrastructure for Hydro and Wind Development

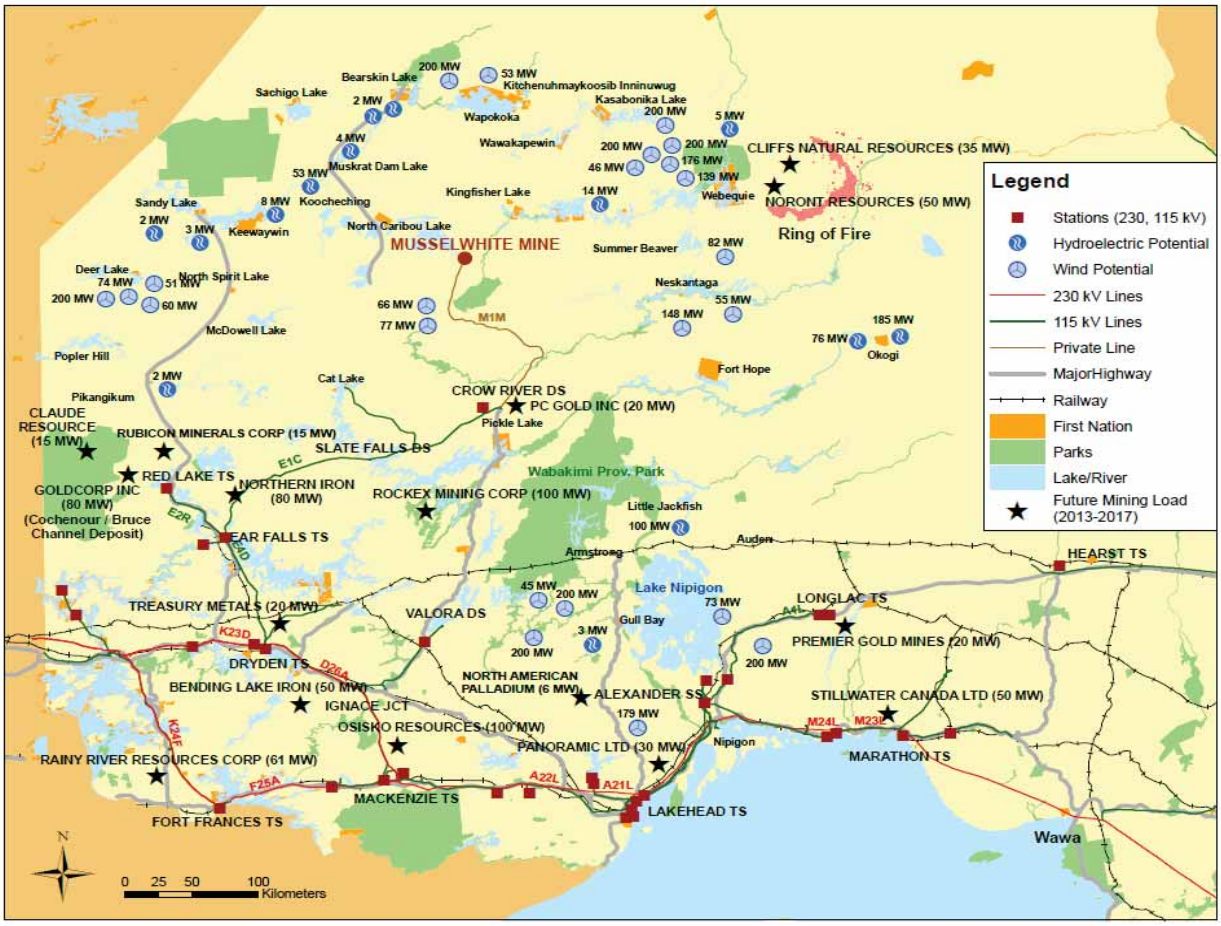
Potential future wind and hydro generation resources in Northwestern Ontario have been identified and characterized. These are as shown on Figure 7-10 in relation to the location of proposed mining projects. Most of the potential wind and hydro generation sites are currently **remote from the existing grid** and will **require long interconnection transmission lines to bring the power into the provincial grid system**. The development of these long lines will require significant investment that must be justified in the context of the potential to generate revenue from the proposed generation project.

Many of the proposed generation sites are proximate to the Ring of Fire area, areas North of Pickle Lake, areas North of Red Lake and areas around Lake Nipigon near to First Nation communities and proposed mining projects.

In determining optimal routing and the timing of development for transmission extensions and interconnections, it will be **important to maximize the potential for sharing the infrastructure** development costs by maximizing benefits among all the parties to capture the **highest social and economic return**.

Figure 7-10

Location of Potential Wind and Hydroelectric Generation Sites in Northwestern Ontario



7.3.7 Future Transmission Infrastructure for Mining

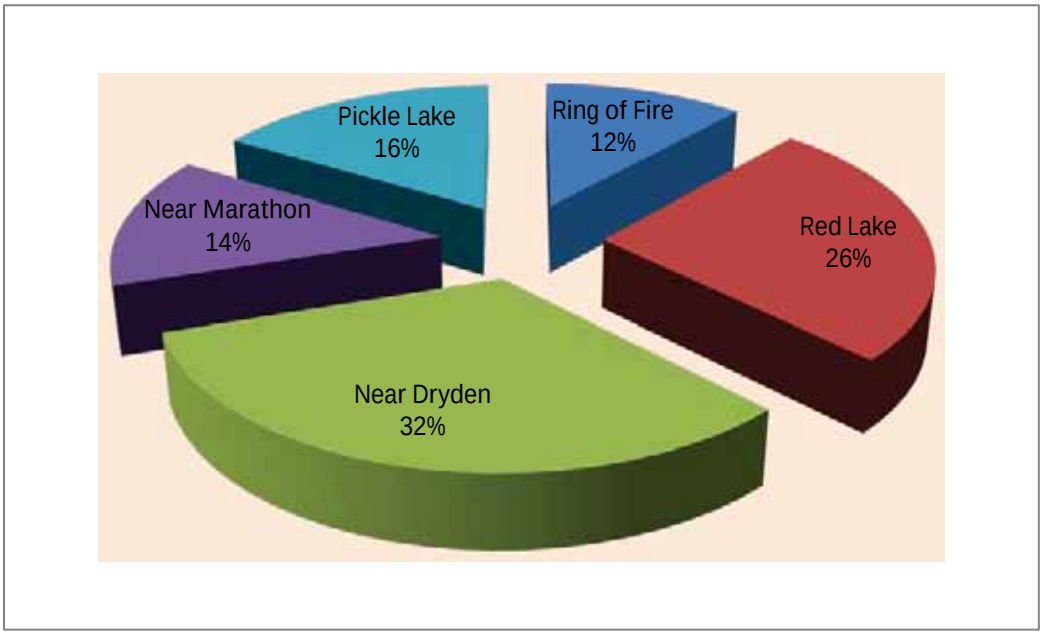
Figure 7-10 shows the major mining exploration programs expected to go into production by 2017, in relation to the First Nation communities and potential generation projects. As discussed earlier, **the peak demand for the high growth forecast for mining projects is 732 MW** as shown on Table 7.1. For transmission planning, the mining projects included in that estimate can be categorized into several geographic groups:

- ***Projects in the Ring of Fire area totaling 85 MW (12% of total mining loads).*** There are only two mines in this area included in the forecast. However, exploration activity in this area is high and can be expected to increase in the near future, particularly if transmission and transportation infrastructure connections are available.
- ***Projects in the Pickle Lake area totaling 120 MW*** (16% of total mining loads).
- ***Projects in the Red Lake area totaling 190 MW*** (26% of total mining loads).
- ***Projects near and south of Dryden totaling 237 MW*** (32% of total mining loads).
- ***Projects within the Marathon-Nipigon corridor totaling 100 MW*** (14% of total mining loads).

Figure 7-11 shows the distribution of the load demand for mining projects in relation to these geographic groupings or clusters.

Figure 7-11

Geographic Distribution of Mining Load



Some challenges with the existing transmission system that restrict the ability to provide power to meet the demands of future mining projects throughout Northwestern Ontario include the following:

- The **E4D circuit from Dryden to Ear Falls** which supplies Red Lake and Pickle Lake **is approaching its capacity limit**. The **loss of the E4D transmission line through some contingency event, would cause a complete power outage for mining activities** around Red Lake and Pickle Lake.
- The **E2R circuit which supplies Red Lake is approaching its capacity limit.**
- The operational problems caused by the **E1C circuit which supplies Pickle Lake** are well documented**. It is already operating at its limit and is unreliable**. Incremental line losses are very high. E1C outages already cause power supply interruptions in Pickle Lake. **There is an urgent need to reinforce Pickle Lake to ensure reliable operation for existing and future mining projects.**

The areas serviced by these three circuits are forecasted to contain 54% of future mining loads, most of the 25 remote First Nations communities, and many potential wind and hydro generation projects.

The E2R, E4D, and E1C transmission lines cannot be expanded or extended. **Reinforcement of interconnections to Red Lake and Pickle Lake must be considered a high priority** for near future transmission system expansion in order to maximize mining development, development of stranded renewable energy projects, and the interconnection of remote First Nations communities.

Transmission Infrastructure Requirements for the Ring of Fire

The **mining projects in the Ring of Fire area** are remote from the existing transmission network and **account for 12% of the forecasted 732 MW total mining load.** Given the mineral potential in the Ring of Fire area, it is expected that load/demand will increase beyond this in the near future. Although there may be others, the following are the most referred to **options for connecting the Ring of Fire**:

- **Extend the 115 kV line from the Five Nations Energy Inc. line (west coast of James Bay)**. This option would connect a small number of remote First Nation communities located in close proximity to the Ring of Fire. However, the weak transmission network at the terminal point of this line located at the DeBeers Victor Diamond mine (south of the Attawapiskat First Nation), the low transmission capacity of the 115 kV line, the high potential for significant line loss and the resultant low reliability of the system, **reduces the attractiveness of this option**.
- **New 230 kV line from Kapuskasing**. This option would connect a small number of remote First Nation communities located in close proximity to the Ring of Fire. However, it would require over 500 km of radial 230 kV transmission line. Further investigation is required to properly assess the feasibility of this option. However, at a very high level of analysis, the high cost of transmission reinforcement and the high cost to strengthen the supply source at Kapuskasing **reduces the attractiveness of this option**.
- **New 115 kV transmission line from Pickle Lake**. This configuration is proposed by OPA to optimize the connection arrangement of the remote communities around Pickle Lake and the Ring of Fire by sharing the capacity and cost of their connection with mining loads served within the Pickle Lake and Ring of Fire clusters. Figure 7-12 shows the proposed connection of the Ring of Fire via Pickle Lake utilizing a 115 kV line.

  This option requires 230 kV transmission enforcement at Pickle Lake. This **also enables the connection of 10 or more communities to the north and northwest of**

Pickle Lake. However, this configuration would only enable up to 30 MW of mining loads at the Ring of Fire and may not have the capacity to capture future wind and hydroelectric generation at the area [4]. These restrictions can be relaxed if the development of 230 kV lines is considered instead of the current proposal to develop 115 kV lines.

- **New 115 kV or 230 kV line from Longlac**. This option was identified by the OPA in a presentation in Thunder Bay on January 17, 2013. This option would **require reinforcing the existing transmission network between Nipigon and Longlac.** The 115kV or 230kV line would interconnect mining loads in the Ring of Fire area, First Nation loads in the vicinity of the Ring of Fire area and renewable energy projects. Given the potential line length and loads, it is **suggested that the 230kV option be favoured**.

Figure 7-12

Routing Option to Feed Ring of Fire from Pickle Lake and/or LongLac TS

In considering the optimal routing option of an interconnection into the Ring of Fire area, it is extremely important to consider the short- and long-term environmental, cultural, social and economic benefits of also connecting **future wind and hydro projects and remote First Nations communities**. Adding local hydro and wind generation will strengthen the transmission system. Providing incremental load capacity from these generation projects will add both energy and reactive power, reducing the need for (and cost of) equipment that might otherwise be needed to maintain voltage stability within the system. The **connection of local generation will also increase supply reliability to the Ring of Fire**.

Transmission Infrastructure Requirements for Pickle Lake

The **Pickle Lake** area cluster contains **16% of total mining loads** in Northwestern Ontario. If the **Ring of Fire loads** are also connected through Pickle Lake then **28% of the total mining loads** will be connected through Pickle Lake. This is in addition to the potential to interconnect 20 First

Nation communities and a good portion of the potential undeveloped wind and hydro generation projects in Northwestern Ontario.

The Pickle Lake area **cannot be supplied from the existing 115 kV radial lines** as these lines lack sufficient capacity and reliability. In Ontario's long term energy plan, **OPA identifies the construction of a new high voltage reinforcement line to Pickle Lake among its top priorities** [10]. There are a number of alternatives available for reinforcing Pickle Lake as shown on Figure 7-13:

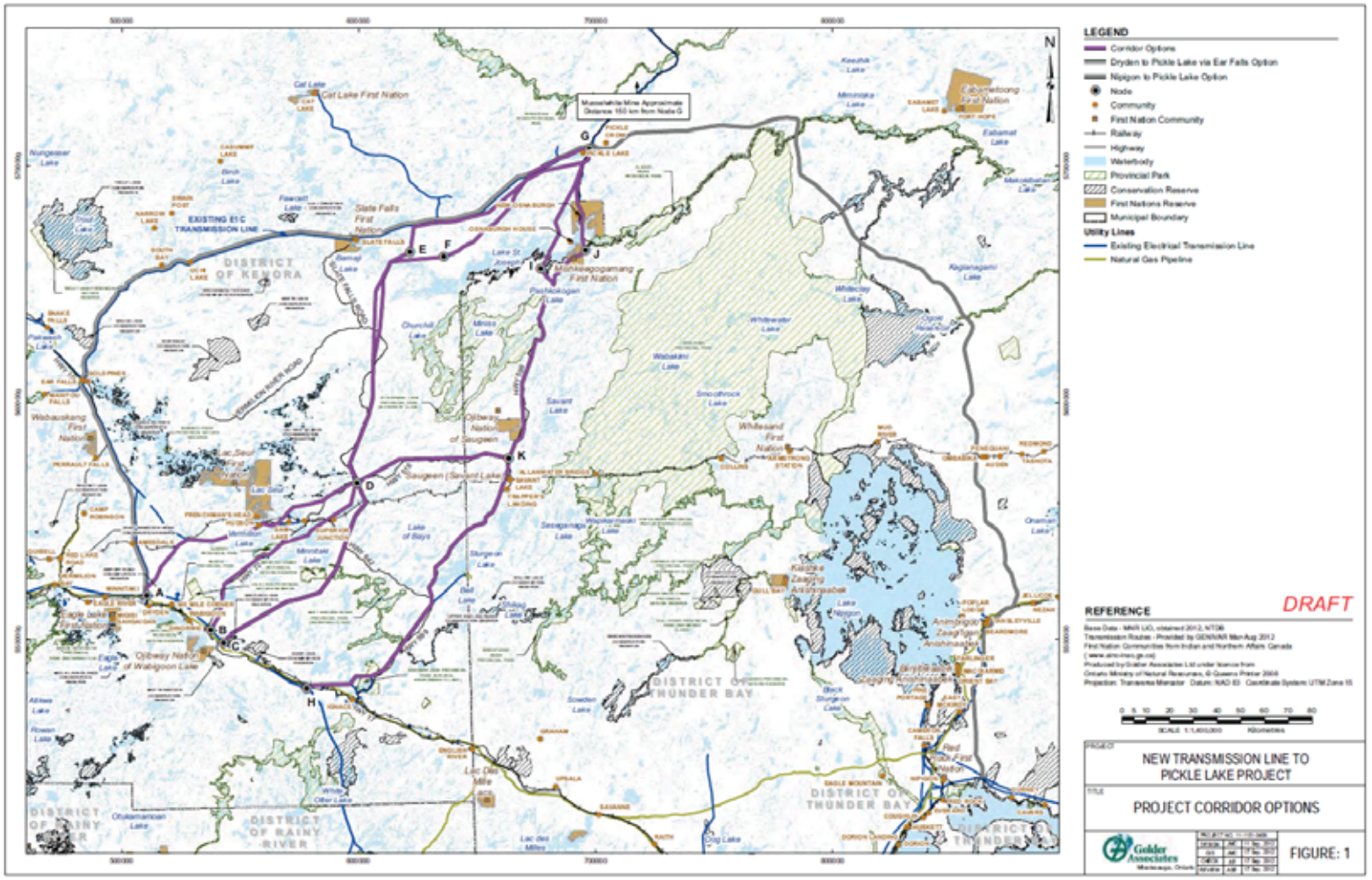
- **Construct a 115 kV line from Valora DS to Pickle Lake**. This option will provide **limited** capacity to Pickle Lake and **will not likely have sufficient capacity to supply the Ring of Fire**.
- **Construct a 230 kV line from Dryden TS or Ignace Junction to Pickle Lake**. This option would be a 300 km to 350 km transmission distance. The capacity of supplying Pickle Lake with this option will increase the loading of downstream lines and may be limited by the capacity available on them [11]. This option would also not provide interconnection to the proposed Little Jackfish hydro generating station.
- **Construct a new 430 km, 230 kV line from Nipigon to Pickle Lake**. Hydro One Inc. considered this transmission route which facilitates connection of the Little Jack Fish hydro station plus future wind generation and other hydro projects.

The planned transmission line should have the capacity to serve the future needs of the First Nation communities, Pickle Lake area, Ring of Fire loads and to integrate possible renewable resources located near to the chosen line routing.

The proposed reinforcement of the Pickle Lake interconnection via a 230 kV line would lay the groundwork for extending and strengthening the grid capacity throughout Northwestern Ontario. In addition, a reinforced loop or arc can be formed by connecting Pickle Lake to Ignace Junction and Pickle Lake to Nipigon. This loop could be developed in phases via a staged planning approach.

Figure 7-13

Transmission Options to Provide 230 kV Transmission Enforcement to Pickle Lake



(*Source: Golder Associates, [12]*)

Transmission Infrastructure Requirements for Red Lake

The **forecast load of the future Red Lake area mining projects is 190 MW** (**26% of total mining loads** in Northwestern Ontario). The OPA proposed extension of the 115 kV E2R circuit in its study that examined options for connecting 6 remote First Nation communities in the Red Lake cluster, namely Pikangikum, Poplar Hill, Deer Lake, Sandy Lake, Kee-Way-Win, and North Spirit Lake, as shown in Figure 7-14. Although there **may be sufficient capacity to interconnect the smaller loads of the First Nations communities, this line will not have the capacity to also interconnect to future mining projects** given the line is currently operating close to its capacity limit.

It is considered more practical to consider development of a 230 kV line from Dryden or Kenora to Red Lake to allow connection of the mining loads, remote First Nations and future wind and hydro generation projects located North of Red Lake.

A significant advantage of developing a 230 kV connection at Red Lake is that this will facilitate **future interconnection with a high voltage interconnection from Pickle Lake, forming a high voltage arc or loop that extends throughout Northwestern Ontario, potentially including the Ring of Fire** area. This loop would strengthen grid capacity in the region. It should be considered that although the capacity of the E2R transmission line (which is currently nearing capacity) would not be reinforced, providing 230 kV transmission reinforcement at Pickle Lake will unload the E4D transmission line, thereby providing the opportunity to reinforce capacity to Red Lake.

Transmission Infrastructure Requirements for South of Dryden and Near Marathon-Nipigon Corridor

The peak demand of the proposed mining projects near and south of Dryden and those within the Marathon-Nipigon corridor is approximately 337 MW (**46% of the total load of the 16 mining projects loads presented in Table 7-1)**. With the exception of the Premier Gold project, all of the proposed mining projects in this area are located in relatively close proximity to existing 230 KV circuits via short radial feeders and **can be supplied from existing infrastructure**.

Major Transmission Infrastructure for Northwest Ontario

Investment in **transmission infrastructure is critical** for the development of future mining projects, as well as interconnection of remote First Nations communities and undeveloped wind and hydroelectric generation projects in Northwestern Ontario, as identified by the Common Voice Northwest Energy Task Force several years ago.

There are **three load hubs in the region,** namely, Pickle Lake, Red Lake and the Ring of Fire. **All three hubs require reinforcement via interconnection to the provincial grid within the next five years to prevent delays in the development of mining projects and to enhance benefits throughout the Region.** This can be achieved by developing the line options listed in Table 7.5 and shown on Figure 7-15.

It is likely that the transmission lines for these **three hubs will from the backbone** of a system that will experience increased demand in the coming years. Therefore it is recommended that the **voltage levels for these lines be 230 kV**. This will allow the potential formation of a 230 kV loop or arc connection throughout Northwestern Ontario in future.

Indicative costs to construct the different options available are presented in Table 7.5 using typical unit rates developed for similar projects in the Region. Based on these indicative costs, and given that the total length of the transmission lines that would form this system would exceed 1000 km, **it**

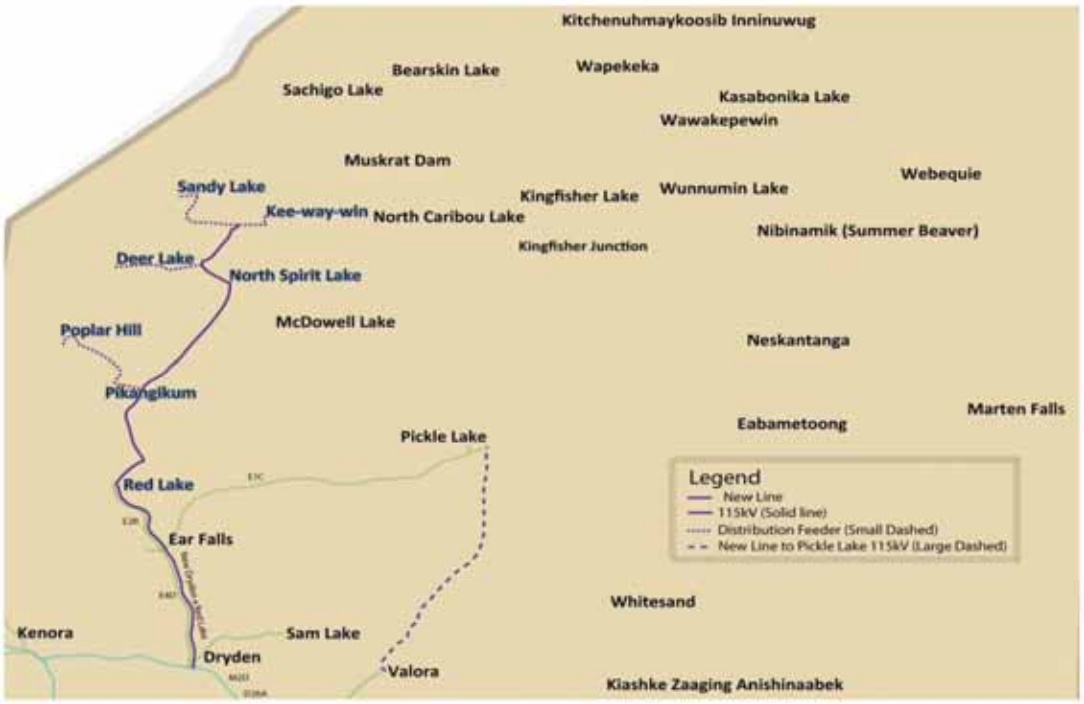
is estimated that well over approximately $1Billion in capital investment is required to build the system. It is recognized that this capital investment will not likely come from any single source.

Developing these **major lines will likely take a minimum of 3-4 years**. As the mining projects are forecasted to be operational by 2016, it is **recommended that the process of permitting/approving/developing these lines should start promptly**. The process must respect Aboriginal and treaty rights as well as issues of environmental sustainability.

The private sector and the public sector, including First Nations, will have to identify creative approaches to partnering and financing. The Province of Ontario, and where appropriate the Government of Canada is encouraged to assist in the financing of the transmission lines through the provision of creative funding such as loan guarantees and avoided cost financing.

Figure 7-14

E2R Circuit Extension from Red Lake to 6 Remote First Nations Communities



Source: Ontario Power Generation [4]

Table 7.5

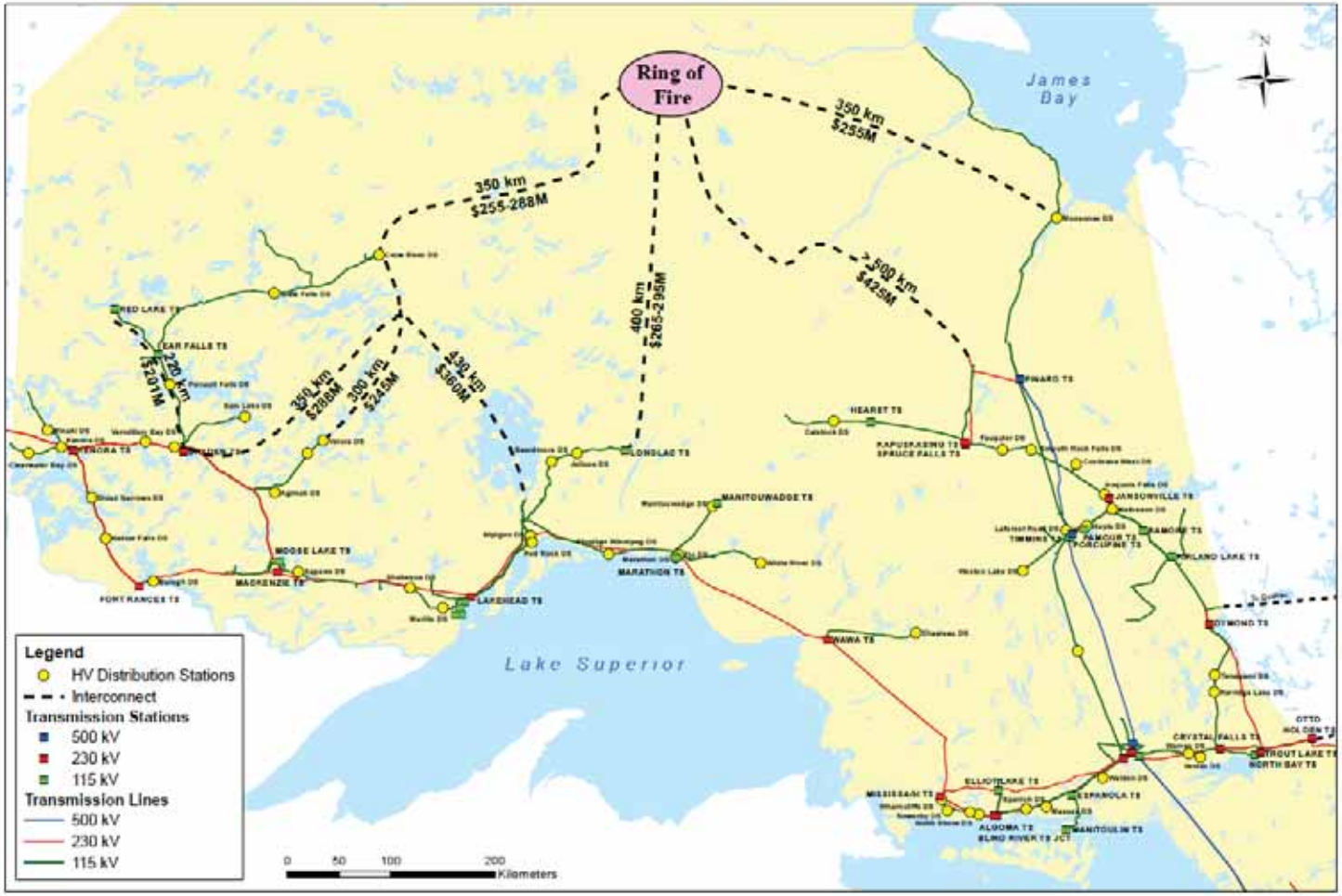
Options for Transmission Infrastructure Upgrade for Northwest Ontario in the next five years

Transmission Destination	Transmission Line Options	Length of Transmission Lines	Total Cost*	Assumptions
Ring of Fire	115 kV from James Bay	350 Km	$254,534,000	Wood Poles, Single Circuit, 477kcmil, two terminals and one intermediate stations
	230 kV From North of Kapuskasing	Over 500 Km	$425,108,871	Twin Wood Pole H Frame, 795kcmil, Single Circuit, two terminals and three intermediate stations
	115 kV from Pickle Lake	350 Km	$254,534,000	Wood Poles, Single Circuit, 477kcmil, Single Circuit, two terminals and one intermediate stations
	230 kV from Pickle Lake	350 Km	$288,613,710	Wood Poles, Single Circuit, 477kcmil, Single Circuit, two terminals and one intermediate stations
	115 kV from Longlac	400 km	$264,712,000	Wood Poles, Single Circuit, 477kcmil, two terminals and two intermediate stations
	230 kV from Longlac	400 km	$295,700,000	Twin Wood Pole H Frame, Single Circuit, 795kcmil, two terminals and two intermediate stations
Red Lake	230 kV from Dryden or Kenora	220 Km	$201,387,903	Twin Wood Pole H Frame, Single Circuit, 795kcmil, two terminals and one intermediate stations
Pickle Lake	115 kV from Valora	300 Km	$245,775,000	Wood Poles, Single Circuit, 477kcmil, two terminals and one intermediate stations
	230 kV from Dryden or Ignace	350 Km	$288,613,710	Twin Wood Pole H Frame, Single Circuit, 795kcmil, two terminals and one intermediate stations
	230 kV from Nipigon	430 Km	$360,216,129	Twin Wood Pole H Frame, Single Circuit, 795kcmil, two terminals and two intermediate stations

**Costs do not include local distribution system infrastructure or reinforcement at the Hydro One network interface.*

Figure 7-15

Future Development for the Transmission Infrastructure in Northwest Ontario



7.3.8 Other Electricity Supply Options for Mining Projects

Other options to supply electricity to mining projects includes **diesel generation, renewable energy (wind and solar), hydroelectricity and even thermal energy such as biomass or natural gas.**

The most common form of electricity generation for mining projects throughout the remote parts of the world is diesel fuel. The development of on-site diesel generation requires that diesel fuel is transported to the mine site via winter road, all-weather access road or via rail. Given the high volume of fuel that would be required to meet the power demand for the mining projects in Northwestern Ontario, especially in the Ring of Fire, it is unlikely that the existing winter road network will be sufficient to provide a reliable means of transporting fuel. As a result, not only would **diesel generation require capital investment in transportation infrastructure, adding significantly to the capital cost,** the high volumes of fuel to transported will impose **considerable environmental risk**.

The initial capital cost to develop diesel generators is relatively low. However, operations and maintenance costs are high due to the cost of diesel fuel and the costs to maintain the infrastructure required for transportation and storage of the fuel. These costs will challenge the feasibility of developing a diesel-fired electricity generation system. **These high costs and environmental risks would similarly apply to natural gas generation.**

Development of **run of river hydro, solar, wind or bio-energy to feed the mining load** is another supply option. However, given the intermittent nature of renewable energy generation, these options would have to be supported with equivalent on-site diesel generation capacity or the development of high voltage transmission lines.

7.4 Conclusions and Recommendations

7.4.1 Conclusions

Based on the analysis conducted for this Strategy, a number of important conclusions can be drawn from the preliminary findings:

- There are significant long-term social, economic, cultural and environmental benefits to interconnecting as many remote First Nations, mining projects and renewable energy projects, as is economically feasible.
- There are **many benefits to covering as much geographic territory as possible** to facilitate future mining exploration and development.
- The **OPA estimates of future electricity demand from growth in the mining sector are considered to be lower** than the total power requirements for the 10 mines that are in the mature exploration stage, and much lower than the total electricity demand when also considering second tier mining projects that are in mature exploration stage.
- After retirement of the coal-fired Thunder Bay Generating Station, the system will continue to be supplied by an inflexible generation mix within the region plus **interconnections outside the region with limited reliability and non-firm transfer capacity**.
- The **majority of the mining load capacity requirements cannot be secured through existing transmission infrastructure** (including expansion of the East-West tie

transmission line). This is due to the remoteness of many future mining projects, including those in the Ring of Fire area. This is considered a **critical limiting factor for the development of the mining sector** in Northwestern Ontario.

- The expanded East-West tie transmission line will not be the reliable supply of electricity that is needed from 2014 to 2019, the earliest in-service date of the line. **Delays to the in-service date will result in delays in new mine production.**
- It is expected that **conversion of the Thunder Bay Generating Station from coal to an alternate fuel could be permitted/approved/developed in a much shorter timeframe than the East-West tie transmission line** given the urban location of the plant and the fact it is simply going through a fuel conversion process that is expected to result in lower emissions and environmental risks.
- Delaying reinforcement of the Pickle Lake and Red Lake interconnections will introduce equivalent **delay and potential cancellation or considerable downsizing of many proposed mining projects.**
- Although capital investment is a challenge for developing long, remote transmission lines, ultimately the **Northwestern Ontario Region would be best served by a system of transmission lines that interconnects to the provincial grid to the south and is arced/looped throughout the Region**, maximizing the potential to interconnect all remote First Nations and viable renewable energy generation projects, while at the same time, maximizing economic development potential through mining exploration/development and related opportunities.

7.4.2 Recommendations

It is recommended that**:**

- The Ontario government, through the Ministry of Energy and the Ontario Power Authority, the federal government, through Aboriginal Affairs and Northern Development, the municipalities of Northwestern Ontario, the First Nations of Northwestern Ontario and the private sector, should convene an Energy Planning Committee whose task it is to **develop a regional electrical infrastructure plan for Northwestern Ontario**. This Plan should include consideration of forecasted growth in demand, available and future sources of electricity generation, challenges and opportunities of interconnecting remote First Nations, remote mining projects and remote renewable energy generation projects, timelines and sources of financing to execute identified projects.
- **Engineering and construction of a high voltage transmission line(s)** should be expedited to strengthen the supply source at Pickle Lake and Red Lake to provide a new, clean and reliable supply of electricity to mining projects, and to interconnect remote First Nations and new sources of renewable energy generation.
- **Plans to connect mining loads, new hydro and wind resources, and remote First Nations should be better coordinated between First Nations, First Nations organizations, as well as the provincial and federal levels of government**. This coordination will tend to decrease the cost of transmission development for all parties.
- **Alternative supply options to meet the short to medium term supply-demand gap should be identified and evaluated prior to the closure of the Thunder Bay (coal-fired) Generating Station (TBGS)** at the end of 2014, until the East West tie expansion

is completed and in-service (say 2018). The closure of TBGS is expected to create a serious gap in the supply of reliable energy to the mining sector over the short to medium term. The amount of mining sector development that will occur in that timeframe will depend to a large extent on the availability of reliable power to meet forecast demand.

- **The Ministry of Energy, Ontario Power Generation and the Ontario Power Authority should support the efforts of the Common Voice Northwest Energy Task Force, the City of Thunder Bay and the Fort William First Nation** in identifying cost-effective and practical options for retaining and converting the TBGS to help address the gap in reliable energy supply that is expected between 2012-2018, prior to the in-service date of the East-West Tie high voltage transmission line. TBGS is considered to be a key contributor to this reliable supply going forward. Options for TBGS conversion from coal that should be considered include:
  - Utilizing torrefied wood pellets that could replace coal by December 31, 2014 without requiring any major retrofit of the TBGS.
  - Investigate the potential for conversion of TBGS to natural gas by December 31, 2014, without requiring a major retrofit
  - Other biomass fuels that could also have TBGS operational by 2015 without a major retrofit.

7.5 References

(1) Ontario Government: “Growth Plan for Northern Ontario 2011”, 2011

(2) Ontario Power Authority: “ Long Term Electricity Outlook for the Northwest and Context for the East-West Tie Expansion”, June 2011

(3) SNC Lavalin and McLeod Wood Association, Transmission Line Concept (TLC) for Northern Ontario Off-Grid Communities, 2009

(4) OPA Technical Report for the Connection of Remote First Nation Communities In Northwest Ontario, Northwest Ontario First Nation Transmission Planning Committee, July 2012

(5) IESO: “An assessment of the westward transfer capability of various options for reinforcing the East-West Tie”, August 2011.

(6) OEB E-W Tie link: http://www.ontarioenergyboard.ca/OEB/Industry/Regulatory+Proceedings/Policy+Initiatives+and+Consultations/East-West+Transmission+Tie+Line

(7) Hydro One Outage Report for East-West Tie line from 2002 to 2011.

(8) OPG: “Update on Developments in Ontario”, November 2012.

(9) IESO Feasibility Study draft report: “North of Dryden and Remote Communities Study”, May 2012.

(10) Ontario Power Authority: “Ontario’s Long-Term Energy Plan”, Nov. 2010.

(11) www.hydroone.com/Northwest.

Golder Associates: “New Transmission Line to Pickle Lake Project Environmental Assessment. Preliminary Corridor Routing Analysis”. Sept 2012.

8 TRANSPORTATION INFRASTRUCTURE

Transportation infrastructure plays an integral role in the socio-economic well-being of northern communities in Canada. It's an asset that improves commercial prospects, strengthens regional connections, provides access to key health and social services, and facilitates the flow of people and goods [1].

This section provides an **assessment of the transportation infrastructure within the study area** with the following objectives:

- To provide an **overview of the existing transportation infrastructure** in the study area, including rail, road, air and marine infrastructure;
- To describe the **transportation infrastructure that will be required to support growth in the mining sector in Northwestern Ontario** based on the transportation requirements of the types of mines to be developed;
- To discuss the **transportation challenges and opportunities** associated with current and anticipated mining development in Northwestern Ontario; and
- To make **recommendations** for improving/enhancing transportation infrastructure in Northwestern Ontario to facilitate mining sector growth.

8.1 Existing Transportation Network

8.1.1 Rail Network in Northwestern Ontario

Rail transport is of particular importance to the mining industry. In 2009, the minerals and metals sector (coal, fertilizer, iron ore, ores and metals) accounted for **44% of the 236 million tonnes in commodity volumes carried by rail** in Canada [1]. Rail is often the most, if not only, economic way to haul mining products (specifically industrial minerals, base metals and fuel minerals (coal) from many regions), most notably for long distance shipments of bulk commodities. Rail service holds a **considerable economic advantage** in moving many bulk goods.

Railway construction is historically linked to the development of communities and mining activities across Canada. For example, in Northeastern Ontario, construction of the rail line from North Bay to Cochrane and later to Moosonee in the **early 1900's was instrumental in opening up this remote area for development and settlement**. Renamed as the Ontario Northland Railway in 1940, this provincially-owned rail line was recognized as the **primary contributor to the discovery of massive silver, gold, copper and nickel deposits**, and the development of major mineral and timber resources in subsequent decades. Most recently, due to under-utilization of the rail line, the Ontario government has announced its plan to divest the assets of the Ontario Northern Railway Commission, including the passenger train service, rail freight, and telecommunications system. This divestiture and potential service termination will likely have important implications for the economy and communities of Northeastern Ontario.

The Northwestern Ontario study area is primarily **served by two east-west oriented rail networks**. As shown in Figure 8-1, the **Canadian National Railway (CN)** mainline runs northeast from the Ontario-Manitoba border towards Nakina; then southeast, crossing the Canadian Pacific Railway (CP) mainline near Sudbury; and on to southern Ontario, making connection to markets in the US and eastern Canada.

The **CP** mainline runs from the **Ontario-Manitoba border in a southeast direction** to the Port of Thunder Bay. It then follows the north shore of Lake Superior in a southeasterly direction to Sudbury and on to southern Ontario, making connection to markets in the US and eastern Canada.

The CN and CP mainlines serve as **two parallel east-west rail corridors** in Northwestern Ontario, with **no interchanges along the entire 1,600 km section between Winnipeg and Sudbury**.

In addition to these mainlines, there is a **CN secondary line** which enters Canada at Rainy River, routes through Fort Frances and Atikokan to Thunder Bay. It then interlines with CP immediately east of the City of Thunder Bay. North-south rail connection is limited in the study area, with only a secondary line running between Hearst and Sault Ste Marie via Wawa, previously known as the Algoma Central (AC) Railway. This north-south line was purchased by CN in 2001 and is now **operated as part of CN's Eastern Division**.

Historically, another north-south secondary line, known as the **CN Kinghorn Subdivision**, connected the Current River Junction in Thunder Bay to the Longlac Junction (via Nipigon). This subdivision was decommissioned in 2004. Efforts have been made by the Municipality of Greenstone to re-open this rail line as an independent short line. To date, line remains closed. Currently, a **proposed Kinghorn Rail-to-Trail Project** is underway to convert the decommissioned 111 km rail line to a multi-use recreational trail.

The former **CN Graham Subdivision** which ran from Thunder Bay northwest to the CN Superior Junction, about 20 km east of Sioux Lookout, was converted to a log haul road in the mid to late 1990's.

The **Franz Subdivision** currently provides rail access to Thunder Bay via transfer from the CN to the CP mainline.

Figure 8-1

Existing and Proposed Infrastructure in Study Area

As shown in Figure 8-1, **mining projects located close to or south of the CN mainline are well connected**. Access to either the CN or CP mainlines could be built by a dedicated short line or access road to the closest provincial highway. Mining projects located north of the CN mainline will require more **road/rail infrastructure to connect to the mainline network**. To achieve the lowest shipping costs, these mines will most likely desire a connection to the CN mainline which will serve as their major transport route going either east or west depending on the supply/commodity origins and destinations.

Since there is **no direct north-south rail connection to the Port or City of Thunder Bay** from the CN mainline, mining supplies and commodities will tend to bypass the Thunder Bay area unless it serves as a processing site for the mines, or unless the port offers a significant cost advantage for shipments going in and out of the St. Lawrence Seaway. **One option to provide this north-south rail connection is to re-establish the Kinghorn Sub as** a short line railroad as previously proposed by the Municipality of Greenstone. This would provide the direct connection between the Ring of Fire and the Port of Thunder Bay. **Another option being considered is to re-establish the former CN Graham Sub** to carry iron ore out of Lake St Joseph in the Pickle Lake area.

"***If people want to see new infrastructure … we are going to have to raise the revenue***"

Kathleen Wynne
Premiere Designate
Toronto Star, Jan. 30, 2013

8.1.2 Road Network

Provincial **Highways 11 (Hwy 11) and 17 (Hwy 17)** are the **two primary highways** serving Northwestern Ontario. Hwy 11 traverses the southern part of the study area from Minnesota State Hwy 72 at the west end (Rainy River), through Thunder Bay along the north shore of Lake Superior to Nipigon. From Nipigon, the highway runs northeast along Lake Nipigon, meets the CN main rail line at Longlac, and continues eastbound to North Bay and beyond. In Thunder Bay, Hwy 11 and Hwy 17 are co-located between Shabaqua Corners and Nipigon, and form part of the Trans-Canada Highway system which connects Northwestern Ontario to Southern Ontario and western Canada.

Hwy 17 is the primary route of the Trans-Canada Highway through Ontario, beginning at the Manitoba border west of Kenora. The (predominantly) 2-lane highway is located in close proximity to the CP main rail line between the Ontario/Manitoba border and White River Juntion, from which the route proceeds south to Sault Ste Marie and east to Sudbury and beyond. The speed limit on 2-lane Provincial Highways is generally 80 km/h in rural areas and 50 km/h in urban areas. On rural portions of the Trans-Canada Highway and on certain other highways in Northern Ontario, the speed limit is 90 km/h.

A number of **secondary highways**, numbered from 502 to 673, connect towns and remote areas to larger towns and major highways. Most secondary highways in the study area are **oriented in a north-south direction** and provide connections between Hwy 11 and Hwy 17. Most segments of these highways are paved 2-lane roads, although a few segments remain gravel-surfaced. The speed limit on nearly all of these highways is 80 km/h, although Highway 655 is posted at 90 km/h (north of Timmins). In addition, a small number of **tertiary highways**[20], numbered 801 to 811, provide connections between secondary highways and provincial highways. Most of these roads are low-standard 2-lane gravel-surfaced roads, typically with a speed limit of 80 km/h. Most of these roads served initially as resource access roads in the remote areas of Northern Ontario, and were later upgraded to secondary highway standards.

Connections to the USA

There are three road-based international border crossings between Canada and the USA within Northwestern Ontario. All three points of entry are located between the Ontario/Manitoba border and Thunder Bay**.** The three border crossings are located at Rainy River/Baudette, Fort Frances/International Falls and Pigeon River/Grand Portage. All of these border crossings are over bridges.

The **Rainy River/Baudette** border crossing is served by the two-lane International Bridge located over the Rainy River, connecting Hwy 11 to Minnesota State Hwy 72 (MN 72). Being a 24-hour per day port of entry, it is primarily used by private vehicles with little commercial traffic.

The **Fort Frances/International** Falls border crossing is the busiest in Minnesota and one of the 5 busiest of all crossings between Canada and USA in Northwestern Ontario. This crossing is served by the privately owned and tolled International Bridge across the Rainy River. The bridge connects Hwy 11 with US Route 53/71. The crossing operates 24 hours daily and is heavily used by local residents and vacationers, trucks and commercial vehicles. The **emergence of mining activities in the Emo area will likely give rise to higher traffic volumes at this crossing**.

The **Pigeon River/Grand Portage** border is the closest US crossing to Thunder Bay. Served by the Pigeon River International Bridge crossing the Pigeon River, the crossing connects Ontario provincial Highway 61 to Minnesota State Highway 61 (MN 61). Operating 24 hours daily, it is the **prime connection between the Hwy 11 and Hwy 17 to Minnesota** and beyond, an area **rich in mining activities**.

Winter Road Network

The winter road network in Northwestern Ontario **extends north in three sections from the communities of Red Lake, Pickle Lake, and Nakina (Greenstone**). The road network is constructed each year and is **open for a period of one to three months** depending on the weather. Depending on local conditions, some sections of the road may not open at all. As shown in Figure 8-2 below, the winter road system **provides seasonal access to the provincial highway system to 23 remote First Nations communities, some mines and mining exploration activities to the north**. The road system is jointly funded on an annual basis by the Province of Ontario and the Government of Canada. Along some segments, tolls are levied on private users (including mining companies) to offset operating costs.

[20] In Ontario, highways and roads have the same legal meaning.

Due to global climate change, the **reliability of the winter road system in Northwestern Ontario has become increasingly uncertain**. Due to the uncertain opening date and shorter operating season, remote communities and mining operations are becoming increasingly reliant on the more expensive air transportation for both passenger travel and freight. Initiatives are currently underway for the **long term transition of the winter roads to an all weather road system**. This includes planning for road realignment to higher grounds to reduce water crossings, and the construction of bridges and culverts where most critical.

Table 8.1

Winter road Connections to First Nation Communities in Northwestern Ontario

North of Red Lake	North of Pickle Lake West		North of Pickle Lake East	North of Nakina
Pikangikum	North Caribou Lake	Wapakeka	Eabametoong Lake	Eabametoong Lake
Poplar Hill	Muskrat Dam	Wawakapewin	Neskantaga	Neskantaga
Deer Lake	Bearskin Lake	Kasabonika	Webequie	Webequie
North Spirit Lake	Sachigo Lake	Kingfisher Lake	Nibinamik	Nibinamik
Keewaywin	Kitchenuhmaykoosib Inniniwug	Wunnimun Lake		Marten Falls
Sandy Lake				
Koocheching				

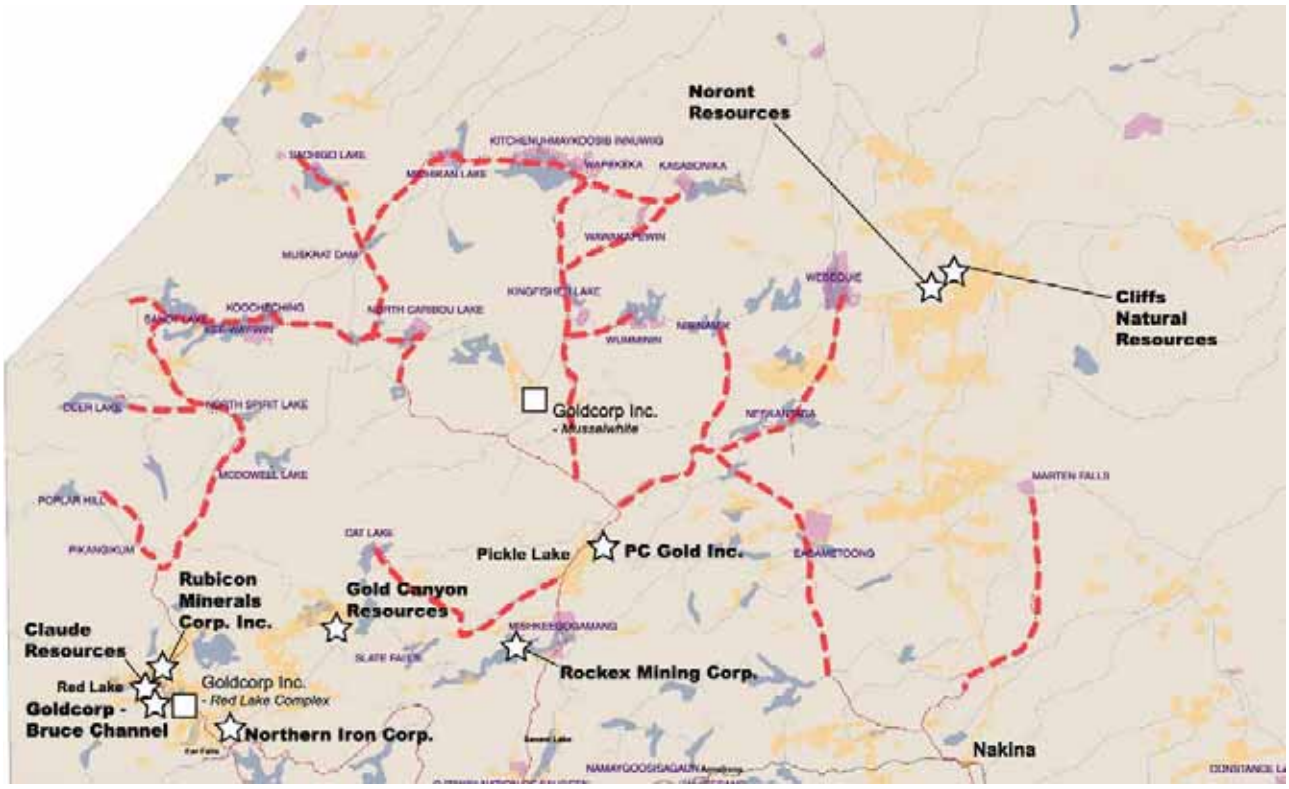
Note: Marten Falls First Nation is connected through Nakina; Eabametoong First Nation is also sometimes connected through Nakina

"When you get the infrastructure there, it will open up the opportunity for all other (mining) companies as well"

Chris Hodgson
President, Ontario Mining Association

Figure 8-2

Winter Roads in Northwestern Ontario



Source: Hoshizaki Development Consulting, Jan 2013

Roads and highways are typically used for the "first mile" and "last mile" of freight haul. Roads often serve to connect shippers, receivers and intermodal yards to the primary higher-capacity transport mode (rail or port). As discussed earlier, due to their remote location and distance from the provincial highway and rail system, **mining projects in the northern part of the study area will require significantly more infrastructure to make all-season connections to the road/rail networks in the south**. Depending on the type and volume of commodities being shipped, dedicated access roads might need to be constructed by individual mine operations to ensure a reliable supply, re-supply and shipping route to the closest rail, port or processing facility. Although **winter roads have historically been used for mining supply and re-supply, it is generally recognized that seasonal infrastructure is unreliable as a primary transportation route year round**. Reliance on winter roads is also becoming increasingly more expensive as operating seasons become shorter, increasing reliance on air transportation for supplies.

8.1.3 Marine Infrastructure

The St. Lawrence Seaway

The St. Lawrence Seaway System (the Seaway) is a **system of locks, canals and channels** that provides lake vessels and ocean-going vessels marine access between the Atlantic Ocean and the Great Lakes, as shown on Figure 8-3. In 2011, there were 4,227 trips made through the Seaway system, consisting of lake freighters (82% by tonnage) and ocean-going ships (18% by tonnage). Seaway Locks 1 through 7 and the Welland Canal (Lock 8) restrict vessel size to a maximum length of 225m long, a maximum width of 24m wide and a maximum draft (depth) of 8m. Most lake freighters travel between all ports along the Seaway, carrying Canada-US imports and exports. Ocean-going ships typically only travel between Seaway Lock 8 (Welland Canal) and the Atlantic Ocean, carrying freight to and from Europe and the Middle East. Typically freight shipped on the Seaway consists of mostly bulk cargo (96%), including iron ore (24%), grain (22%) and coal (10%), as shown in Table 8.1.

Table 8.2

Commodity Mix on the St. Lawrence Seaway, (2011)

Commodity	Tonnes/Yr	Percent of Total
Iron Ore	**8,841,856**	**24%**
Grains	8,613,271	23%
Manufactures and Misc.	7,693,054	21%
Other Mine Products	7,101,417	19%
Coal	3,739,848	10%
General Cargo	1,492,756	4%
Containers	36,702	0.1%
Agriculture Products	20,708	0.06%
Total	37,539,610	100%

Source: The St. Lawrence Seaway Traffic Report , 2011 Navigation Season

Figure 8-3

St Lawrence Seaway and the Great Lakes System

Source: Canadian Geographic Magazine, January 2009.

The Great Lakes System

Many Canadian and US ports located on the Great Lakes System are connected to the Atlantic Ocean by the St. Lawrence Seaway. Freight is also hauled directly between a number of ports within the Great Lakes System. Compared to the Seaway, larger lake freighters can navigate within the Great Lakes System since there are only size restrictions at the Soo Locks (Lock 9 at Sault Ste Marie). Vessels can be up to 365 m long and 33.5 m wide, but are restricted by Lock 8 in Buffalo, New York to connect to the Seaway as discussed earlier. Most of the lake freighters are used to transport bulk goods between Canadian and US ports along Lakes Superior, Michigan, Huron and Erie. **Currently, there is no container service at any of the Great Lakes Ports**[21]. Several container services have been tried, but all have failed for a variety of reasons. This could **serve as a limitation to the transport of mining supplies to, as well as mining ores and concentrates from, Northwestern Ontario**. Another limitation is the **seasonality of the Seaway and Great Lakes System**. The Seaway is closed from the end of December to the middle/end of March, with an average operating window of 282 days in a year. **Shipments going in and out of the Seaway and the Great Lakes must be transported by rail outside of this window.** Alternatively, materials can be stockpiled at a storage facility at the ports, the mine sites or trans-shipping locations, for marine haul once the shipping window opens.

Port of Thunder Bay

The Port of Thunder Bay is **located at the northern end of Lake Superior**, making it the most western Canadian port along the Great Lakes System. Cargo throughput at the port has dropped significantly since the late 1980s[22]. One reason for this decline is that the former Soviet Union,

[21] While container shipments are not common for transporting mining products, Cliffs Resources (as an example) are considering using containers for shipping chromium ore products from their mine site to the proposed smelter at Carpeol and beyond. This is also discussed in Section 8.2.2.

[22] Since the late 1980's, cargo throughput at the Port of Thunder Bay has dropped from 23 million tonnes/year to 7.6 million tonnes in 2011. The total number of ships has dropped from 1,470 to 390 per year.

once the biggest customer for Canadian grain, broke up and started exporting grain rather than buying it from Canada. At the same time, the Pacific Rim became a main importer of Canadian grain, resulting in more grain transport going through the west coast. Increased competition by rail transport, primarily north-south to the US, might also be a factor leading to the reduced throughput at the port. Today, grains make up most of the cargo throughput from the port (82% by tonnage), followed by coal (11%)[23] and other bulk goods (see Table 8.2).

The Thunder Bay port has a total "dry bulk" capacity of 11 million tonnes/year at the two bulk terminals – Thunder Bay Terminals Limited and Valley Camp Inc. In 2011, only 1.2 million tonnes were shipped, leaving an unused capacity of 89% (see Table 8.3). **In anticipation of mining development in Northwestern Ontario, opportunities exist to increase commodity handling at the port for mining exports, as well as imports of supply and heavy equipment into Northwestern Ontario**. The Port Authority's **Keefer Terminal** is served by both CP (eastbound and westbound) and CN rail (to/from Western Canada). CN has a transload facility in Thunder Bay, allowing shippers to transfer goods readily between road and rail. The facility currently handles 50 rail car loads per week, with **ample capacity to handle more traffic** as demand increases. The Thunder Bay Port Authority hosts the former CP **intermodal facility**, with two tracks for loading and unloading truck trailers. This facility is in place and could be revamped to handle new ore cargo by utilizing existing track capacity.

The City of Thunder Bay and the Port of Thunder Bay estimate that there is a **freight cost advantage of approximately 40% over Sudbury for ore shipments** to US water-served steel mills in Detroit. The cost advantage regarding shipments to Europe (Hamburg, Germany) is also estimated to be **3.7% lower than Sudbury** [2].

The Keefer Terminal recently **acquired a $3 million Liebherr LHM Mobile Harbour Crane,** built in Austria and assembled on-site. The crane was acquired in July 2012 and made its inaugural lift in August 2012. The new mobile crane is 60 metres tall and capable of lifting more than 100 metric tonnes including containers, pipes, steel products and a variety of other shipping cargo. With a life expectancy of 20 years, the Thunder Bay Port Authority plans to use the crane as a means to **increase inbound cargo to Keefer Terminal, as well as to enter into new markets**. The Port Authority's new target clients include large oil companies (i.e. Suncor and Husky), wind generator manufacturers, and many other companies intending to ship cargo to the west end of Lake Superior. Crushers, ball and sag mills, and mine track may be ideally suited as future inbound cargo to the Thunder Bay port, for new mine/mill construction components and equipment.

[23] Another reason for the port throughput decline could be related to the decision by the Ontario Government to phase out coal. A portion of the coal used in southern Ontario was low sulpher western Canadian coal.

Table 8.3

Thunder Bay Port Authority - Commodity Mix 2011

Commodity	Tonnes/year	Percent of Total
Grain	6,267,457	82%
Coal	831,166	11%
Potash	217,316	3%
Other Dry Bulk	158,283	2%
Liquid Bulk	117,157	2%
General Cargo (Wind Mills)	17,313	0.2%
Total	7,608,692	100%

Source: Thunder Bay Port Authority website and cargo statistics

Table 8.4

Thunder Bay Port Authority - Current Bulk Cargo Throughput and Capacity

Commodity	Tonnes/year	Percent of Capacity
Dry Bulk Throughput 2011*	1,206,765	11%
Dry Bulk Capacity	11,000,000	100%
Unused Capacity	9,793,235	89%

** Dry bulk cargo includes coal, potash and other dry bulk shown in Table 2.*

Source: Thunder Bay Port Authority website and presentation.

Other Ports in the Thunder Bay Area

In addition to the Thunder Bay Port Authority, a number of other **deep water marinas** exist along the north shore of Lake Ontario with varying cargo capacities. With the exception of Wawa, all of these marinas are associated with former or current forestry sector operations.

Nipigon: The Nipigon Marina is the most northerly freshwater port in North America, with a deep water channel connecting to/from the fully serviced marina. Located in the heart of the freshwater marine conservation area, the marina is currently used by recreational cruisers and trailer boaters.

Red Rock: The Red Rock Marina is in the secure freshwater harbour of Nipigon Bay, with deep water access from the Simpson Channel. The marina has **three docks with a capability of docking 82 vessels**, and an entrance depth of 3 meters (9'8") up to and along the fueling peninsula.

Marathon: Marathon has a deep water harbour and commercial dock at the former pulp mill site. In light of the recent **mining activities in the area** (the Barrick Gold and Marathon PGM deposits), a **number of companies have expressed interest to purchase the 13-acre site for commercial and industrial redevelopment**.

Wawa: At the natural river mouth connected to Lake Superior, Wawa is home to two deep water marinas. The Michipicoten Harbour was used extensively by Algoma Ore to ship iron to market until the late 1990s. The harbour is 22 1/2 feet deep, with a wharf area of about 1,500 feet long and 300 feet wide. **Up to one-third of the wharf area may become available for commercial use**. The existing dock is a wooden faced heavy timber structure which is 8 feet above datum. There is a trucking corridor to the dock.

Located inside the junction of the Magpie and Michipicoten Rivers, the Harry McCluskie Memorial Marina provides docking facilities for 97 slips (40 slips with water and electrical hookups). The marina can accommodate pleasure craft up to an 80 foot length. A picnic shelter, water supply, clean washrooms and showers, sewage pump out, and fuel are available on site.

8.1.4 Airports

Thunder Bay International Airport

Originally named the Fort William Municipal Airport, construction began in 1938. During World War II, the airport was home to the No. 2 Elementary Flying Training School, part of the British Commonwealth's Air Training Plan. The airport was also used as a base for test flights of fighter aircraft built at the nearby Canadian Car and Foundry factory (now Bombardier). The latest major renovation occurred in 1994, with the construction of a new airport terminal building, including two jetways, a food court, a gift shop and an arcade. In 1997, ownership and operation of the airport was handed over from the provincial government to the Thunder Bay International Airports Authority.

The Thunder Bay International Airport (TBIA) is the **largest airport in Northern Ontario**, and one of the 26 airports in Canada's National Airports System. With **761,623 passengers in 2012**, the airport has the **third largest passenger traffic in Ontario** [3]. The airport has scheduled service to Toronto, Winnipeg, Calgary, Edmonton, Sault Ste. Marie and Chicago (effective February 2013). It serves as the regional hub for scheduled flights to/from the regional and local airports throughout Northwestern Ontario, as well as charter flights throughout the study area. TBIA is the hub for air transport of mining personnel to the operating mine at Musselwhite (Goldcorp Inc.), and is expected to serve the same function for future mining operations.

The airport currently contributes **$500 million in economic activity** to the economy of Northwestern Ontario. It also supports 5,000 jobs in the local community and almost **15% of Thunder Bay's GDP** [4]. Airport surveys show that the **mineral sector is the largest user of the Thunder Bay Airport**, among all other industry sectors.

The airport is home to the **Thunder Bay Solar Park**, one of the first solar projects in North America on airport lands. Built in collaboration with the Thunder Bay International Airport Authority, this **8.5 MW project produces enough clean energy to power approximately 15,000 homes over the life of the project**. It was recognized as a **2012 Intersolar Project Award Finalist for top solar project in North America,** and is responsible for creating over 100 direct and many additional indirect jobs for the Thunder Bay community.

Recently, the Airport Authority received approval for $1 million funding from the Northern Ontario Heritage Fund Corporation (NOHFC) to build an extension to the aviation-related industrial park located at the airport, including an expanded taxi way (to accommodate larger aircraft) and connecting roads. This project will accommodate new tenants and create employment for up to 270 full-time people within 10 years. **Expanding industrial parks and facilities at the airport site will provide the required base logistics support, storage and business services for the expected increases in mining activity in the region[24].**

Other Airports in Northwestern Ontario

Table 8.5 shows a selected list of airports in the study area **supporting mining development** in Northwestern Ontario. With the exception of the mines in the Ring of Fire (Cliffs, Noront Resources and KWG/Canada Chrome), most **mining projects are within 50 km of an existing airport**, making air transport of labour and other resources accessible to all mine operations. Most of the existing airports and aerodromes are all-weather and asphalt-surfaced.

[24] It should be noted that the TBIA Authority also operates the Red Lake Airport.

For the remote mining sites in the **Ring of Fire area**, **aircraft landing strips have been built by the mining companies at Koper Lake and McFaulds Lake** as winter ice landing strips. Muketi River (recently permitted) is the only all season strip in the Ring of Fire and is controlled by Marten Falls First Nation. Selected airports and aerodromes in study area are summarized in Table 8.5.

Table 8.5

Selected Airports and Aerodromes in Study Area

Airports	Type*	Runways	Surface	Aircraft Movements	Nearby Mines
Thunder Bay	National Airport	2	Asphalt	96,712 (2011)	Magma Metals
Sioux Lookout	Municipal Airport	1	Asphalt	30,133 (2011)	Treasury Metals, Rockex Mining
Red Lake	Municipal Airport	1	Asphalt	28,189 (2011)	Rubicon Minerals, Goldcorp Bruce Channel, Claude Resources
Pickle Lake	MTO (provincial) Airport	1	Asphalt	22,522 (2011)	PC Gold, Rockex Mining
Kenora	Municipal Airport	1	Asphalt	16,488 (2011)	Coventry Resources
Dryden	Municipal Airport	2	Sand/Asphalt	15,601 (2011)	Treasury Metals
Fort Frances	Municipal Airport	1	Asphalt	6,275 (2011)	Rainy River Resources
Atikokan	Municipal Airport	1	Asphalt	N/A	Osisko Mining, Bending Lake Iron
Marathon	Municipal Airport	1	Asphalt	N/A	Hemlo Mines Stillwater Canada
Garaldton	Municipal Airport	1	Asphalt	N/A	Premier Gold Mines
Webequie	MTO (provincial) Airport	1	Gravel	N/A	Noront Resources Cliffs Natural Resources Ring of Fire
Ogoki Post (Marten Falls)	MTO (provincial) Airport	1	Gravel	N/A	Ring of Fire

Source: Canadian Flight Supplement and Statistics Canada

**Municipal Airports are defined as public airports that serve local/municipal needs, and provide a socio-economic contribution, regardless of ownership structure, although most are municipally owned (Source: Ontario Municipal Airports Data Collection Study, 2011 Update)*

8.2 Mining Transportation Activities

An **efficient and cost-effective multi-modal transportation system is critically important for goods moving in and out of the mining areas of Northwestern Ontario.** Freight logistics and supply chain efficiencies will determine the location of production and distribution activities, the flow of supplies, mined products, and related transport services.

The **Ministry of Transportation Ontario** (MTO) is currently undertaking a **multi-modal supply chain study** of the "**Transportation Requirements for Economic Development in Northern**

Ontario". One objective of this study is to provide a comprehensive examination of the supply chain and commodity flows for each major industry sector (mining, agriculture, manufacturing, forestry and tourism) in Northern Ontario, based on key transportation needs and constraints.

The findings from this study will help define priority areas of transportation planning and infrastructure development in Northwestern Ontario. This MTO study will not be complete until the Spring of 2013, following finalization of this Strategy.

In light of the above, the following sections provide an overview of mining transportation activities in the study area. Mining projects have been grouped into three categories based on commodity type, mine life and unique transportation requirements.

8.2.1 Precious Metals (Gold, Platinum and Palladium)

Gold, platinum and palladium producers can be grouped into the same category in terms of transportation activities for the following reasons:

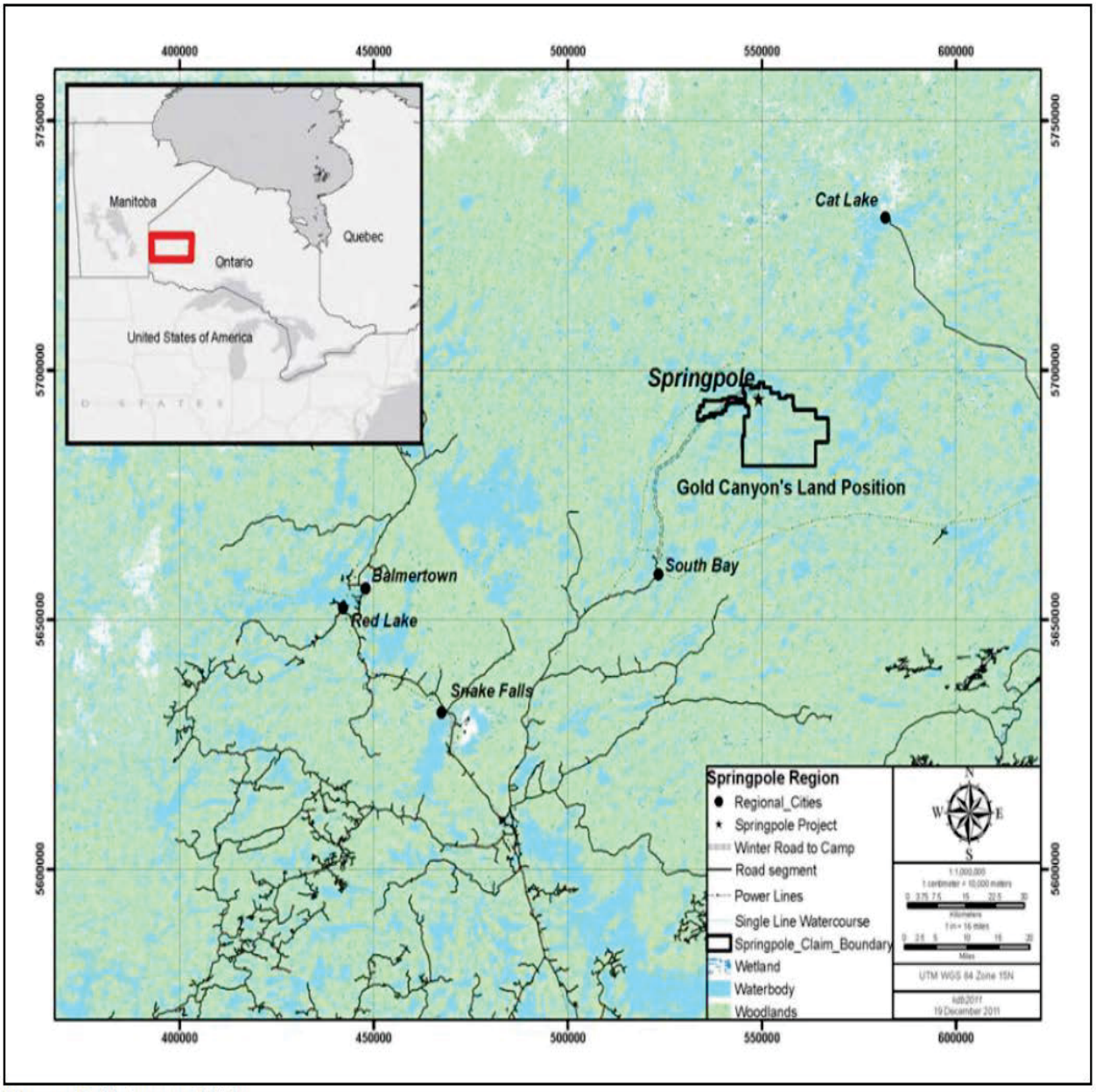
- Low-weight and high-value final products, **usually shipped out by air**
- **Shorter mine life (7-15 years)**
- **Equipment and re-supply by road, ports and airports**
- Mostly exports to US and international destinations

Thunder Bay currently serves as the "hub" for a number of operating gold, platinum and palladium mines, including the Lac de Iles Mine (North American Palladium), the Musselwhite Mine (Goldcorp Inc.) and Red Lake (Goldcorp Inc.). Many other gold mines are in advanced exploration stages, with expected production starting in 2015 and 2016. Supply and transportation activities in and out of these mine sites will depend on the stage of exploration/production, the size of the mine, and the proximity to existing infrastructure.

For mines with no existing airports in the immediate vicinity, driving to the "end of the road" is often a preferred strategy due to the lower cost involved. As an example, the **Springpole Gold Project** (Gold Canyon Resources), one of the projects included in column 4 of Table 4.1, is in a relatively **remote location with no all-season road access and no airstrip within 50 km of the mine site**. The majority of supplies to the site are delivered through Red Lake, the closest community to the mine site, located 110 km to the southwest. The nearest emergency medical facilities are located at the Margaret Cochenour Hospital in Red Lake, and the nearest major cities are Winnipeg (370 km to the southwest) and Thunder Bay (380 km to the southeast). The **project site is accessible by float-plane** during late spring, summer, and early fall. **All fuel, food and material supplies are flown in from Red Lake, Pickle Lake**, **or from Winnipeg, Manitoba**, with flight distances of 110 km, 167 km and 370 km respectively. The closest road access at present is the landing near Confederation Lake, approximately 50 km away by air (see Figure 8-4). During winter, when weather permits, an **85 km ice road is constructed** from the landing near Confederation Lake to the Springpole Lake Camp. During spring break-up and fall freeze-up, access to the site is by **helicopter.** During the winter 2011 drill season, a 1 km airstrip was also constructed on Springpole Lake for personnel and food supplies to the camp via light planes on wheels or skis.

Figure 8-4

Springpole Gold Project Location Map



(Source Gold Canyon 2011)

Table 8.6

Gold, Platinum and Palladium Projects in Study Area

Mining Project	Nearest Community	Nearest All-Weather Road	Approximate Cost *
PC Gold Inc.	Pickle Lake	Hwy 599 (15 km)	$.5M
Gold Canyon Resources	Red Lake	Hwy 105 (123 km)	$123M
Rubicon Minerals Corp.	Red Lake	Pine Ridge (0 km)	
Claude Resources	Red Lake	Hwy 105 (8 km)	$8M
Goldcorp Inc. (Bruce Channel)	Red Lake	Hwy 599 (0 km)	
Treasury Metals	Dryden	Hwy 72 (2 km)	$2M
Coventry Resources	Sioux Narrows	Hwy 71 (40 km)	$40M
Rainy River Resources Corp.	Black Hawk	Hwy 600 (15 km)	$15M
Osisko Resources	Atikokan	Hwy 622 (16 km)	$16M
Magma Metals	Thunder Bay	Trans-Canada (26 km)	$26M
Premier Gold Mines	Geraldton	Eldee Rd. (11 km)	$11M

**Note: Based on estimate the "Mining in Northwestern Ontario Opportunities and Challenges" Report [5] of $1M/km for construction of all weather roads. We believe this is a reasonable estimate for upgrading existing winter or logging roads. The most recent estimated cost for construction of the access road to the Ring of Fire is, however, $3.1M/km [6].*

Many of the precious metal mining projects are located within 50 km of the existing all-weather road network in the study area, as shown in Table 8.5.

Most gold and platinum products from Ontario (unrefined and semi-manufactured) are for export to off-shore markets. As shown in Table 8.6, 70% of unrefined gold is destined to Europe (United Kingdom and Switzerland), 22% to the US and 7% to Asia (Hong Kong and China). 61% of unrefined platinum goes to the United Kingdom and 39% to the US. Almost all semi-manufactured gold and platinum products are destined to the US. Due to their high value and low volume characteristics, **most gold and platinum products are transported by air.** In 2009, Canada **exported $40 billion worth of products by air,** of which $9 billion (or 22.5%) was **gold** and precious metals.

Table 8.7

Gold and Platinum Exports from Ontario, 2011

Commodity	Major Destination	Value in CAD	Percent of Total Export
Unrefined			
Unwrought Platinum	United Kingdom	$7.9 M	61%
	United States	$5.2 M	39%
Unwrought Gold	United Kingdom	$11.3 B	68%
	United States	$3.6 B	22%
	Hong Kong	$1.0 B	6%
	Switzerland	$0.43 B	3%
	China	$0.15 B	1%
Semi-Manufactured			
Semi-Manufactured Platinum	United States	$13.5 M	99%
	Mexico	$0.1 M	1%
Semi-Manufactured Gold	United States	$45.4 M	99%
	Other	$0.3 M	1%

Source: Industry Canada - Trade by Products

8.2.2 Chromite and Iron

Chromite and iron are **similar in terms of transportation characteristics** for the following reasons:

- Large quantities of bulk concentrates**, requiring heavy haul by rail**.
- **Longer mine life (30-35 years), making investments in road/rail infrastructure feasible over the project operational phase**.
- Chromite ore, being a new commodity to Canada and North America, requires **new concentration and smelting facilities to be built and strategically located.**
- Iron ore transport is heavily dependent on the St. Lawrence Seaway for Canada-US refinement and trade.

Located near the shores of McFaulds Lake, about **550 km northeast of Thunder Bay**, the Black Thor and Big Daddy deposits (both majority-owned by Cliffs Natural Resources) are the **most advanced chromite projects in the Ring of Fire area.** The Black Thor project, expected to go into production in 2017-18, will require $3.3 billion in capital investment for mining development, infrastructure and a new Ferrochrome Production Facility (FPF).

Cliffs Natural Resources has identified the **need for a 340 km all-weather road**, connecting the mine site to production facilities and their market. At this time, the company has conducted studies which **recommend a north-south road corridor**, connecting the mine site to a transload facility to be located at the CN Cavell junction, just west of Nakina (near Geraldton). It is expected that concentrate would be transported by rail from Cavell to either the Ferrochrome Processing Facility (FPF), expected to be located at Capreol, 25 km north of Sudbury, for processing, or to a port for export via bulk marine transportation.

A port location has not been identified at the time of this Strategy. However, given the preferred north-south orientation for the all-weather road from the mine site to Cavell, the port is likely to be located to the east of Cavell and Sudbury, somewhere on the St. Lawrence Seaway system with intermodal transfer facilities from the rail line.

The **location of the $1.8-billion FPF is a key decision in servicing the mining development** at Black Thor and other upcoming mining projects within the Ring of Fire. With the FPF planned to be located at Capreol, near Sudbury, the **southerly and easterly commodity flow from the mine site will essentially by-pass the Thunder Bay City and Port area**. A key consideration for Cliffs Natural Resources in selecting the Capreol FPF site might be the established industrial infrastructure (in terms of land use, transportation, labour supply and other factors) in the Greater Sudbury area. The road/rail transport routing to Sudbury and east may also be more favourable for container shipments, compared to the Thunder Bay Port Authority which has no container handling facilities at this time.

Three major iron exploration projects are located in the study area -- the **Lake St. Joseph** deposit (Rockex Mining Corp), the **Bending Lake** deposit (Bending Lake Iron Group) and Griffith Mine (Northern Iron Corp).

The **Lake St. Joseph iron ore deposit** is located approximately 100 km northeast of Sioux Lookout and 80 km southwest of Pickle Lake. The property is currently accessed via a logging road off Highway 516, about 30 km northeast of Sioux Lookout. The gravel road continues northwards for 75 km to the south shore of Lake St. Joseph. It takes about 2.5 hours to drive from Sioux Lookout to the camp site. Existing rail access is about 80 km from the mine site to the CN mainline and 160 km to the CP mainline. In either case, a **new spur line would be required for regular, year-round access to and from the site**. **If a direct connection is desired between the CN mainline and the Thunder Bay Port Authority, it would be logical to restore the old CN Graham Subdivision to facilitate mining development and transport from the Lake St. Joseph area**.

"Industry will not invest in words and talk"

Chief Belrose
Mushowekwan First Nation

The **Bending Lake iron deposit** is located in the Kenora Mining District, approximately 285 km northwest of Thunder Bay (the closest port for seaboard access), 49 km southwest of Ignace (along Highway 17 and the CP mainline) and 80 km north of Atikokan (along Highway 11 and the CN secondary line to Winnipeg and western Canada). The **site is readily accessible by a system of logging roads** off Highway 622 with connections to Highways 11 and 17. Based on the company's current market assessment, **Bending Lake will be concentrating their ore to the production of iron pellets at site, producing 4 million tonnes of pellets annually**, starting in 2016-17. Future plans include the conversion of iron ore to value-added nuggets (merchant pig iron). This will depend on the results of the company's commercial plant under installation in Minnesota and adaptability of the technology to raw materials. Based on current studies and on-going engineering and permitting evaluations, the mine, concentrating plant and pelletizing plant

will be located at sites near the Bending Lake deposit and close to utilities, railroad and highway infrastructure connections.

Northern Iron Corp controls the Griffith Mine and Karas property at Ear Falls, and plan to produce hot briquetted iron (HBI). 500 million tones of historic tonnage is known.

Integrated steel plants are located wherever it is economically feasible to bring together large quantities of required raw materials. The biggest steel processing plants in Canada have been built at locations along the Great Lakes and St. Lawrence Seaway System, locations to which iron ore from Northern Ontario, Québec, Labrador, Minnesota, Wisconsin and Michigan, and coal from Pennsylvania, West Virginia and Kentucky can be transported most economically. Also, they are located near the market for steel product, close to the heavy concentration of steel-using manufacturers in Southern Ontario, such as the automobile manufacturing plants. **In 2011, iron ore transport accounted for 24% of the total traffic on the St. Lawrence Seaway** (see Table 8.1). In Ontario, iron ore exports totaled $34 million in 2011, with half going to the US and half going to China and Hong Kong (see Table 8.8).

Table 8.8

Iron Ore Exports from Ontario, 2011

Major Destination	Value in CAD	Percent of Total Export
United States	$16.9 M	50%
China	$14.2 M	42%
Hong Kong	$2.9 M	0.9%
Total	**$34 M**	**100%**

Source: Industry Canada - Trade by Products

As the iron mines develop in Northern Ontario, the Thunder Bay Port Authority will likely play a bigger role in the transport of iron ore and related iron and steel products along the St. Lawrence Seaway.

8.2.3 Copper and Nickel

Copper and nickel, **commonly occurring in the same ore deposit types** in Canada, are grouped together in terms of transportation activities for the following reasons:

- Large quantities of bulk concentrates, **requiring heavy haul by rail**
- **Shorter mine life compared to chromite and iron** (**10-15 years), making investments in road/rail infrastructure less feasible**
- **Existing smelters in Northern Ontario**; less reliance on marine transport for bulk concentrate shipments

The Eagle's Nest Nickel-Copper-PGM mine (Noront Resources) and **Marathon PGM-Copper** mine (Stillwater Canada Ltd) are two advanced exploration projects in the study area. The Eagle's Nest mine is located at McFaulds Lake in the Ring of Fire area. **The mine has a forecast 11 year mine life, and is planned to produce 150,000 tonnes of nickel-copper concentrate annually** starting in 2016 or 2017. Pre-production capital expenditures are estimated at $600 million, including mine development, on-site processing facilities and on- and off-site infrastructure.

Current Project design includes an on-site underground processing plant to minimize surface infrastructure. Road access to the project initially included an east-west all-weather road to the bWebequie First Nation (the nearest community to the west of the mine site), with upgrades to the existing winter road from Webequie to Pickle Lake for a total length of 275 km of all-weather road construction.

Based on the understanding that the Province of Ontario and Cliffs Natural Resources had committed to building the north-south all-weather road from McFaulds Lake to Cavell, **Noront Resources has now stated their intent to use this north-south Road on a user-pay basis.** Their concentrate would then be shipped to an intermodal transfer facility that would be built at Cavell to facilitate rail haul, either eastbound or westbound depending on the location of the production facility or market destination.

The **Marathon PGM Copper** project is located 10 km north of the Town of Marathon, about 300 km east of the City of Thunder Bay. The **total mineral reserve is estimated to be 91 million tonnes over an 11.5 year mine life.** During the project operations phase, production is expected to be 22,000 tonnes per day. It is intended that the ore will be processed (crushed, ground, concentrated) on-site. It is planned that concentrate products (copper, palladium, platinum and gold) will be transported off-site via all-season road and rail to a smelter and refinery for subsequent metal extraction and separation and at undisclosed location. The project capital cost is estimated at $400 million, with **minimal investment in transportation infrastructure due to its close proximity to Highway 17 and the CP Rail mainline** along the shore of Lake Superior.

There are two existing copper-nickel smelters/refineries in Sudbury [7]. If the Marathon project chooses to use any of these local smelters/refineries, concentrate from the mine will probably be transported eastbound by road/rail to the smelter/refinery, and the final products shipped by rail or marine to their final destination (see Table 8.9 for the copper and nickel exports from Ontario in 2011).

Table 8.9

Copper and Nickel Exports from Ontario, 2011

Commodity	Major Destination	Value in CAD	Percent of Total Export
Copper	United States	$557 M	62%
	Norway	$174 M	19%
	China	$145 M	16%
Nickel	Norway	$2.0 B	41%
	United States	$1.2 B	24%
	United Kingdom	$1.0B	21%
	China	$0.21 B	4%
	Taiwan	$0.15 B	3%

Source: Industry Canada - Trade by Products

For both of these nickel-copper projects, **most of the mined concentrates will probably be transported to the east of Thunder Bay** (therefore by-passing the City or Port of Thunder Bay), for the reasons discussed above. The **opportunities for the City and the Port**, however, might

be in the **supply of equipment and resources to the mine sites**, particularly for the Marathon project which is on the CP rail mainline with direct connection from the port.

8.3 Transportation Infrastructure Strategies

Based on the existing transportation infrastructure and mining transport activities in the study area, the transportation issues and opportunities in the study area are summarized below, under the headings of three strategic areas in the context of the Strategy.

8.3.1 Thunder Bay as a Transportation Hub

- The **Thunder Bay Port Authority, the largest export port in Northern Ontario, is in a strategic location to service mining development in the study area**. The port has a total capacity to handle 11 million tonnes of dry bulk products per year, of which nearly 90% is currently unused.
- Iron ore is currently the largest commodity being handled along the St. Lawrence Seaway. **As the iron mines develop in Northwestern Ontario, the Thunder Bay Port Authority could play a bigger role in the transport** of iron ore and related iron and steel products along the Seaway.
- There is **currently limited north-south connectivity between the CN mainline and the Thunder Bay Port Authority** in the study area. This could be a barrier for Thunder Bay to capture some of the mining transport activities and services, particularly for mines located in the remote north.
- **Currently, there is no container service at the Thunder Bay Port Authority,** or any other ports on the Great Lakes System. Compared to rail and other east coast ports, this **may serve as a limitation to the transport of mining ores/concentrates and mine supplies** into and out of the Northwestern Ontario mining regions.
- **The Port of Thunder Bay**, similar to the St. Lawrence Seaway, has an **average operating window of 282 days per year**, from mid/end of March to December. This **may be another limitation** when competing with year-round transport by rail and other east coast ports.
- **Thunder Bay currently serves as the "hub" for a number of operating gold, platinum and palladium mines**, and **many other gold mines in advanced exploration** stages. In terms of mining personnel flying in and out, the **Thunder Bay International Airport has a competitive advantage** over other regional airports (e.g. Timmins) due to the number and frequency of regional, provincial and inter-provincial connections available. For mines located in the western portion of the study area, Winnipeg could be a serious contender, especially for workers coming from the west.
- For the **transport of supplies and mined products**, driving to the "end of the road" is often a preferred strategy due to the lower cost involved, particularly for mines located in the remote north of the study area. This **may put regional/local airports at an advantage** due to their proximity to the mines (e.g. Gold Canyon being serviced out of Red Lake). In most cases, airlines serving the northern communities and mining projects use a hub-and-spoke system within the region. Wasaya Airways, as an example, uses

Sioux Lookout as the main regional hub for passenger and freight services to 21 First Nation communities in the north, routing through Pickle Lake and Red Lake (the end of the existing roads) depending on the final destinations.

8.3.2 Ring of Fire Road and Rail Infrastructure

- The **lack of transportation infrastructure is recognized as a major obstacle for mining development in the Ring of Fire area**. To bridge this gap, Cliff Resources has proposed a 340 km north-south road corridor to connect its mine site to a proposed transload facility near the CN Cavell Junction (near Nakina). At the same time, Canada Chrome Corporation (a wholly-owned subsidiary of KWG Resources) is proposing a rail corridor along the same alignment, suggesting that a rail corridor, despite a higher initial capital cost (estimated at $1.5 billion for the McFaulds Lake Railroad versus $1 billion for the all-weather road), is expected to result in lower operating costs, higher pay loads and less environmental impacts.
- Regardless of road or rail, this **surface transportation linkage is essential to on-going exploration and development in this remote area**. Financial contributions from the provincial and federal governments will be sought for this "most promising mining opportunity in Canada in a century". Under the appropriate funding and development structure (e.g. via public-private partnership), the road/rail corridor could be developed on a user-pay basis for advancing the various mining projects in the area.
- In addition to mining development, a number of **First Nations communities along the proposed corridor** (e.g. Webequie, Lansdowne House, Fort Hope, Marten Falls/Ogoki and Aroland**) will also benefit** from secondary roads from the north-south corridor into their communities, potentially resulting in employment, business development and electrical transmission.

8.3.3 Mines in the Remote Northwest

- Compared to the Ring of Fire, mines located in the northwest of the study area (north of Red Lake and Pickle Lake) are more scattered and **more sensitive to the remoteness in their location and supply networks**. The Gold Canyon gold mine, as an example, is 110 km away from the closest community (Red Lake), and 85 km from the closest all-weather road by ice road (constructed annually). When the ice road is not operational, site access is via helicopter or float plane from "the end of the road" 50 km away.
- **Winter roads are crucial for on-going mining exploration activity in Northwestern Ontario, particularly for remote locations north of Red Lake and Pickle Lake**. In on-going winter road maintenance programs and future upgrades to all-weather roads, the priorities and staging of these programs and upgrades should consider the needs of the mining projects to reduce transportation costs and to facilitate mining development to the extent feasible.
- In the Northwest of the study area, **many mines are in advanced exploration stages** (e.g. PC Gold, Rockex Iron, Rubicon Minerals and Goldcorp Bruce Channel). As these projects mature, regional **transportation requirements will expand**, including road/rail/marine connections, to bring equipment and supplies in, and ship commodities

out to market. The **upgrade and/or construction of all-weather roads will become critical to serve these mines as they move into the operational stage**.

- The current winter road networks provide seasonal connections to a total of 23 remote communities in Northwestern Ontario. **Extension of the all-weather road network in the remote north would also provide opportunities to connect First Nations communities that are currently reliant on costly winter road and air supply systems.**

8.3.4 New Technology and Future Development

To **meet the transportation requirements for mining projects in remote areas**, a number of technological developments are worth mentioning and could play a key role in the mining supply chain in the coming years.

Combi aircraft

- Combi aircraft is an **aircraft with easily reconfigured bulkheads** to be used to carry either passengers (as an airliner), or cargo (as a freighter), or a combination. This aircraft type is particularly suitable for small airliners that fly to small towns as they can convert empty seats into useful and profitable cargo space. First Air has a number of combi aircraft (Aerospatiale ATR 42 and 72, and Hawker Siddeley HS 748) for flying into the remote communities of NWT and Nunavut.
- While combi aircraft may have an advantage to service the remote community sector, many airlines have recently converted their combis into full passenger service or full freighter service for better profits. Under the appropriate niche markets, **these aircrafts could offer considerable cost savings and flexibility in servicing mining projects in remote areas.**

Airships

- Lighter-Than-Air (LTA) aircraft, also known as airships or dirigibles, are an **emerging technology perceived by some as the solution to transporting cargo and fuel to remote areas.** Unlike aerodynamic aircraft such as fixed-wing aircraft and helicopters, aerostatic aircraft stay aloft by having a large "envelope" filled with a gas which is less dense than the surrounding atmosphere.
- Once fully developed, these aircraft **can carry up to 40 tons of cargo and travel as far as 10,000 km without refueling.** Operating costs are expected to be much less than conventional aircraft, in the range of $0.50 per tonne-km for long range missions and $1.50 per tonne-km for short range missions. In addition, the use of air ships drastically reduces the environmental impact of constructing airstrips in the North.
- If advanced into the production and operational stage, **these airships could provide a lower cost alternative in servicing the mining projects**. The timing of which, however, is uncertain at this time.

The discussion above is based on the information available to the study team at the time of this report, and our understanding of the mining development and commodity flows in the study area. **As mentioned earlier, the Ministry of Transportation Ontario (MTO) is currently undertaking a multi-modal supply chain study of the "Transportation Requirements for Economic**

Development in Northern Ontario". It is anticipated that the findings from this MTO study, when completed, will provide useful information on transportation planning and infrastructure development in the region.

8.3.5 Investing in Infrastructure to Resources

Canada's Economic Action Plan identifies that natural resources account for 15 percent of Canada's gross domestic product (GDP) and 50 percent of its exports. Including spin-off industries, natural resources account for nearly 20 percent of Canada's GDP. Further, natural resources are expected to play a larger role in future. The Economic Action Plan estimates that over the next decade, more than 600 major resource projects, worth over $650 billion are planned in communities across Canada, representing hundreds of thousands of well-paying jobs in every sector of Canada's economy, in every region of the country [9].

The Federation of Canadian Municipalities argues that to compete globally, Canada needs faster, more efficient transportation networks that connect companies to customers, workers to jobs, and communities to international markets. They claim that a lack of long-term funding and coordination among government agencies has allowed critical gaps in Canada's air, rail, road and marine linkages, particularly in rural, remote, and northern areas and communities, preventing critical linkages between that support families and industry, and allow Canada's producers to be reliably connected to distant markets [10].

The Conference Board of Canada estimates that for every $100 million invested in electricity generation, transmission, and distribution infrastructure, real GDP will be boosted by $85.6 million and 1,200 jobs will be created [11].

In its report on infrastructure into Canada's remote northern regions, the Conference Board of Canada's Centre for the North concludes that, *"Overall, addressing the North's infrastructure needs will require a concerted effort involving the public and private sectors. The public sector should take the lead in these efforts by developing a sustained and coordinated transportation strategy that responds to the unique social, economic, and environmental circumstances of the North. But the development of this strategy must engage businesses, communities, and individuals and take into account the many ways transportation infrastructure affects them all."* [1].

Many authorities and agencies have recognized the need to make strategic investments in infrastructure to enhance access to resources and jobs, and to increase private and public revenue streams. Implementation of **the Quebec Plan Nord, one of Canada's best recognized initiatives for creating economic growth through resource development, has led to construction of Route 167. Initially, Route 167 will interconnect the Stornoway Renard Diamond project** to the provincial highway system, resulting in reduced capital and operating costs for the mining company, and providing an economic seed for project development and a road to future resource investment in the areas served by the road. At an estimated capital cost of $332 million, the road is being partially financed by Stornoway Diamond Corporation, to the value of $44 million, paid over 10 years [12].

"*A first for diamond mining in Canada, year round road access will allow Renard to be developed and operated with significantly reduced costs and operating risk*." Stornoway Diamond Corporation [13].

Northwestern Ontario

The geological environments and mineral potential of Northeastern and Northwestern Ontario are similar. Both host world class mineral resources in Precambrian Shield greenstone (volcanic) belts. However, it is well recognized that **the level of historical mining development is much higher in Northeastern Ontario**, despite equal levels of interest in both Regions to see increased mining activity. Examining the key reasons as to why there is a much more active mining industry in Northeastern Ontario provides some insight into the opportunities that can be addressed in developing a similar level of mining activity in Northwestern Ontario.

From the observations of the analysts involved in the development of this Strategy, the most obvious and significant reason is that **transportation and energy infrastructure is vastly superior in the Northeast**. Successful exploration and exploitation of the resources in the Northeast are very much related to the available infrastructure. Northeastern Ontario is not unique in this regard as the same could be said for any other region or country in the world. It can be argued that **mining exploration activity and the subsequent development of significant mineral deposits in the Northeast in the early decades of the 20th century, was initially facilitated by development of the Ontario Northland Railway system**, known at that time as the Temiskaming and Northern Ontario Railroad (T&NO), which went under construction in 1902. Building the 253 mile T&NO main line from North Bay to Cochrane was instrumental in opening this region of the province for development and settlement, with its construction being cited as the reason for the discovery of a massive silver deposit at Cobalt, as well as gold at Porcupine and Kirkland Lake. Subsequent extensions of the line were built into the mining regions of Quebec, and the Transcontinental railway linking Canada's east and west, intersected T&NO in Cochrane. It is interesting to note that the railway was built by the Temiskaming and Northern Ontario Railroad Commission with public funding. It is also interesting to note that the T&NO Commission also worked closely with sister provincial Crown agency, the Ontario Hydro-Electric Commission, in developing hydroelectric generating stations on rivers in the region, such as at Island Falls and Fraserdale, providing high voltage power into the Region [14].

To access the billions of dollars in mineral resources that have been identified throughout Northwestern Ontario, **transportation infrastructure must be a priority for financial and fiscal planning at all levels of government**. Not only would investment in infrastructure be considered to result in direct return on investment through mine development, creating spin-off benefits throughout the supply chain, but it would also be expected that this investment would result in increased exploration activity. Recognizing the rights and interests of local Aboriginal communities and developing systems that are financially and environmentally sustainable would be an important objective.

8.3.6 Recommendations

It is recommended that:

- **A Northwestern Ontario Infrastructure Planning Committee be established**, made up of representatives of the Ontario government (including Ministry of Northern Development and Mines, Ministry of Natural Resources, Ministry of Transportation, Infrastructure Ontario), federal government agencies (including NRCan, FedNor, Aboriginal Affairs and Northern Development Canada), First Nations and the mining sector, to prepare a regional plan of a system of transportation access into the areas of highest mineral exploration and project development activity, considering the contribution that can be made by winter roads, all-season roads, private access roads, public highways rail lines,

and combinations of surface transportation that will facilitate development of the mining sector as well as enhance the social and economic interests of the remote First Nations communities.. This Committee should address the following:

- **Identify the needs of various mine and resource developers** in respect of transporting goods and services for mine construction and development, as well as the cost-effective transportation of mining products to market, that might include a combination of winter roads, all-season roads, airports and rail.
- **Consider the feasibility of restoring previous (and now closed) CN Rail Subdivisions** as cost effective methods of facilitating mining development transportation. Two Subdivisions in particular should be examined:
  - the Graham Subdivision which would connect the Lake St. Joseph area to the CN mainline and the Port of Thunder Bay
  - the Kinghorn Subdivision which connects the Longlac area (Municiaplity of Greenstone) to the Port of Thunder Bay.
- **Identify the timing of developing new infrastructure** that would include consideration of cost, schedule, constructability and political support from local communities. It is possible that shorter roads into areas of more advanced mine development might become a priority for financing and development.
- **Consider the impacts and benefits of establishing any new all weather road** on the establishment of new forest harvesting areas in the boreal forest.
- **Identify the regulatory issues and other requirements that will influence project selection and implementation**.
- **Examine the structures and frameworks established by the Province of Quebec to fund/finance development of Route 167**, and broader structures established by the Plan Nord, including methods of Aboriginal consultation and accommodation; methods of procurement to maximize the involvement of local labour and businesses; and methods of on-going operation and maintenance.
- **Evaluate the social, economic, and cultural issues associated with the routing of various infrastructure projects identified**, as well as the challenges and opportunities associated with public access versus dedicated roadways, ensuring the long-term needs and interests of the mining sector and local communities are addressed.
- **Evaluate various methods of financing transportation infrastructure** that might include participation by various levels of government and the private sector and that address the risk management concerns of the private sector.

It is suggested that this Committee be chaired by a senior representative of the Ontario Ministry of Northern Development and Mines, appointed by the Minister. **This Committee should be given a timeframe of no more than nine (9) to twelve (12) months from inception to provide its preliminary findings** in the form of a high level regional infrastructure plan, including the nomination of a lead agency or proponent to continue functional development of high priority, lower risk projects. As projects are identified and shifted to a responsible agency or proponent, the Committee should re-focus its attentions to the areas remaining and the issues that are outstanding to develop the more complex projects.

- **Establish a sub-committee of the Northwestern Ontario Infrastructure Planning Committee, made up of Aboriginal leaders**, that is overseen by an independently appointed Moderator, and jointly funded by the provincial and federal governments. The purpose of the sub-Committee would be to examine and coalesce social, economic, financial and cultural challenges and opportunities associated with major infrastructure projects. Initially, it is suggested that the sub-Committee be made up of representatives of Tribal Council Organizations, Treaty Organizations and other higher level associations to address over-arching issues and principles associated with regional infrastructure development in Northwestern Ontario. Issues of specific routing within a broad regional context, could be left to subsequent planning processes that will involve local communities. This sub-Committee should examine frameworks and structures that could be implemented to broadly address: Aboriginal involvement in ownership and operation; treaty and Aboriginal rights associated with infrastructure development; the perception of imbalanced benefits and impacts at the local community level; and other high level issues that could affect project approval and implementation. The sub-Committee should report to the Planning Committee on a monthly basis, providing regular updates and identifying any specific challenges that require broader resources to address.
- The Northwestern Ontario Infrastructure Planning Committee, in its consideration of a regional infrastructure plan, should specifically address the challenges and opportunities surrounding planning and implementation of a road or rail system into the Ring of Fire, considering the many challenges and opportunities identified above.
- Consideration should be given to appointing the Major Project Management Office, or an equivalent agency of the government to coordinate the regulatory approvals process and Aboriginal consultation to ensure that timelines for major infrastructure projects are actively managed and that approval timelines are minimized, while ensuring that all social, economic, cultural and environmental impacts are minimized through effective mitigation and community engagement.

8.4 References

(1) Conference Board of Canada, Centre for the North, “Northern Assets: Transportation Infrastructure in Remote Communities.” The Conference Board of Canada, 2011.

(2) Source: Transportation in Canada 2009

(3) Presentation by the Strategic Alliance of the City and Port of Thunder Bay, November 2011.

(4) Source: Aircraft Movement Statistics, NAV Canada 2011

(5) Source: 2011 Annual Report, Thunder Bay Airports Authority Inc.

(6) Ambassador’s Northwest (2012) Mining in Northwestern Ontario: Opportunities and Challenges. This report was supported by the city of Thunder Bay, Thunder Bay CEDC, Thunder Bay Ventures, Thunder Bay Chamber of Commerce, Northwestern Ontario Municipal Association, Lakehead University and Confederation College of Applied Arts and Technology.

(7) Canadian Chrome Corporation Rail v/s Road Tradeoff Study, Tetra Tech, 9th February, 2013

(8) Ontario Ministry of Infrastructure & Ministry of Northern Development, Mines and Forest. Growth Plan for Northern Ontario 2011. 2011.

(9) Tetratech. KWG Study.

(10) Canada's Economic Action Plan. http://actionplan.gc.ca/en/page/r2d-dr2/overview

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(12) Stornoway Diamond Corporation. http://www.stornowaydiamonds.com/renard/

(13) The Northern Miner. "Stornaway Pushes Renard Ahead." October 28, 2012.

(14) Wikipedia. http://en.wikipedia.org/wiki/Ontario_Northland_Transportation_Commission

(15) Conference Board of Canada, Centre for the North, "The Future of Mining in Canada's North". January 2013.

9 MUNICIPAL AND FIRST NATION INFRASTRUCTURE - CITY OF THUNDER BAY AND FORT WILLIAM FIRST NATION

This Section examines components of the City of Thunder Bay's municipal infrastructure and Fort William First Nation's community infrastructure as they relate to this Strategy. Key components reviewed include housing, industrial/commercial lands and infrastructure demands. These are compared against projected local impacts of anticipated new mining sector activity within Northwestern Ontario.

Based on these comparisons a series of findings and recommendations are presented respecting changes to municipal and First Nation infrastructure to facilitate achieving the goals of this Strategy.

9.1 Housing - City of Thunder Bay

9.1.1 Housing - City of Thunder Bay

Local housing, its availability and marketability, will impact the level of success the City has in attracting and retaining a portion of the population growth associated with the expected mining sector and related employment growth. While the private sector is responsible for the majority of housing development, the City through land use planning processes and the provision, or support, of needed infrastructure can impact the local housing market.

The municipality is active in monitoring key indicators of the local housing market. These indicators include the supply of designated and buildable lots within the community, infill or residential intensification opportunities, the housing resale and rental markets and projected future demands.

9.1.2 Thunder Bay Residential Lot/Unit Inventory

The **City of Thunder Bay currently has approximately a 1.5 year supply of residential lots** (urban and suburban combined) **available for construction** of single detached dwellings in Registered Plans of Subdivision. In addition, several plans are nearing the registration stage. Once approved, supply will increase to 3.5 to 4 years based on historic take-up rates. If the plans of subdivision that have Draft Approval status are included the projected supply increases to 10 years. These figures are based on the most recent corporate report on residential lot/unit inventory (March 29, 2012) updated with file records to December 31, 2012 [1].

The City's Planning Division has indicated that the supply of buildable residential lots within Registered Plans of Subdivision is sufficient to meet the objectives of the City's Official Plan based on historic take-up rates. Further, there is a sizable number of lots with Draft Plan Approval status. The City's opinion is supported by comments received from the development community and a review of lot inventory on file. The City's Official Plan states that, "*it is intended that at least a three (3) year supply of draft approved and/or registered residential lots and blocks of plans of subdivisions shall be maintained.*"

This objective is achieved considering both historic take-up rates and projected increases in demand based on anticipated new mining activity (see Section 9.1.5).

However, there are some issues with the residential lot/unit inventory. It is recognized that the buildable lot inventory does not necessarily reflect market demands. Furthermore the Planning Division recognizes that "*several of the plans in the Draft Approval stage have not progressed for several years and may not realistically be available for development."* [1] However, much of the control of housing supply rests with the private sector and is based on market supply-demand.

There are **currently only 152 registered lots available for building single detached dwellings** [1].

Table 9.1 presents a percentage breakdown of the single detached lots in both Registered and Draft Plan Approved stages within the city.

Table 9.1

Single Detached Lots by Lot Type and Stage of Approval [1]

Lot Type (based on Official Plan Designation)	Registered Plan Lots (% of Total)	Draft Plan Approved Lots (% of Total)
Urban Residential	54.0%	81.4%
Suburban Residential	44.7%	17.6%
Rural Residential	1.3%	1.0%

The City has identified **78 lots, intended for two unit dwellings** that are currently in draft approved plans of subdivision. Additionally, the City has seen a **trend towards the development of multiple unit dwellings,** infill and redevelopment of existing buildings.

Table 9.2 summarizes the **existing and upcoming supply of residential lots/units** as provided by the City.

Table 9.2

Summary of Buildable Units City of Thunder Bay [1]

	Single Detached	Semi-Detached	Town House	Apartment	Total
Plans under Circulation					
Rural Residential	0	0	0	0	0
Suburban Residential	220	0	0	0	220
Urban Residential	72	0	0	130	202
Sub Total	**292**	**0**	**0**	**130**	**422**
Draft Approved Plans					
Rural Residential	8	0	0		8
Suburban Residential	144	0	0		144
Urban Residential	667	78	0	1144	1889
Sub Total	**819**	**78**	**0**	**1144**	**2041**

	Single Detached	Semi-Detached	Town House	Apartment	Total
Registered Plans					
Rural Residential	2	0	0	0	2
Suburban Residential	68	0	0	0	68
Urban Residential	82	0	0	365	447
Sub Total	**152**	**0**	**0**	**365**	**517**
Grand Totals	**1263**	**78**	**0**	**1639**	**2980**

Table 9.3 presents the **absorption rate for single detached homes** within the Thunder Bay Census Metropolitan Area (CMA) for the first three quarters of 2011 and 2012. The first three quarters of 2012 saw 35 new single detached homes absorbed into the market. The highest activity was in the **$250,000 to $299,999 price range which accounted for 48% of new single detached homes** absorbed.

Table 9.3

Absorption Rate for Single Detached Houses, Thunder Bay CMA for 2011 and First 3 Quarters of 2012 [2]

Thunder Bay CMA	Price Ranges										Total	Median Price	Average Price
	< $250,000		$250,000 - $299,999		$300,000 - $349,999		$350,000 - $399,999		$400,000 +				
	Units	Share	Units	Share	Units	Share	Units	Share	Units	Share			
Q3 2012	0	0.0%	2	28.6%	1	14.3%	2	28.6%	2	28.6%	7	- -	- -
Q3 2011	1	9.1%	5	45.5%	2	18.2%	3	27.3%	0	0.0%	11	$289,900	$308,373
First 3 Quarters of 2012	0	0.0%	17	48.6%	8	22.9%	7	20.0%	3	8.6%	35	$309,900	$329,951
First 3 Quarters of 2011	4	11.8%	9	26.5%	10	29.4%	11	32.4%	0	0.0%	34	$309,950	$315,141

Table 9.4 presents a **summary of building permits for single detached dwellings** within the City of Thunder Bay. During the past five years**, approximately 63.8% of building permits issued for single detached dwellings have been for lots within plans of subdivision**. The remaining new housing construction has occurred on infill lots or on lots created through the consent to sever process [3].

Table 9.4

Historical Absorption Rate for Single Detached Housing Lots within Plans of Subdivision[3]

Year	Building Permits Issued within Plans of Sub-division	Total Permits Issued	Proportion within Subdivisions
2008	107	155	69.0%
2009	80	139	57.6%
2010	81	155	52.3%
2011	98	153	64.1%
2012	117	159	73.6%
Yearly Average	**97**	**152**	**63.8%**

Table 9.5 exhibits the **population change for the City of Thunder Bay and the Thunder Bay CMA** from 2006 to 2011, total number of private dwellings, and the average number of persons occupying households. As can be seen over this period the population changes for both the City and the CMA have been **relatively flat, showing a slight decline over the five year period**.

Table 9.5

City of Thunder Bay and Thunder Bay CMA Populations 2006 and 2011 and Total Private Dwellings [4]

	City of Thunder Bay	Thunder Bay CMA
Population in 2011	108,359	121,596
Population in 2006	109,160	122,907
2006 to 20011 Population Change	-0.70%	-1.1%
Total Private Dwellings	49,547	56,071
Average Number of Persons in Private Households	2.3	2.3

9.1.3 Thunder Bay Census Metropolitan Area (CMA) Housing Resale Market

The **Thunder Bay CMA is currently experiencing very high demand for resale housing**. The Canadian Mortgage and Housing Corporation (CMHC) reports that the low supply and high demand relationship within the resale housing market in Thunder Bay resulted in **average resale prices increasing by 14% in 2012** [5]. CMHC also reports that all segments of the housing resale market are showing strong price gains not just the higher "top-of-market" housing segment. Further, CMHC indicates that **during the first three quarters of 2012, 48% of all MLS sales were at or over list price** [6].

Table 9.6 presents **Multiple Listing Service (MLS®)[25] residential listing and sales activity** for Thunder Bay for the first three quarters of 2011 and 2012.

Table 9.6

MLS® Residential Activity for Thunder Bay [7]

	Number of Sales	Year over Year	Number of New Listings	Average Price	Year over Year
Q3 2011	407	7.1%	502	$179,241	**13.1%**
Q3 2012	391	3.9%	543	$199,064	**11.1%**
YTD 2011	1,080	5.9%	1385	$168,811	**8.1%**
YTD 2012	1,065	1.4%	1359	$192,640	**14.1%**

9.1.4 Thunder Bay Census Metropolitan Area Rental Housing Market

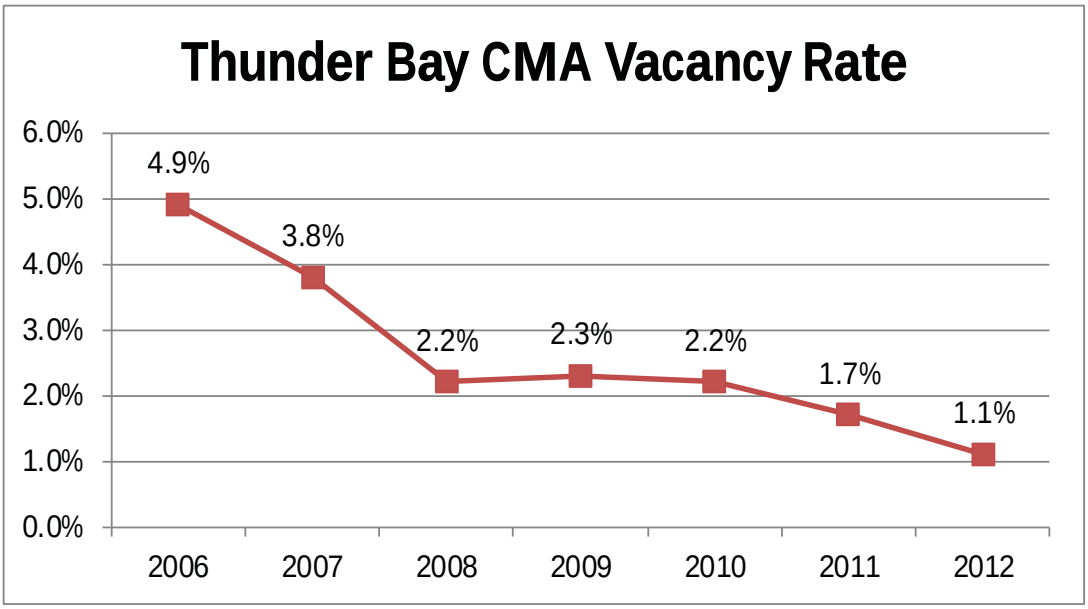
The **tight supply of housing within the Thunder Bay CMA** is also reflected within the vacancy rate for rental units. In December of 2012 the **vacancy rate was reported at 1.1%.** This is the

[25] Note: MLS is a registered trademark of the Canadian Real Estate Association (CREA).

second lowest vacancy rate in the country. This is a marked decline from 2006 when the vacancy rate was 4.9% [8][26] as shown in Figure 9-1 below.

Figure 9-1

Thunder Bay CMA Apartment Vacancy Rates 2006 – 2012



It is generally accepted that a healthy and well functioning rental housing market is one where building owners/investors earn a reasonable rate of return, and renters are able to find appropriate housing. It is generally accepted that a **balanced rental housing market will have an average vacancy rate of 4%**. The CMHC states that, "*factors exerting downward pressure on vacancies include limited new rental supply, strong employment growth and positive and continued in-migration to the city*" [9].

The current low rental vacancy rates within the Thunder Bay CMA have not been conducive to the construction of new units.

Other issues reported by CMHC to be affecting the rental housing market in Thunder Bay include:

- "**Supply has been scarce for five years in the Thunder Bay CMA, pushing the vacancy rate below three percent**.
- With the exception of 2012, **very little purpose built rental construction has broken ground**. Given that the 160 units under construction are not reflected in the rental inventory until completion, they did not have an effect on the 2012 vacancy rate.
- **Very little product choice in the resale market** for prospective buyers was another contributing factor to a declining vacancy rate. After peaking in 2008, sales have fallen or been flat since then. **2011 sales fell below 1,400 for the first time since 2000 and are on track to be in that range again in 2012. Listings have been falling since 2006 and currently listings are near an all-time low. With sales of existing homes waning,**

[26] Note: Rental universe = privately initiated rental apartment structures of three units and over.

first-time homebuyers or newcomers to Thunder Bay searching for ownership housing may be forced to put off home buying decisions this year, thereby remaining in rental accommodations.

- **Positive net migration is a key factor fuelling rental demand since a high proportion of people moving in to the City tend to be renters** [10].

9.1.5 Current Mix and Distribution of Residential Lands

Current residential lands available within the City of Thunder Bay were determined using data from the **Geographical Information System** (GIS) supplied by the City of Thunder Bay and the **Municipal Property Assessment Corporation (MPAC)**. This information is shown in tabular form in Table 9.7 and illustrated on a map of the City in Figure 9-2.

From a review of the data, **only 4.2% of residential parcels of all types across the City remain vacant.** By contrast, the total area of vacant residential lands across all zones is 23.3%. However, this is skewed by the availability of lands in large area parcels within the “residential future zones” as well as the “rural area zone” and “rural residential zone”. Considering only those lands within Residential zones 1, 2 and 3, the total area of lands that are vacant drops to 10.4%, 1.9% and 2.1% respectively.

Table 9.7

City of Thunder Bay Residential Land Inventory by Zoning Designation, Vacant, and Occupied by Parcels and Area, 2012 [11][27]

ZONE	Number of Parcels				Area (M^2)			
	Vacant	Occupied	Total	% Vacant	Vacant	Occupied	Total	% Vacant
Residential Future Zones	111	291	402	38.1%	3,151,979.9	4,012,546.9	7,164,526.8	78.6%
Residential Mobile Home Park Zone	0	3	3	0.0%	0.0	5,915.8	5,915.8	0.0%
Residential Prefabricated Dwelling Zone	0	10	10	0.0%	0.0	235,969.0	235,969.0	0.0%
Residential Zone 1	637	14091	14728	4.5%	2,444,135.6	23,457,283.1	25,901,418.7	10.4%
Residential Zone 2	287	15230	15517	**1.9%**	191,324.8	9,816,091.5	10,007,416.3	**1.9%**
Residential Zone 3	104	8172	8276	**1.3%**	136,609.0	6,495,206.2	6,631,815.2	**2.1%**
Rural Area Zone	344	1961	2305	17.5%	25,530,854.7	94,168,199.7	119,699,054.4	27.1%
Rural Residential Zone	256	1461	1717	17.5%	5,682,654.2	21,081,105.5	26,763,759.7	27.0%
TOTALS	**1739**	**41219**	**42958**	**4.2%**	**37,137,558.2**	**159,272,317.8**	**196,409,876.0**	**23.3%**

ZONE	Number of Parcels				Area (hectares)			
	Vacant	Occupied	Total	% Vacant	Vacant	Occupied	Total	% Vacant
Residential Future Zones	111	291	402	38.1%	315.2	401.3	716.5	78.6%
Residential Mobile Home Park Zone	0	3	3	0.0%	0.0	0.6	0.6	0.0%
Residential Prefabricated Dwelling Zone	0	10	10	0.0%	0.0	23.6	23.6	0.0%
Residential Zone 1	637	14091	14728	4.5%	244.4	2,345.7	2,590.1	10.4%
Residential Zone 2	287	15230	15517	**1.9%**	19.1	981.6	1,000.7	**1.9%**
Residential Zone 3	104	8172	8276	**1.3%**	13.7	649.5	663.2	**2.1%**
Rural Area Zone	344	1961	2305	17.5%	2,553.1	9,416.8	11,969.9	27.1%
Rural Residential Zone	256	1461	1717	17.5%	568.3	2,108.1	2,676.4	27.0%
TOTALS	**1739**	**41219**	**42958**	**4.2%**	**3,713.8**	**15,927.2**	**19,641.0**	**23.3%**

[27] MPAC definition of "Vacant Industrial Land" is defined as: "Vacant land principally zoned for industrial development". Per Ontario Regulation 282/98 the following land, if it is not being used, is vacant land for the purposes of this regulation if: (1) Land that has no buildings or structures on it; (2) Land upon which a building or structure is being built; (3) Land upon which a building or structure has been built if no part of the building or structure has yet been used; (4) Land upon which a building or structure has been built if the building or structure is substantially unusable. O. Reg. 282/98, s. 1. (1) For greater certainty, any occupation of a building or structure is a use for the purposes of paragraph 3 of subsection (1) and once a building or structure has been occupied the land upon which the building or structure is located cannot be vacant land unless the building or structure becomes substantially unusable. O. Reg. 282/98, s. 1 (2); (3) A portion of a parcel of land is vacant land for the purposes of this Regulation if,

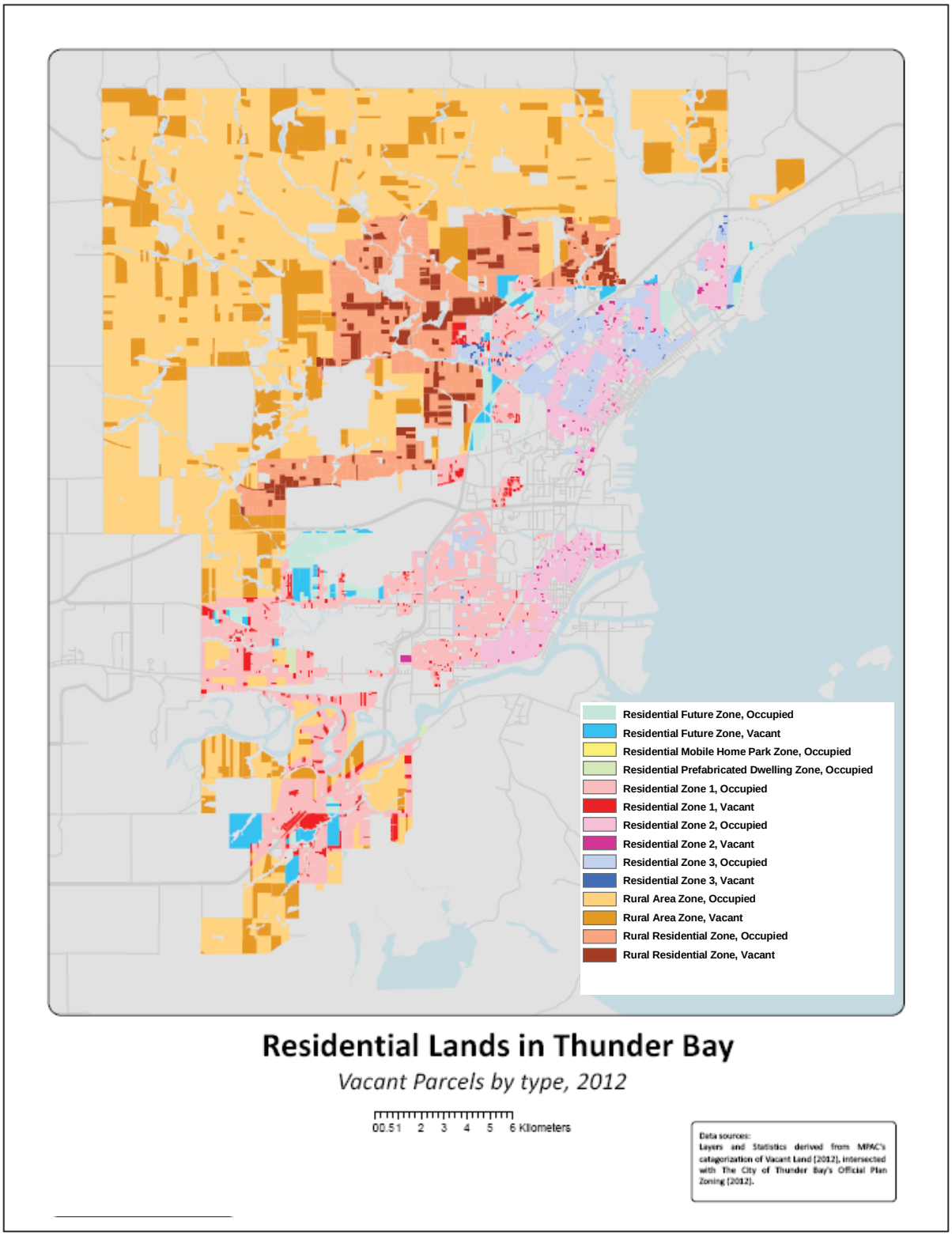
(a) there is no building or structure on the portion of the parcel or there is a building or structure on the portion but no part of the building or structure has yet been used;

(b) there is a building or structure on the rest of the parcel; and

(c) the portion of the parcel is zoned for a kind of development that is different from the development on the rest of the parcel. O. Reg. 282/98, s. 1 (3).

Figure 9-2

City of Thunder Bay Residential Lands: Vacant Parcels by Type, 2012



9.1.6 Projected Mining Impacts on Housing Market

The demand for additional serviced residential lots within Plans of Subdivision – Based on % Employment Increases

As an initial method of **estimating the potential impacts of new mining development on the housing market**, anticipated changes in employment were examined. Due to the fact that employment statistics were not yet available from the 2011 Census, the employment statistics from the 2006 census data for the Thunder Bay CMA and Northwestern Ontario (Districts of Thunder Bay, Kenora, and Rainy River) were used. Quarterly labour force survey data was not used for the Thunder Bay CMA as: (1) comparable data for the Northwestern Ontario region was not available; and, (2) the quarterly labour force survey specifically excludes on-reserve populations.

The **employment rate was used to determine the number of people employed** assuming that every person employed equals one job. Estimates of annual Ontario Employment Impact figures were used and broken down into Thunder Bay CMA and Northwestern Ontario categories. Highest and lowest employment impact estimates were used to indicate the variation that could be expected within job creation in the region. The projected jobs were then used to determine the percent increase of employment.

As shown in Table 9.4, the **historic annual absorption rate for single detached housing lots within Plans of Subdivisions averaged 97 lots over the years from 2008 to 2012** [12]. The projected average annual absorption rate was determined by multiplying the current yearly average by the expected percent increase in employment. It is assumed the percent increase in employment will be similar to the change in demand for single detached housing building permits. The total number of single detached lots available within the three stages of development (Registered Plan, Draft Approved, and Under Circulation) were then examined to determine the remaining number of years of supply. This was calculated by dividing the total number of lots available by the average number of lots absorbed annually (current and projected).

Table 9.8 presents the 2006 Employment Statistics for Thunder Bay CMA and Northwestern Ontario.

Table 9.8

2006 Employment Statistics Thunder Bay CMA and Northwestern Ontario [13]

	Thunder Bay CMA	Northwestern Ontario
Total Population (15yrs+)	100,870	187,985
Employment Rate*	58.7%	58.6%
Employment (persons)	59,211	110,159

**The employment rate is the number of employed persons as a percentage of the population 15 years of age and over. The rate for a particular group (for example, youth aged 15 to 24) is the number employed in that group as a percentage of the population for that group.*

2011 labour force Statistics not yet available.

Table 9.9

Projected Mining Development Employment Average Annual Impacts Thunder Bay CMA, Northwestern Ontario, and Ontario

Mining Development Employment Impact - Jobs Created			
	Thunder Bay CMA	Northwestern Ontario	Ontario
High	4,891	8,151	12,350
Medium	4,192	6,987	10,586
Low	3,493	5,822	8,821

As shown in Table 9.9, based on current projected mining development employment impacts as detailed in Section 11 of this report, the **Thunder Bay CMA could experience annual employment impacts between 3,493 jobs per year (low growth scenario) to 4,891 jobs per year.** The Northwestern Ontario region could experience between 5,822 (low growth) and 8,151 (high growth) jobs per year. Ontario could experience between 8,821 and seeing 12,350 jobs per year for the low and growth estimates respectively. As shown in Table 9.10, this level of employment growth is estimated to result in a **projected increase in employment within the Thunder Bay CMA between 5.90% (low growth) and 8.26% (high growth).** Employment growth in Northwestern Ontario is forecast to between 5.28% (low growth) and 7.39% (high growth).

Table 9.10

Projected Mining Development Impacts- % Increase in Employment Thunder Bay CMA and Northwestern Ontario

Mining Impact	Thunder Bay CMA			Northwestern Ontario		
	Current Jobs	***Projected Jobs***	***Percent Increase***	***Current Jobs***	***Projected Jobs***	***Percent Increase***
High	59,211	64,102	8.26	110,347	118,498	7.39
Medium	59,211	63,403	7.08	110,347	117,334	6.33
Low	59,211	62,704	5.90	110,347	116,169	5.28

As shown on Table 9.11, when these increases in employment are applied to the current projected supply of buildable lots within plans of subdivision in Thunder Bay, the impact is marginal in that total years of supply (registered supply, draft approved supply, and under circulation) are reduced only slightly – from a high of 13.02 to 12.03 years and a low of 13.02 to 12.30 years.

Table 9.11

Projected Mining Development Impacts on Buildable Lots Supply within Plans of Subdivision Thunder Bay

Mining Impact	Current Yearly Average	Expected Average	Registered Supply (years)		Draft Approved Supply (years)		Under Circulation Supply (years)		Total (years)		
			Current Rate	*Projected Rate*	*Current Rate*	*Projected Rate*	*Current Rate*	*Projected Rate*	*Current Rate*	*Projected Rate*	*Change*
High	97	105.01	1.57	1.45	8.44	7.80	3.01	2.78	13.02	12.03	-0.99
Medium	97	103.87	1.57	1.46	8.44	7.89	3.01	2.81	13.02	12.16	-0.86
Low	97	102.72	1.57	1.48	8.44	7.97	3.01	2.84	13.02	12.30	-0.73

As previously noted, the City's Official Plan states that "*it is intended that at least a three (3) year supply of draft approved and/or registered residential lots and blocks of plans of subdivisions shall be maintained.*" **This objective is achieved both using historic take-up rates and when applying projected increases in demand based on anticipated new mining activity**.

Problems with Predicting Housing Demand and Impacts Based on a % Increase Demand for Additional Serviced Residential Lots within Plans of Subdivision

There are problems associated with predicting housing demand and impacts based on a **percentage increase in demand for additional serviced residential lots within plans of subdivision**:

- While the supply of residential lots is sufficient to meet the objectives of the Official Plan based on both historic and projected take-up rates, **the location and availability of lots is not necessarily in keeping with market demands** and not all lots within draft plan of subdivision will come to market [14].
- **The resale housing market is currently very tight (high demand and low supply) with a 14% increase in resale housing prices in 2012** [15].
- In December of 2012 the **rental housing vacancy rate was reported at 1.1%** (the second lowest vacancy rate in the country) [16].

The combination of a tight resale market and a tight rental market may have impacts on the new housing market that are unpredictable. At the very least these potential impacts will test the validity of any future demand forecasts.

It is evident that new employment will be created through growth in the mining sector in Northwestern Ontario. Where these employees reside will be at the discretion of the employee.

If the community and its private sector developers are not successful in making a broad and attractive range of housing options available the impact of the growth in the mining sector could be minimal within the Thunder Bay CMA.

Comment on Residential Land Development

As Thunder Bay has a relatively small and contained housing market and the economic growth has been very limited in the last five years, **residential development in Thunder Bay has been characterized by the sale of individual lots for development by contractors**. There has not been large scale construction of single family homes built on a speculative basis. As the five year

average for new housing starts within approved plan of subdivision is only 97 units, **the available lots that are in approved or draft plan of subdivision and available for new housing construction, could be enough to meet demand.**

Residential housing development in Thunder Bay is currently dominated by **one large private sector developer** with only small parcels available for development. These subdivisions offer a combination of suburban residential lots and urban residential lots of varying prices and sizes. Within the urban area the subdivisions are mostly located west and northwest of the Thunder Bay Expressway.

Developers in the community indicated that there are a number of challenges to changing the housing development landscape in the City. One of the more significant **challenges facing developers is the carrying/financing cost associated with undeveloped/unsold lots.** It was commented that previously there were administrative mechanisms in place that reduced the risk of carrying costs on unsold lots. However, through literature review, and discussions with municipal and property tax specialists, no such program was ever implemented.

As historical housing demand has been weak, **developers indicated they have limited their plans for developing new subdivisions and have only sought approvals on a phased basis**. This allows them to make a variety of lots available without having to carry the costs of a large number of serviced/built lots with limited sales. They indicated **that more certainty of long term demand is required before they will increase the rate of development of additional serviced lots or new subdivisions**.

Respecting infrastructure, a number of those within the development community indicated that the **City of Thunder Bay needs to continue planning, engineering and obtaining approvals for additional sewer and water main extensions to the Thunder Bay Northwest area to facilitate long term development**. It is believed that a large part of residential growth will take place west and northwest of the Expressway. Another comment was that the City needs to work with the Province of Ontario to **accelerate the building of Expressway interchanges** to facilitate better transportation links between areas west and northwest of the City into the centre of the city.

Developers indicated that **the number of serviced lots currently available are sufficient to support new growth in the near term, but the City needs to make investments in infrastructure to support growth in the longer term.**

9.2 Industrial/Commercial Lands - City of Thunder Bay

Similar to housing, the availability and marketability of local industrial and commercial lands will impact the level of success the City has in attracting and retaining a portion of the business growth associated with increases in regional mining sector activity.

This section looks at the community's inventory and availability of industrial and commercial lands.

9.2.1 Industrial Lands

2007 Land Use Needs Study

In September of 2007 the City of Thunder Bay Planning Services Department, published the report "**Land Use Needs Study: Final Report**" [17]. The report evaluated both the inventory of, and demand for, various land use classes within the City of Thunder Bay. Land use classes included

commercial, industrial, residential, and institutional classes. The report also makes a number of land use planning observations and conclusions. This report is the City's most recent comprehensive evaluation of industrial lands.

Table 9.12 presents the 2007 inventory of industrial lands by Zoning By-law zone.

Table 9.12

City of Thunder Bay Industrial Land Inventory by Zone, 2007 [17]

ZONE	Number of Parcels				Area (Hectares)			
	Vacant	Occupied	Total	% Vacant	Vacant	Occupied	Total	% Vacant
Airport	5	13	18	27.8%	28.8	349.9	378.7	7.6%
Extractive Industrial	7	4	11	63.6%	113.6	151.4	265.0	42.9%
Future Industrial	23	6	29	79.3%	207.4	55.6	263.0	78.9%
PBP/GBP	47	1	48	97.9%	68.0	0.8	68.8	98.8%
Heavy Industrial	697	369	1066	65.4%	282.3	1,692.3	1,974.6	14.3%
Harbour Industrial	26	152	178	14.6%	50.7	863.4	914.1	5.5%
Light Industrial	52	206	258	20.2%	228.8	58.0	286.8	79.8%
Light Industrial Park	96	481	577	16.6%	48.2	181.2	229.4	21.0%
Railway	6	187	193	3.1%	8.5	432.2	440.7	1.9%
Suburban Industrial	19	39	58	32.8%	93.9	42.9	136.8	68.6%
Utilities and Services	8	24	32	25.0%	2.0	591.2	593.2	0.3%
TOTALS	**986**	**1482**	**2468**	**40.0%**	**1,132.2**	**4,418.9**	**5,551.1**	**20.4%**

Principal Findings and Conclusions – 2007 Study

The 2007 study contains the following Principal Findings and Conclusions, and Recommendations:

Principal Findings and Conclusions:

- **Industrial building permits for new building construction have been driven largely by expansion in the functions of existing, longstanding heavy industrial sites** and in the City's Balmoral industrial park.
- A total of 131 **industrial building permits were issued for new buildings** over the study period and an adjusted total of 89 demolition permits were issued.
- An estimated **11.1 hectares of industrial land are estimated to be required during the 20-year forecast period**. Supply of industrial land far exceeds the estimated demand. However, a significant proportion of the available industrial lands has access limitations or lacks servicing.
- Current **demand for large industrial lots with low water use cannot be met** as these lots are not available in the current inventory. Large lots with good access and low development costs might meet this demand.

Recommendations:

The Report offered the following recommendations:

- **No new supply of industrial land is needed**.
- The **most westerly portion of the Shabaqua North planning area fronting onto the new Shabaqua Expressway extension and accessed from Mapleward Road should be planned and developed as low water use, large lot industrial site** [18].

9.2.2 Current Industrial Lands Inventory Findings

Based on a review of GIS data supplied by the City of Thunder Bay and the MPAC the following information regarding current Industrial lands within the City of Thunder Bay was compiled.

Table 9.13

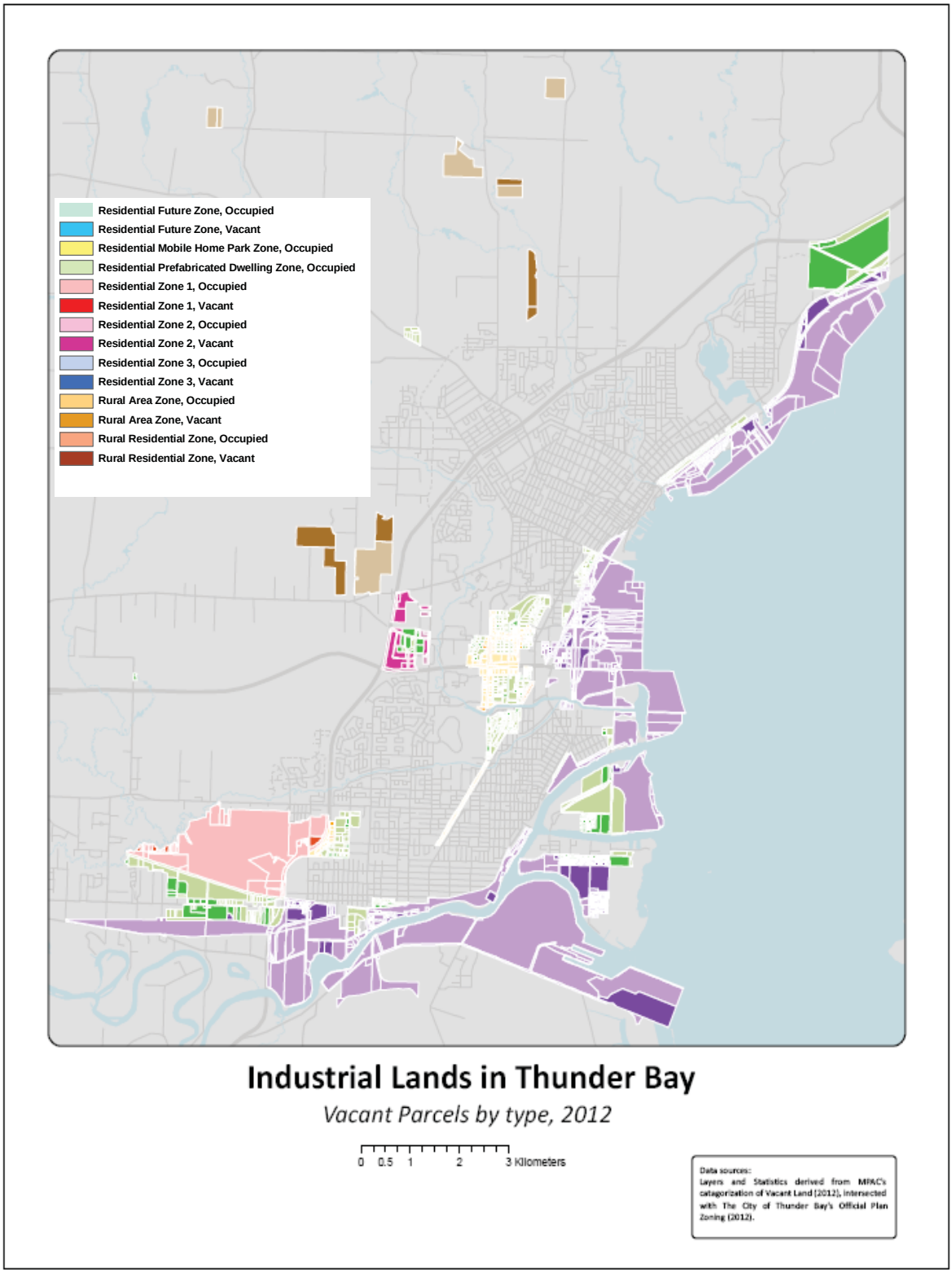
City of Thunder Bay Industrial Land Inventory by Zoning Designation, Vacant, and Occupied by Parcels and Area, 2012 [19][28]

Zoning	Number of Parcels				Area (Hectares)			
	Vacant	Occupied	Total	% Vacant	Vacant	Occupied	Total	% Vacant
Airport	4	66	70	5.7%	6.2	393.1	399.3	1.5%
Extractive Industrial	7	13	20	35.0%	105.5	138.5	244.0	43.2%
Prestige Industrial	42	13	55	76.4%	42.2	24.7	66.9	63.1%
Light Industrial	37	312	349	10.6%	9.0	109.3	118.3	7.6%
Medium Industrial	266	903	1169	22.8%	260.8	518.8	779.6	33.4%
Heavy Industrial	868	369	1237	70.2%	221.0	2,061.0	2,282.0	9.7%
TOTALS	**1224**	**1676**	**2900**	**42.2%**	**644.6**	**3,245.4**	**3,890.0**	**16.6%**

[28]See Footnote: 3 for MPAC definition of “Vacant Industrial Land”.

Figure 9-3

City of Thunder Bay Industrial Lands Showing Zoning and Vacancies [20]



Impacts of Industrial Lands within the Thunder Bay CMA but Outside of the City and the Fort William First Nation

The 2007 "Land Use Needs Study" reports, "*in the case of industrial land use, a* ***significant amount of land exists, however it appears that lands do not exist that meet the current area of need*** *– namely larger lots with significant traffic exposure, intended for industrial activities', such as trucking companies and construction yards that have low water and often large open space requirements*"[21]. This situation continues to date and to a great extent these lands have been provided outside of the city limits. It is suggested that this has occurred due to a combination of lot availability and more attractive or affordable pricing elsewhere.

9.2.3 Projected Mining Impacts on Industrial Land Demands

Forecast Demand for Industrial Lands

Forecasting the demand for industrial lands will be **largely dependent on which mining sectors advance**. Within the City of Thunder Bay an adequate supply of a wide variety of industrial lands has been documented through a number of sources including:

- The City's 2007 "Land Use Needs Study: Final Report" which indicated that, **with the exception of low water use, large lot industrial sites, no new industrial lands are needed"** [21];
- The 2012 "Renew Thunder Bay (RTB) Golf Links Road / Junot Avenue Corridor Study" which indicated that "**Innova Business Park … as the starting point and supply hub for exploration and mining in the 'Ring of Fire' [that] between 2,000 and 5,000 new jobs could physically be located within Innova Business Park**. Hundreds of new jobs could be accommodated on industrial, institutional and commercial lands located elsewhere along the Corridor" [22].
- Table 9.13 shows that an **average of 42% of industrial parcels and 16.6% of industrial lands by area can be classified as vacant**.

This perception was confirmed through discussions with local Industrial Commercial and Investment Real Estate Professionals.

Identified Issues with Industrial Lands

Notwithstanding the above, there are a number of issues to be addressed to ensure that the city maximizes the potential to develop available industrial lands:

- **Many of the heavy industrial lots and large industrial lots that are available require remediation of contaminated soils.** Contaminated soils result in higher development costs and often raise investor uncertainty. While remediation is not a requirement under provincial or municipal land use controls or regulations if the property remains as an industrial use, increasingly potential owners as well as investors and financial institutes are wary of investing in contaminated properties.
- These same heavy industrial lots and large industrial lots often have **complicated ownership structures**, some of which include property title covenants restricting future uses, and/or for various reasons may not be available for sale or lease.

- While industrial lands are available on **Mission and McKellar Islands** these are limited by both the **lack of access to natural gas and municipal sewer systems**.

9.2.4 Commercial Lands

The City of Thunder Bay has grown and continues to grow as a regional commercial hub. Although growth in the mining sector is likely to increase the demand for commercial lands, the City identified as recently as 2012 **that with the amount of commercial land available, the amount of existing retail space, shifting purchase patterns, and current rates of development indicate that development of commercial lands is not a priority for the City** [22].

9.3 Infrastructure Demands

Development, redevelopment, or intensification of residential, industrial or commercial properties places additional pressures on municipal infrastructure including road networks, water and waste water systems. The following section examines key infrastructure demands and their potential impact on the municipality's mining readiness. The discussions are based on interviews with municipal staff, the local development community, as well as realtors.

9.3.1 Renew Thunder Bay

The City of Thunder Bay has adopted a five year capital plan, called Renew Thunder Bay, which aims to **enhance quality of life and grow the economy** "through targeted and highly leveraged strategic infrastructure investments" [23]. The City, through Renew Thunder Bay, has planned for an **additional investment of *"$130 million in Thunder Bay's infrastructure by the year 2014. The City of Thunder Bay's funding share of Renew Thunder Bay is estimated at approximately $40 million***", with the additional funding expected to come from senior levels of government [23].

Table 9.14 lists a number of the activities and projects underway or planned in the Renew Thunder Bay plan.

Table 9.14
Renew Thunder Bay Projects and Programs

Legacy Capital Projects
• Waterfront Development - Phase 2
• Thunder Bay Event Centre
Major Capital Projects
• Thunder Bay Public Library Facility Renewal - new branch library - County Park
• City-Wide Multiuse Trail System
• Golf Links Road/Junot Avenue Mixed Use Corridor - Multi-phased transport upgrades
Multi-year Capital Programs
• Recreation and Park Facility Renewal - Major facility upgrades, revitalization and replacements, etc.
• Downtown/Mixed Use Areas Infrastructure Upgrades - Steetscaping, Street Furnishings, Public Art., etc.
• Smart City Projects - Broadband connectivity upgrades City-wide Wi-Fi, etc.
• Green City Projects (Environmental) - Sustainable Energy Projects, Community Environmental Action Plan (CEAP) Initiatives, Urban Reforestation, Energy Management Projects, etc.
• Community Partnership Capital Projects - City capital contribution to community based projects.

9.3.2 Golf Links Road/Junot Avenue Corridor Study

A significant component of the Renew Thunder Bay effort is the Golf Links Road/Junot Avenue **Mixed Use Corridor – Multi-phased transport upgrades**. The city has completed a Municipal Class Environmental Assessment (EA) which included the following physical improvements:

- **Widening of Golf Links Road/Junot Avenue to 4 lanes**;
- **Intersection improvements**; and,
- **Various infrastructure components** (e.g. sidewalks, bike/recreation trails, street lighting and servicing).

These physical upgrades were seen as **key to continued economic growth and development** along this corridor within the City. To examine possible best uses for lands in proximity to the corridor a study was completed in August of 2012. The study looked at vacant or underutilized lands along Golf Links Road/Junot Avenue and concentrated on five key parcels of land as illustrated in Figure 9-4 below. It should be noted that these parcels include the municipality's Innova Business Park.

The study identified the following uses as the **highest and best uses[29] for the key parcels of vacant land:**

- **Parcel 1: Single-family housing (less than 5 units)** or maintain as natural open space;
- **Parcel 2: Maintain as natural open space**;
- **Parcel 3: Single-family housing (2 or 3 lots)** or maintain as open space;
- **Parcel 4: Residential and institutional** uses, with the option of either incorporating existing industrial uses (e.g. C.C. Poulin) or redeveloping these lands for other employment and residential uses; and
- **Parcel 5: Innova Business Park**: Cluster of Mining-Related Uses and a Mining Centre of Excellence [24].

[29] The Appraisal Institute of Canada defines highest and best use as "the reasonably probable and legal use of property, that is physically possible, appropriately supported, and financially feasible, and that results in the highest value"

Figure 9-4

Key Parcels of Vacant Land within the Golf Links/Junot Avenue Corridor [25]

It was further suggested by the report that:

"*With access to the "institutional ring", skilled labour and vacant land,* ***significant opportunity exists to position and market Innova Business Park (Parcel 5) as the starting point and supply hub for exploration and mining in the 'Ring of Fire'****. Providing Golf Links Road/Junot Avenue is upgraded, between 2,000 and 5,000 new jobs could physically be located within Innova Business Park.* ***Hundreds of new jobs could be accommodated on industrial, institutional and commercial lands located elsewhere along the Corridor***" [25].

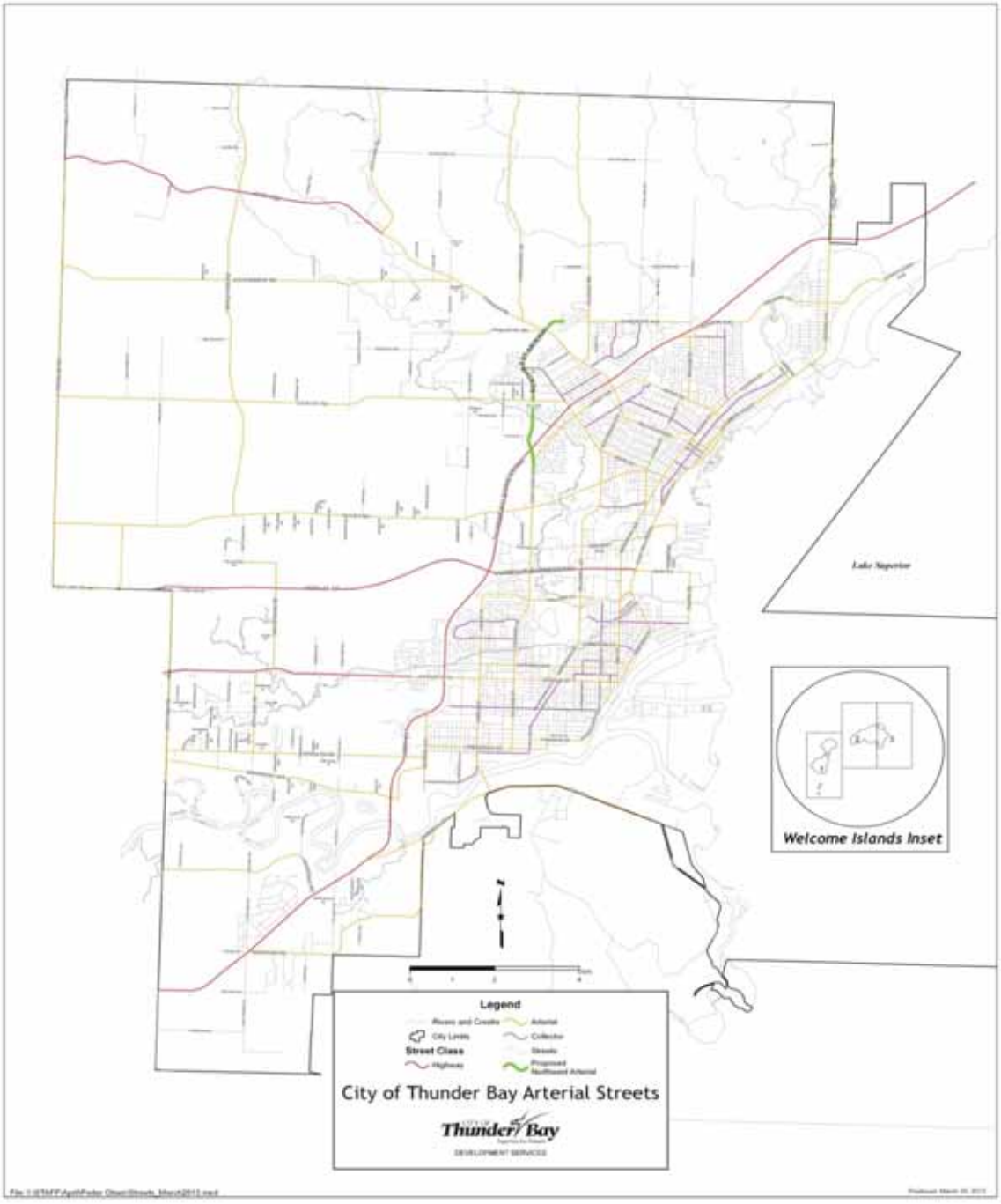
Continued promotion and facilitation of mining sector related development and employment within this serviced and available area would aid the community in maximizing the retained economic benefits of new mining activity.

9.3.3 Northwest Arterial Road

For a number of years the City of Thunder Bay has been looking at development of what is commonly referred to as the Northwest Arterial. As shown on Figure 9-5, the Northwest Arterial **would be a major new road connecting existing and new development in the northwestern section of the city to the Thunder Bay Expressway and the Intercity area.** It would also help to lessen current traffic congestion at both John Street and the Thunder Bay Expressway as well as Red River Road and the Thunder Bay Expressway. Initial routing of the Northwest Arterial is shown the figure below. The Northwest Arterial is highlighted in light green.

Figure 9-5

Location of Northwest Arterial



The Northwest Arterial continues to be one of the City's **potential or current major road network improvements**. Other planned improvements include:

- Golf Links/Junot Road Widening including Active Transportation Corridor

- Valley Street Widening
- Balmoral Street Storm Sewer/Road Work including Active Transportation Corridor
- Waterfront Roadway – Pearl Street to Central Avenue Overpass
- Carrick Street/ Vickers Street Extension
- Northwest Arterial

9.3.4 Sanitary Sewerage Systems- Additional Capacity across the Thunder Bay Express Way

If the City determines that continued growth of residential units within the northwest section of the community is to be pursued, **additional sanitary sewer capacity will be needed** in this area. While the need may not be immediate, **growth will need to be monitored closely and tied to longer term municipal capital plans**.

Planning, engineering and approvals processes that would be needed to see the development of additional sewer and water main extensions to the Thunder Bay Northwest area can continue prior to proceeding with larger scale capital expenditures.

9.3.5 Telecommunications Infrastructure

Thunder Bay Telephone (Tbaytel) is the largest independent municipal telecommunications provider in Canada. Operating as Tbaytel they provide a full complement of telephone, mobility, internet, television and data services in Thunder Bay, as well as selected services into Northwestern Ontario. While able to provide the services of a large carrier they can react quickly to customer needs.

Infrastructure

Tbaytel provides infrastructure in Thunder Bay to support its Broadband Internet and landline connectivity service portfolio. A fibre-optic backbone currently provides internet to most residential and commercial customers. Tbaytel's core fibre network can be extended to most homes and businesses quickly and cost effectively to provide private data network connectivity.

Tbaytel offers an array of broadband packages for residential and small business customer internet access. Business customers can also opt for Ethernet based symmetrical access to the Internet or to corporate networks outside of the Tbaytel network area through Tbaytel's interconnectivity with the national carrier data networks.

At the present time there would be no barriers to service the plans of subdivision on file in the city of Thunder Bay. As a matter of process they are involved in the planning for needed services to those developments. Through their community wide fibre network they will be able to accommodate any major growth through subdivision agreements when and if needed.

Service Provision

TBaytel Mobility is the largest wireless service provider in Northwestern Ontario and uses the 4G HSPA+ network. Tbaytel's new network is the latest in next generation wireless technology. 4G HSPA+ networks are the most widely deployed mobile broadband voice and data technology in the world today. Tbaytel Mobility has roaming agreements with most domestic and North American providers and is looking to ensure interoperability with as many carriers as possible.

TBaytel has entered into a partnership with Rogers Canada, the largest mobility provider in Canada. The partnership allows Tbaytel to provide a large spectrum of mobile phones as well as mobility packages. The company has continually invested in technical upgrades to provide top tier service to their customers in the region.

At present TBaytel offers a wide array of DSL packages to the residential and small business customers. As well they provide full data services to large commercial customers with build outs based on their data needs. They support Ethernet based wide area and private networking and offer competitive pricing and seamless interconnectivity for business and government.

Regional Presence

Tbaytel's 4G HSPA+ network covers over 2,000 km of highway and provides service to Thunder Bay, its surrounding Municipalities as well as the region's communities. Tbaytel continues to invest in its wireless network to improve service quality (i.e. LTE) and coverage to ensure top tier service to its customers.

Tbaytel and Rogers Communications, have a strategic business relationship that provides Tbaytel customers with access to a large spectrum of wireless phones as well as access to Canadian, US and worldwide coverage through the Rogers worldwide roaming partner network. The relationship also provides access to Tbaytel's extensive wireless network for major carrier customers. In addition, Tbaytel has extended its roaming partner access within Northwestern Ontario through a separate roaming arrangement with KNET to provide service through the regions remote First Nations communities.

Tbaytel's regional wireless and data services are delivered via an extensive tower/microwave and fibre based infrastructure from Sault Ste. Marie to the Manitoba border. The towers also provide the capability to reach regional business customers for data connectivity and local wireless services.

9.4 Findings

9.4.1 Housing

- The City **currently has a total of 2,980 buildable units available** including single detached, semi-detached, town house, and apartments when registered plans, draft approved plans, and plans under circulation are combined.
- Using a five year historical average single detached housing lots within plans of subdivision have had a yearly absorption rate of 97 lots. This has occurred over a period where both the City and the CMA have seen slight negative reported population growth.

- The current housing market within the community is extremely tight. There has been **low supply and high demand within the resale market**. This resulted in a 14% increase in resale prices in 2012.
- The **rental housing market vacancy rate in December 2012 was 1.1%** - the second lowest in the country.
- Based on projected mining related employment increases, it is estimated that the **annual absorption rate of housing could increase from between 5.21 and 7.29 additional single detached housing lots** within plans of subdivision. This would see an estimated 102 to 104 new single detached housing units absorbed by the market annually.
- Relying on these projections for this Strategy presents problems in that with an existing tight re-sale housing market (demand exceeding supply) **new employees may choose or be forced to reside elsewhere**.
- A number of economic conditions have and are impacting housing development within the community. These include relatively low market rent levels, relatively low housing prices, and more recently, escalating construction costs.

9.4.2 Industrial and Commercial Lands

- Thunder Bay has a **large and varied inventory of vacant or available industrial lands** capable of accommodating mining associated growth.
- **Many of the heavy industrial lots and large industrial lots have contaminated soils issues that raise investor uncertainty and development costs.** While remediation is not a requirement under provincial or municipal land use controls or regulations if the property remains as an industrial use, increasingly potential owners as well as investors and financial institutes are wary of becoming involved in properties with brownfield issues that are not thoroughly documented and understood.
- Many of the heavy industrial lots and large industrial lots often have **complicated ownership structures**, some also have covenants associated with the property titles restricting future uses, and/or for various reasons may not actively be on the market for sale or lease.
- While significant industrial lands are available on Mission and McKellar Islands these are limited by the **lack of access to natural gas and municipal sewer service**.
- The supply and availability of commercial lands within Thunder Bay has not been identified as an impediment to mining related development, rather this growing sector may be seen as a strength.

9.4.3 Infrastructure Demands

- The City has begun upgrades to Golf Links Road/Junot Avenue under the Renew Thunder Bay initiative. These upgrades will increase the potential to locate between 2,000 and 5,000 new jobs within the Innova Business Park.

- The development of the **Northwest Arterial Road** has been identified as **key to long term development within the northwestern section of the City** and relieving existing congestion at points along the Thunder Bay Expressway.
- If the City is to continue to grow its residential units within the northwestern section of the community **additional sanitary sewer capacity will be needed** into this area.

9.5 Fort William First Nation

9.5.1 Housing - Fort William First Nation

As shown in Table 9.15, Fort William First Nation (FWFN) has a reported population of 931 members living within the community with an additional 1,175 members living outside of the community.

Table 9.15

Fort William First Nation Population [26]

Residency	# of People
Registered Males On Own Reserve	471
Registered Females On Own Reserve	460
Registered Males On Other Reserves	7
Registered Females On Other Reserves	13
Registered Males On Own Crown Land	0
Registered Females On Own Crown Land	0
Registered Males On Other Band Crown Land	0
Registered Females On Other Band Crown Land	0
Registered Males On No Band Crown Land	1
Registered Females On No Band Crown Land	2
Registered Males Off Reserve	534
Registered Females Off Reserve	618
Total Registered Populiation	2,106

FWFN currently has an insufficient supply of housing to meet the demands of its membership and as a result there is an ongoing demand for new housing on the reserve. In response the community has established a Housing Program. A description of the Housing Program is provided below.

Mission and Mandate

The Housing Program aims to address housing needs for FWFN through a fair equitable process, providing equal opportunities for all members. The First Nation is capable of engaging in home

ownership opportunities. The Housing Program will provide support and resources to encourage sustainable housing for Fort William First Nation.

Progress in Housing

The Housing Program has successfully delivered services to over 350 homes both on and off-reserve and is in the process of establishing a fully functioning Housing Committee to guide and direct housing administration, enhancing the level of accountability and reporting to the membership.

Completion of Section 95 Housing Units

FWFN has recently completed the construction of ten housing units, nine of which are Section 95 housing units on Lynx Court.

Housing Program Resources

Current Housing Program resources being utilized by FWFN include the following:

- Aboriginal Affairs and Northern Development Canada (AANDC) (Indian and Northern Affairs Canada (INAC)) – Minor Capital (materials only) $707,000.00
- CMHC – Repairs and Renovations Assistance Program (RRAP) $16,000.00
- OFNLP – Ontario First Nation Limited Partnership $50,000.00

Future Housing Projects

FWFN Housing Administration is currently planning a 20 unit residential development, 8 of which will be funded through CMHC's On-Reserve Non-Profit Housing Program (section 95). This program assists in the construction, purchase and rehabilitation, and administration of suitable, adequate and affordable rental housing on-reserve. The program provides a subsidy to the project to assist with its financing and operation [27].

FWFN has identified a number of goals to improve its Housing Program, these include the following:

- Higher number of well-maintained units;
- Affordable, suitable and accessible housing options for all (singles, people with disabilities, special needs, single mothers/fathers, Elders);
- Quality, professionally built homes;
- Policies in place that are effective, fair, consistently followed and transparent;
- Increase housing administration to accommodate growing housing needs and demands;
- Enhanced measures of accountability and reporting requirements to membership;
- Flexible finance options;
- Fully operational housing program;
- Established committee with terms of reference;
- Long term sustainable housing plan for FWFN;
- Maintain an Arrears free housing program;

- A positive working relationship with membership;
- Elder's Emergency Home Repairs and Renovations Program; and,
- Options for off-reserve residents.

While opportunities to provide housing in relationship to forecasted mining developments have been identified, FWFN is currently concentrating on the provision of on-reserve housing to meet the present needs. This plan includes sourcing funds for the preparation of a new capital and financial plan for infrastructure and lot development.

The potential for a private "On-Reserve" housing development exists on 40 acres of reserve lands held under a Certificate of Possession. These lands are held by Chippewa Trailer Park and boarder on Chippewa Park.

Figure 9-6

Area of Potential "On-Reserve" Housing

9.5.2 Industrial/Commercial Lands – Fort William First Nation

Discussion of industrial and commercial lands associated with FWFN requires an understanding of the historical events that have impacted reserve and non-reserve lands associated with the First Nation.

The following provides a summary of key events in the formation of the Fort William First Nation reserve, the current reserve lands and lands owned or having interest of the Fort William First Nation.

Table 9.16

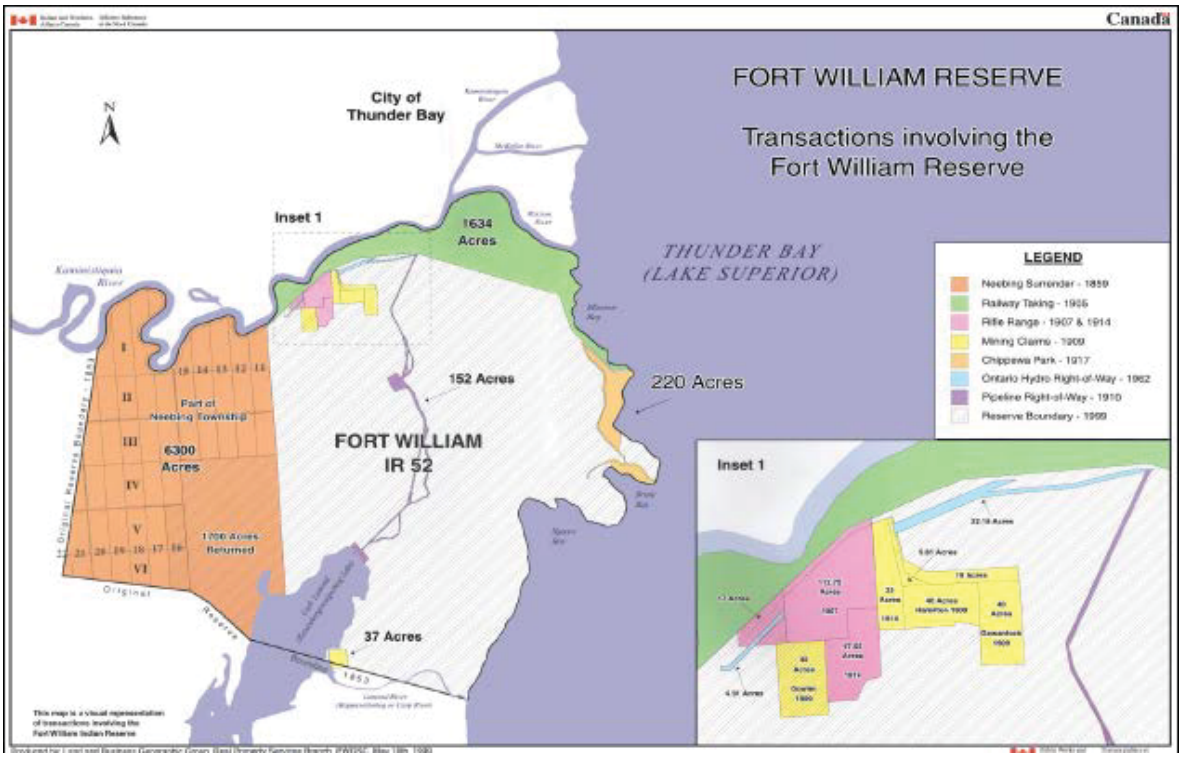
Fort William First Nation Summary Table of Key Events

Year	Event
1849	Establishment of the Immaculate Conception – Roman Catholicism at Ft William
1850	Robinson Superior Treaty
1853	Fort William Reserve created
1859	6,300 acres Neebing land sold
1906	Expropriation of CN Land
1907	Surrender of Rifle Range
1909	Mining Surrender next to rifle range
1917	220 acres sold to City of Fort William for Chippewa Park
1930	1,700 acres of Neebing parcel returned
1948	Old Age Pensions given to Band Members
1995	Research began of land claims
1999	CN Lands returned to Fort William First Nation
2002	Rifle range settlement
2008	Loch Lomond Watershed settlement
2011	FWFN Boundary Claim Settled

Figure 9-7 below provides an illustrated summary of the historical land transactions that have involved FWFN and their geographic relationship to the current reserve lands.

Figure 9-7

Map Showing History of Transactions Involving the Fort William First Nation Reserve [26]

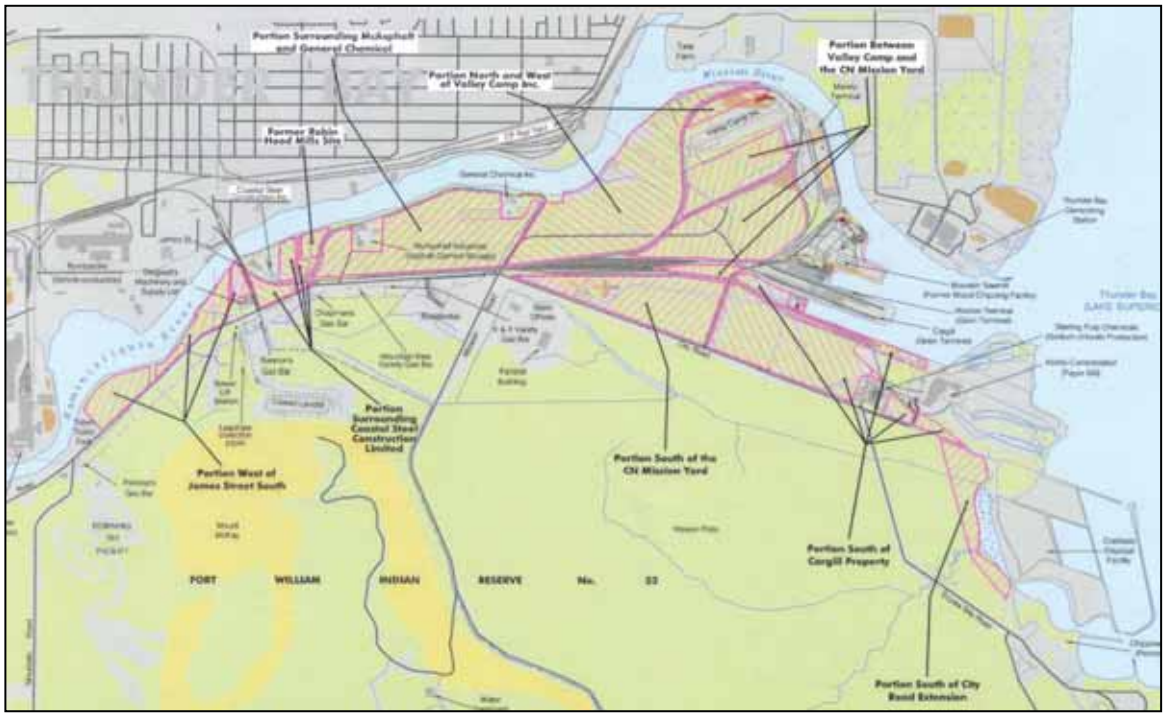


As a result of historic land takings and the recent land claim settlements, FWFN has come into possession of 1,600 acres of industrial lands which are currently within the City of Thunder Bay boundary.[30] Figure 9-8 provides an overview of the Industrial lands held by the FWFN. These lands were included within the industrial lands discussion associated with the City of Thunder Bay.

[30] The industrial lands are held by the Fort William First Nation Economic Development Corporation on behalf of the First Nation.

Figure 9-8

Fort William First Nation Industrial Lands [28]



9.5.3 Fort William First Nation Industrial Development

In 2005 FWFN undertook a comprehensive strategic plan that focused on the development of an Industrial Development Cluster [29] that supported the development of the First Nation's underutilized, former CN industrial lands. The strategic plan highlighted the certain incentives relating to taxes, cost of land and energy that made the lands attractive for potential investors. The study concluded that FWFN is a more attractive place to invest compared to Thunder Bay and other Northwestern Ontario locations. Recommendations include that FWFN should reinforce and build on established and emerging clusters in Thunder Bay and Northwestern Ontario rather than attempt to promote entirely new ones.

> "*Industry clusters form where there is a foundation of locational advantages to build on. To justify cluster development efforts, some seeds of a cluster should have already passed a market test. Cluster upgrading involves recognizing the presence of a regional cluster and then removing obstacles, relaxing constraints and eliminating inefficiencies that impede cluster productivity and innovation." [29]*

FWFN has taken steps to follow up on this report by promoting and developing the Resolute Sawmill and SkyPower Solar Farm. These two projects occupy a total of 165 acres and have a combined capital investment estimated at $140 million. Currently the Resolute Sawmill employs up to 200 workers with 90% of the workforce residing in the City of Thunder Bay. A preliminary examination of the current resource development opportunities in Northwestern Ontario point to

the potential of a regional industrial mining cluster. Fort William First Nation and the City of Thunder Bay have the potential to build on the comparative tax and locational advantages enjoyed by FWFN through the creation of an economic plan, supporting policies and a regulatory environment conducive to development. The new mining cluster on FWFN industrial lands has the potential to provide direct benefits to the Ring of Fire First Nations and their urban members living in Thunder Bay.

9.5.4 Past Economic Development

FWFN's own source revenues are primarily derived from capital investments made in commercial properties. FWFN currently leases over 50,000 sq.ft. of commercial office space to Aboriginal Affairs and Northern Development Canada, Wasaya Airlines, Dilico Ojibway Child and Family Services, Anishinabek Police Services, Public Works Canada as well as a number of smaller enterprises. FWFN also leases over 160,000 sq.ft. of industrial building space to Resolute Forest Products (formerly Bowater Canadian Forest Products Inc.).

The First Nation Development Corporation owns and leases the former CN Rail Lands. Current tenants on the industrial lands include SkyPower (10MW Solar Project), Coastal Steel, McAshphalt, Valley Camp and CN Rail. Other First Nation own source revenues are generated through the Bingo, Casino Rama, Community Centre, Arena Ice Rentals and 3rd Party land leasing.

9.5.5 Present Economic Development

As an urban First Nation business center in Northwestern Ontario, FWFN has successfully returned expropriated industrial lands back to the community and settled more than $180 million in land claim settlements. The land settlements included the return of the former CN Lands and the Pie Island/the FWFN industrial lands inventory includes deep sea shipping docks, with rail and highway access. The First Nation's industrial park is serviced by power, water, gas and telecommunications. The FWFN on-reserve land base has attracted commercial and business development that includes more than 8 non-FWFN owned Aboriginal business. Current projects initiated include the following:

- *Development of a commercial building - $5-10 million.*

  Presently discussions are occurring with Nishnawbe Aski Nation on the development of a new commercial property to house NAN Administration Offices, Wasaya Airlines as well as other tenants.

- *Transmission Development – East West Transmission Project.*

  Ontario has identified a need to build a new electricity transmission line, the East West Tie, to increase the capacity of the existing public electricity transmission network between Thunder Bay and Wawa. The Chief and Council of Fort William First Nation are currently reviewing the opportunity to participate in the development of the East West Transmission Project. The project could create significant opportunities for all Fort William members as well as benefit the region by strengthening the transmission infrastructure throughout Northwestern Ontario.

- *Waterpower development.*

  Fort William First Nation has the potential to develop electricity from the former Loch Lomond Water Supply System, located on reserve lands. The community is also engaged in discussion with Xeneca Power Development and Lac des Mille Lacs First Nation on two crown land waterpower projects located off of reserve lands.

- *Impact Benefits Agreement with Lac des Iles and Panoramic*

  Presently there is one operating mine and another mineral exploration project that is nearing advanced exploration within the First Nation's traditional lands. These projects present a variety of opportunities for new sources of revenue while supporting mineral development in Northern Ontario.

- *Industrial Park Development on the former CN Lands*

  Both Cliff Natural Resources and Noront have been active in reviewing the former CN Industrial Lands owned by FWFN as potential sites for mineral processing.

- *Development of On-Reserve Residential Subdivision and Business Park*

  There is an opportunity for First Nations involved in the Ring of Fire to create urban business partnership between FWFN and industry. This would create on-reserve employment opportunities for the residents of the Ring of Fire communities who live in the City of Thunder Bay and surrounding area.

- *Mineral Exploration in the Thunder Bay Region*

  It is expected that mineral exploration companies in the region will identify new First Nation opportunities associated with mineral exploration and mine development.

Figure 9-9

Fort William First Nation Traditional Territory

9.5.6 Community Vision for Regional Economic Development

FWFN's leadership has recognized that more must be done to create jobs. The community has acknowledged that a holistic approach to both the people and social issues must be factored into the development equation. With this understanding, FWFN leadership has begun to re-ground with the members and engage in dialogue regarding the future of the community. The leadership of Fort William has embarked on an approach to development that puts the health of people and the land first. The First Nation has recently applied for funding to commence with a Comprehensive Community Development Strategic Plan. This plan is intended to do more than just identifying the economic drivers that build an economy; rather the plan is to look at the social drivers and priorities of the First Nation with a view to developing strategies to achieve socio economic goals. Presently the First Nation is moving towards an election. A new council will set the direction for community development and priorities.

9.5.7 Fort William First Nation Economic Development Policies

In 2012, FWFN developed a series of policies including the Fort William First Nation Project and Economic Opportunity Evaluation Policy and a Community Engagement Policy. The outgoing Chief and Council have adopted these policies in principle, leaving the new incoming Council with the task of policy review and implementation.

The FWFN Economic Opportunity and Evaluation Policy

The FWFN Project and Economic Opportunity and Evaluation Policy sets out a systematic process for evaluating projects and opportunities, which meet the broader economic objectives of environmental sustainability, employment creation, and sustainable community growth. The policy will assist the community with identifying projects and partnerships that provide both infrastructure and services such as road, parks, business centers and affordable housing. The activities approved within the policy must lead to the creation of skilled employment opportunities such as trades, finance, marketing, community development, skills development, small business development, business retention and expansion, technology transfer, and real estate development.

9.5.8 Future Economic Development in the Mining Sector

FWFN is positioning itself to act upon unprecedented development opportunities and create social change by taking advantage of the regional mineral exploration and Northern Ontario's "Ring of Fire" developments (and other NOW mining activity). While, the "Ring of Fire" is not located within the traditional territory of the FWFN, the development of mines and related infrastructure will have direct impacts on the economic, social, and cultural well being of the region. Based on 2006 Census results the City of Thunder Bay had a reported population of 8,845 Aboriginal people living within the city limits. This represents a 17.6% increase from 2001. The City has estimated that 75% of this Aboriginal population is First Nation [30]. The "Ring of Fire" First Nations, which consist largely of Matawa Tribal Council communities and Marten Falls First Nation, reported an estimated urban population of 3,911 off reserve members in 2006.

9.5.9 Commercial Lands

FWFN has seen commercial development largely concentrated along Chippewa Road (City Road) east of James Street. It is expected that additional commercial activity could take place along this corridor in conjunction with the vacant 800 acres of CN lands in the area. The need for support for small business development has been identified by the community through its Economic Development Strategy [29].

9.6 Infrastructure Demands

FWFN is currently establishing mechanisms and strategic directions to guide future development that will meet the needs of the community. Efforts include the establishment of the FWFN Lands Department to provide land and environmental management services for the community. Services will include community land use planning, management of reserve land and natural resources, environmental management, and compliance with policy and legislative frameworks [31]. The First Nation has also recently applied to Aboriginal Affairs and Northern Development Canada (AANDC) for Community Economic and Opportunities Program for funding to undertake a Community Development Strategic Plan. In conjunction, these efforts will document current infrastructure capacities within the community and set preferred priorities for future development.

9.6.1 Water and Waste Water

Water supply for the majority of the community is provided by piped water service linked to the City of Thunder Bay municipal water system. Waste water service within the community is through septic tanks and tile fields.

9.6.2 Energy

FWFN receives electrical power service through Thunder Bay Hydro. In addition, the majority of the community is connected to natural gas services. The FWFN has the opportunity to develop a small waterpower site within the former Loch Lomond municipal water supply infrastructure now abandoned by the City of Thunder Bay [32].

9.6.3 On-Reserve Roads

Roads and associated roadway drainage within FWFN are designed and built to the standards set by the Ministry of Transportation – Ontario (MTO). The on-reserve road system provides access to the City of Thunder Bay, Mountain Road and the Mission and Squaw Bay town sites.

9.6.4 Access to Fort William First Nation

Fort William First Nation has two primary points of access linking the community to the City of Thunder Bay. Commercial traffic accesses the First Nation via Chippewa Road, which becomes City Road, 3 km east of Highway 61 and 5 km southeast of the Trans Canada Highway. Local businesses, residents and consumers access the community via the James Street Swing Bridge

connecting the Westfort neighborhood of Thunder Bay to Chippewa Road and City Road. The aging Swing Bridge over the Kaministiquia River has historically seen high traffic flows due to the commercial development on FWFN.

CN's James Street Swing Bridge is more than 100 years old and has been at the center of a number of debates regarding safety and maintenance. CN Rail is responsible for the bridge having acquired it on March 29, 1905 after the Grand Trunk Agreement was signed. CN acquired the Grand Trunk Pacific Railway including 647 ha (1,600 acres) of Indian Reservation south of the Kaministiquia River for the purpose of constructing a railway. The acquisition included a spur that led from an area near the bridge to the south and west through the subject site. This is the first industrial activity known on the site. The spur connected the Quinn Stone & Ore Co. quarry, located at the base of Mount McKay.

Figure 9-10

James Street Swing Bridge (historical photograph)[31]

Photograph D-2 Photograph of James Street Bridge over the Kaministiqua River dated 1910. (Thunder Bay Historical Society photograph 977.113.180).

The bridge continues to provide rail access to the Resolute Sawmill, Valley Camp and the Cargill sites. The First Nation and City of Thunder Bay are exploring the feasibility of a new fixed link to the south side of the river to resolve the safety issues while enhancing development opportunities on the First Nation's Commercial Lands (it should be noted that City Council has not formally agreed to pursue this effort). Any proposed large scale development associated with the growth of the mining sector on FWFN lands will only compound the traffic and loading issues on the James Street Swing Bridge and must be factored into any future plans for development.

[31] Thunder Bay Historical Society.

9.7 Fort William First Nation Summary

Fort William First Nation's reserve location represents a distinct advantage and ingredient for the development of new partnerships with remote communities and mineral exploration industry. This opportunity will drive the need for access to both on-reserve and off-reserve FWFN lands to host development. These factors along with the tax incentives for First Nation employees and business and the industrial characteristics of FWFN lands, support the expansion of FWFN's commercial center. This First Nation commercial hub can provide access to reserve lands for mining companies that wish to enhance benefits for their urban first nation partners.

The projects and partnerships that will generate community investments are regional in nature and should be viewed with a focus on FWFN, the First Nations in the Ring of Fire, City of Thunder Bay, the mining companies and the mining service industry. Key regional projects and the spin-off of the mining sector includes the East West Transmission Corridor, waterpower developments (McGraw Falls), contracting, and employment, local community infrastructure and commercial / retail opportunities, as well as new housing development.

9.7.1 Fort William First Nation Economic Development Initiatives

1) The CEDC and the City of Thunder Bay are encouraged to facilitate the Fort William First Nation in their efforts to develop small businesses as identified in their Economic Development Strategy. These activities could be enhanced by collaboratively developing joint industrial clusters.

2) The FWFN should be supported in their initiatives to position itself in acting upon unprecedented development opportunities and create social change by taking advantage of the regional mineral exploration and Northern Ontario's "Ring of Fire" developments (and other Northwestern Ontario mining activity). In support of these efforts, the federal government is encouraged to support the First Nation by approving their recently submitted application for funding to prepare a Comprehensive Community Development Strategic Plan.

3) The FWFN Project and Economic Opportunity and Evaluation Policy should be a key driver in selecting business activities with the FWFN. Economic development initiatives that should be supported include:

   - *Waterpower development:* Fort William First Nation has the potential to develop electricity from the former Loch Lomond Water Supply System, located on reserve lands. The community is also engaged in discussion with Xeneca Power Development and Lac des Mille Lacs First Nation on two crown land waterpower projects located off of reserve lands.
   - *Impact Benefits Agreement with Lac des Iles and Panoramic:* Presently there is one operating mine and another mineral exploration project that is nearing advanced exploration within the First Nation's traditional lands. These projects present a variety of opportunities for new sources of revenue while supporting mineral development in Northern Ontario.
   - *Industrial Park Development on the former CN Lands:* Both Cliffs Natural Resources and Noront Resources have been active in reviewing the former CN Industrial Lands owned by FWFN as potential sites for mineral processing.

- *Development of On-Reserve Residential Subdivision and Business Park:* There is an opportunity for First Nations involved in the Ring of Fire to create urban business partnership between FWFN and industry. This would create on-reserve employment opportunities for the residents of the Ring of Fire communities who live in the City of Thunder Bay and surrounding area.
- *Mineral Exploration in the Thunder Bay Region:* It is expected that mineral exploration companies in the region will identify new First Nation opportunities associated with mineral exploration and mine development.

4) Aboriginal Affairs and Northern Development Canada is encouraged to provide financial support for development of a strategic plan to identify and quantify synergies between remote First Nations, FWFN, the mining sector and the City of Thunder Bay. The strategic plan should identify any remote First Nation mining opportunities that can be pursued within the urban environment of FWFN and Thunder Bay. Any proposed plan should strive identify the business and partnership opportunities that have potential to create stable sources of revenue and employment for the urban First Nation population in and around Thunder Bay.

9.8 Recommendations

9.8.1 Housing

It is recommended that:

- The **need for more rental housing units** in the local market should be reflected in the municipality's on-going Official Plan update. In addition, the City should continue to monitor trends within what has become an extremely tight local rental housing market and respond as needed to facilitate the development of additional units.
- Examine administrative mechanisms which **encourage investment in new rental housing development.** These might include offering a preferred municipal tax rate for new multi-residential developments. By establishing a "new multi-residential" property class, and setting the tax rate at or similar to that used for "residential", private sector interest in bringing new units into the local market may be increased.[32]
- It is recommended that the City of Thunder Bay **strengthen and/or broaden its current provisions allowing for residential intensification** where appropriate, as a way of encouraging additional housing unit development, and particularly rental housing, within the community. Efforts in this regard were begun with the introduction of the new comprehensive zoning by-law in 2010 which increased the opportunities for rental unit development through infill and conversion within many areas of the City.
- The City should **investigate the establishment of a Development Permit System (DPS).** While Development Permit Systems have been promoted by the Province as a tool for integrating zoning, site plan, and minor variance approvals into one application and thereby can aid in reducing review and approval timelines, this feature would likely not provide much benefit to the City of Thunder Bay as there already exists the option to

[32] See: City of Greater Sudbury municipal tax rates as well as the Cities of Toronto, Ottawa, Kingston, Guelph, Hamilton, Orillia, Timmins, the Town of Parry Sound, and Region of Waterloo.

have multiple applications for a property processed together. However, the rules and regulations under the Development Permit System do provide for additional restrictions on the timing and eligibility of third party appeals regarding development applications. These restrictions may serve to facilitate quicker market responses to demand and may encourage the development of additional infill housing units.

- Thunder Bay, in conjunction with private sector developers, is encouraged to work together on a **"place to live" strategy** that includes aggressive marketing of Thunder Bay's educational, health, recreational and commercial/business assets in addition to creating and maintaining an attractive and diversified local housing market. It is expected that this type of marketing campaign, combined with an active campaign to provide a reasonable supply of new homes (for sale and rental) which will in turn attract the population growth resulting from mining sector growth. Although it is certain new employment will be created by growth in the mining sector, it is uncertain and unpredictable as to where these employees will choose to reside on a permanent basis, being a personal/family choice. This in turn makes housing supply forecasting uncertain. However, it is certain that the re-sale home and rental housing markets are currently short on supply, leading to higher prices. While there is currently a significant inventory of buildable lots, the location and availability of lots is not necessarily in keeping with market demands, nor is the supply and type of available housing.
- The City should continue to **closely monitor housing absorption rates**, vacancy rates, housing prices and rental rates, as well as input from the development community and realtors.
- The City should establish, in the Official Plan Review process, a "sunset" clause providing the City a **mechanism to rescind approvals for draft plans of subdivision for undeveloped lots that are unlikely to come to market in the near term**. These lots would then be removed from the building lot inventory used for planning purposes.
- The City should **investigate options to lower the cost of bringing lots to registered plan status ahead of anticipated demand**. Any initiatives pursued must be measured against the potential impacts they may have on existing buildable lots, whether infill or under registered plans of subdivisions, as well as pressures that may be placed on the municipality to extend services prematurely.
- If the inventory of buildable lots declines over the near term (3 years) the City should, in conjunction with the development community, **explore the opportunity of taking a more active role in land development.** This could include the provision of specific or upgraded infrastructure assets financed through the application of area specific development charges.

9.8.2 Industrial and Commercial Lands

It is recommended that:

- The City of Thunder Bay through the CEDC, and working closely with private property owners, should **investigate and document remediation requirements for the many available lots that are designated for heavy industrial and large industrial use**, to ensure their market availability for potential mining sector related development is as clear as possible.

- Opportunities are identified for **partnering between the private sector and senior levels of government to remediate contaminated lands** that could then be made available as application-ready industrial development sites to the industrial developer market.
- The City should **investigate the feasibility of extending sewer service to Mission Island** to facilitate the development of available industrial lands. The feasibility of this development will likely be based on: 1) whether the Thunder Bay Generating Station is converted to natural gas, providing potential gas line connection to the Island; and 2) the rate of uptake of existing serviced industrial lots within other areas of the City and the Fort William First Nation.
- The City, through the CEDC, together with Fort William First Nation, should **explore the feasibility of developing a smelter on serviced industrial lands** that are adequately connected to sources of high voltage power and heavy transportation systems, for the purposes of receiving ore from Marathon copper and all of the other potential mines in Northwestern Ontario, as well as neighbouring markets in the United States.

9.8.3 Infrastructure Demands

It is recommended that:

- The City should continue to **pursue the development of the Northwest Arterial road in order to facilitate the long term growth potential of the northwest section of the city** and lessen current congestion at both John Street and the Thunder Bay Expressway (Highway 11/17) as well as Red River Road and the Thunder Bay Expressway. This should be coordinated with the Province's recently announced design study and environmental assessment of possible improvements to the Thunder Bay Expressway (Highway 11/17) between Arthur Street and Balsam Street. That study is to look at possible widening of the highway and building new interchanges. The City should be in a position to influence the Provincial process to help ensure it reflects current local needs.
- The City should **continue to monitor growth patterns and demand for development within the northwestern section of the community** and proceed with necessary planning, engineering and environmental assessment studies so that additional sewer capacity to this area can be delivered expediently prior to demand outstripping capacity.

9.9 References

(1) City of Thunder Bay, "Corporate Report: Residential Lot/Unit Inventory & Monitoring Report – January 2012", March 29, 2012, with updates from current City records..

(2) Canadian Mortgage and Housing Corporation, "Housing Now: Thunder Bay CMA" Fourth Quarter 2012.

(3) City of Thunder Bay, "Corporate Report: Residential Lot/Unit Inventory & Monitoring Report – January 2012", March 29, 2012, with updates from current City records..

(4) Statistics Canada, Census Profile, http://www12.statcan.gc.ca/census-recensement/2011

(5) Canadian Mortgage and Housing Corporation, "Housing Now: Thunder Bay CMA" Fourth Quarter 2012, and "Housing Market Outlook: Thunder Bay CMA", Fall 2012.

(6) Canadian Mortgage and Housing Corporation, “Housing Now: Thunder Bay CMA” Fourth Quarter 2012.

(7) Canadian Mortgage and Housing Corporation, “Housing Now: Thunder Bay CMA” Fourth Quarter 2012. Note: original source is data from the Thunder Bay Real Estate Board, Districts 1 and 2.

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(9) Canadian Mortgage and Housing Corporation, Media Release “Thunder Bay Vacancy Rate Declines”, December 2012.

(10) Canadian Mortgage and Housing Corporation, “Rental Market Report, Thunder Bay CMA”, Fall 2012, with updates from current City records..

(11) Sources: Municipal Property Assessment Corporation (MPAC) data on Vacant Industrial Lands, City of Thunder Bay GIS data layers related to land use designations.

(12) City of Thunder Bay, “Corporate Report: Residential Lot/Unit Inventory & Monitoring Report – January 2012”, March 29, 2012, with updates from current City records.

(13) Source: Statistics Canada, 2006 Census, 2006 Community Profiles

(14) City of Thunder Bay, “Corporate Report: Residential Lot/Unit Inventory & Monitoring Report – January 2012”, March 29, 2012, with updates from current City records.

(15) Canadian Mortgage and Housing Corporation, “Housing Now: Thunder Bay CMA” Fourth Quarter 2012, and “Housing Market Outlook: Thunder Bay CMA”, Fall 2012.

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(17) Planning Services Department, City of Thunder Bay, “Land Use Needs Study: Final Report”, Manahan Consulting and Associates, Northern Bioscience and Superior Business Consulting, September 2007.

(18) Planning Services Department, City of Thunder Bay, “Land Use Needs Study: Final Report”, Manahan Consulting and Associates, Northern Bioscience and Superior Business Consulting, September 2007. (Page 35)

(19) Sources: Municipal Property Assessment Corporation (MPAC) data on Vacant Industrial Lands, City of Thunder Bay GIS data layers related to Official Plan land use designations.

(20) Sources: Municipal Property Assessment Corporation (MPAC) data on Vacant Industrial Lands, City of Thunder Bay GIS data layers related to land use designations.

(21) Manahan Consulting and Associates, Land Use Needs Study, September 2007, City of Thunder Bay.

(22) IBI Group, Turner & Townsend, cm2r, and Engineering Northwest Ltd, “Renew Thunder Bay (RTB) Golf Links Road / Junot Avenue Corridor Study” for City of Thunder Bay, August 2012

(23) City of Thunder Bay, “Renew Thunder Bay”, http://www.thunderbay.ca/City_Government/News_and_Strategic_Initiatives/Renew_Thunder_Bay.htm

(24) IBI Group, Turner & Townsend, cm2r, and Engineering Northwest Ltd, “Renew Thunder Bay (RTB) Golf Links Road / Junot Avenue Corridor Study” for City of Thunder Bay, August 2012.

(25) Source: IBI Group, Turner & Townsend, cm2r, and Engineering Northwest Ltd, “Renew Thunder Bay (RTB) Golf Links Road / Junot Avenue Corridor Study” for City of Thunder Bay, August 2012

(26) Aboriginal Affairs and Northern Development Canada, January 2013, http://pse5-esd5.ainc-inac.gc.ca/fnp/Main/Search/FNRegPopulation.asp

(27) Canadian Mortgage and Housing Corporation, “On-Reserve Non-Profit Housing Program (section 95)”, http://www.cmhc-schl.gc.ca/en/ab/onre/onre_010.cfm

(28) Fort William First Nation

(29) Fort William First Nation Development Corporation ,“Economic Development Strategy”, February 2005

(30) City of Thunder Bay, “City of Thunder Bay Aboriginal Liaison Strategy”, http://www.thunderbay.ca/Assets/City+Government/Aboriginal+Relations/docs/Aboriginal+Strategy+2012.pdf

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10 HEALTH

10.1 Introduction

This Section of the Report characterizes the components and structure of the health sector in Northwestern Ontario. It includes a description of the administrative makeup of the sector as well as an analysis of the challenges, both present and impending, that the sector faces. With an expected rise in population due to mining and subsequent economic development activity, added pressure will be placed on existing health care resources. Changing population characteristics as well as health care professional retirement rates also underline the urgent need to address the increasing demand for health care resources [1].

10.2 Regional Health Care

The North West Local Health Integration Network (LHIN) presented a blueprint in 2012 for optimizing the delivery of health services in Northwestern Ontario [2]. Implementation of this blueprint has led to the formation of five Integrated District Networks (IDNs) within Northwestern Ontario, shown in Figure 10-1. These are:

- Thunder Bay district IDN;
- City of Thunder Bay IDN;
- Kenora IDN;
- Rainy River IDN; and
- Northern IDN.

Figure 10-1

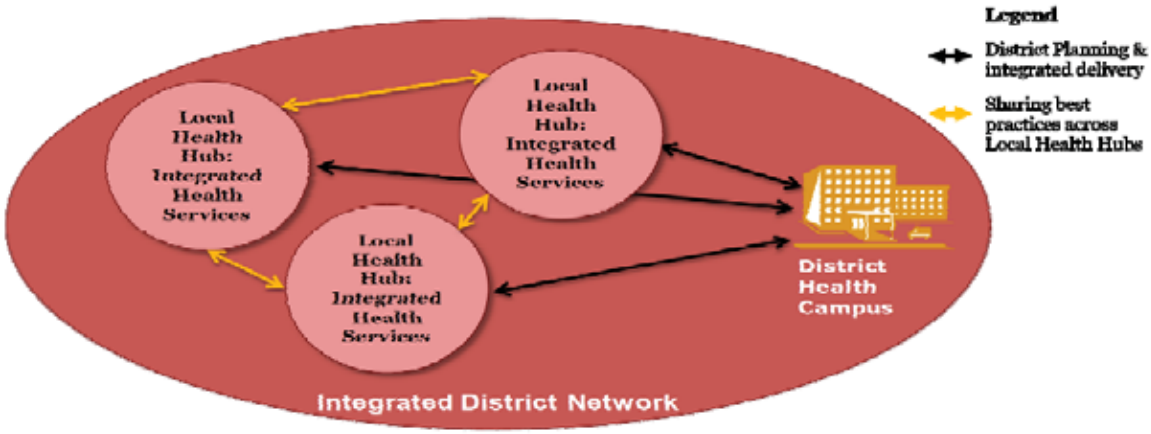
Northwestern Ontario Integrated District Networks

Source: Health Profile – Northern Integrated District Network [3]

The purpose of the IDN's is to provide a forum for integrated planning and service delivery within a district as a means of optimizing healthcare quality and access for the district's population; and to repatriate patients back to health care services closer to home [2]. The structure of an IDN is illustrated in Figure 10-2.

Figure 10-2

Integrated District Network

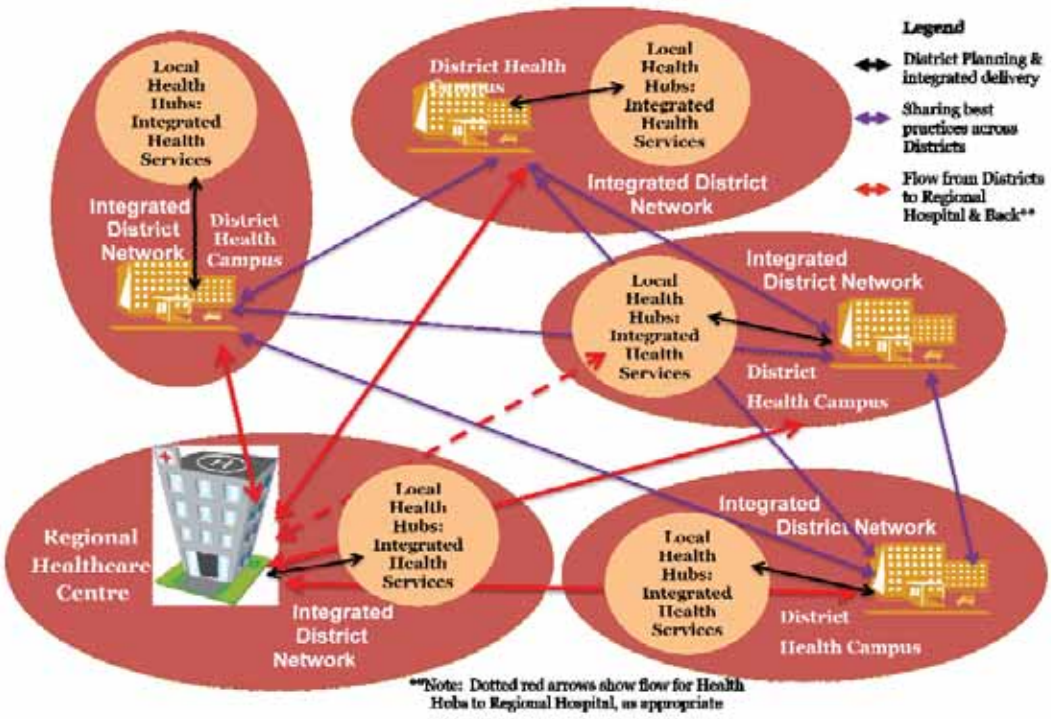


Source: North West LHIN: Health Services Blueprint [2]

The establishment of the five IDN's within the region requires collaboration to optimize health service quality and access. At each level, providers aim to achieve integration, coordination and standardization through the creation of networks within and across all levels. Integration is achieved through enhanced collaboration, effective use of technology and consolidation of services where appropriate. Coordination is supported through a revised management structure and collective accountability for the delivery of health services [2]. The relationship between individual IDN's in the region is demonstrated in Figure 10-3.

Figure 10-3

Collaboration of Integrated District Network



Source: North West LHIN: Health Services Blueprint [2]

10.2.1 Emergency Services

Table 10.1 outlines the number of unscheduled emergency department visits by residents within Northwestern Ontario between 2009 and 2010 [3][4][5][6][7].

Table 10.1

Emergency Visits to Regional Hospitals by IDN for 2009-2010

Hospital	Thunder Bay CMA	Thunder Bay District	Kenora	Rainy River	Northern
Atikokan General Hospital	138	14	13	4,051	13
Dryden Regional Health Centre	157	42	15,978	43	314
Geraldton District Hospital	150	8,790	10	9	17
Lake of the Woods District Hospital	100	27	18,375	121	182
Manitouwadge General Hospital	23	3,362	4	7	1
The McCausland Hospital	72	2,230	4	5	0

Hospital	Thunder Bay CMA	Thunder Bay District	Kenora	Rainy River	Northern
Nipigon District Memorial Hospital	630	4,598	4	6	2
Red Lake Margaret Cochenour Memorial Hospital	53	10	2,355	13	233
Riverside Health Care Facility – Emo	<5	<5	34	775	0
Riverside Health Care Facility - La Verendrye Hospital	198	16	458	15,124	34

Source: Health Profile –Thunder Bay district, City of Thunder Bay, Kenora, Rainy River and Northern IDN, 2012. [3][4][5][[6][7]

10.2.2 Non- Acute Care LHIN Funded Services

Non-acute health care service providers funded by the Northwest LHIN and operating in Northwestern Ontario are listed in Table 10.2 [3][4][5][6][7].

Table 10.2

North West LHIN Funded Non-Acute Health Service Providers

Organization Name	Head Office Location	Area Served
Community Social Services (CSS) Sector		
Alzheimer Society of Kenora & Rainy River	Kenora	Kenora District and Rainy River District including Northern Communities
Alzheimer Society Thunder Bay	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District
Anishinaabeg of Kabapikotawangag Resource Council	Sioux Narrows	Sioux Narrows and surrounding Aboriginal communities
Aroland First Nation	Aroland	Aroland First Nation
Bearskin Lake First Nation	Bearskin Lake	Bearskin Lake First Nation
Big Trout First Nation	Thunder Bay	Big Trout Lake First Nation
Brain Injury Services of Northern Ontario (BISNO)	Thunder Bay	Northern Ontario with services primarily in city of Thunder Bay
Canadian Hearing Society	Thunder Bay	North West LHIN
Canadian National Institute for the Blind (CNIB)	Thunder Bay	North West LHIN
Canadian Red Cross Society – Thunder Bay	Thunder Bay	City of Thunder Bay and surrounding area, Thunder Bay District and Dryden area
Corporation of the City of Thunder Bay	Thunder Bay	City of Thunder Bay
Deer Lake First Nation	Deer Lake	Deer Lake First Nation
Dilico Anishinabek Family Care	Thunder Bay	City of Thunder Bay and Thunder Bay District (including Armstrong, Longlac, Nipigon, Pic River and Pic Mobert First Nations)
Dryden Aboriginal Women's Resource Centre	Dryden	Metis/Status First Nations' women and families in Dryden area

Organization Name	Head Office Location	Area Served
Dryden Regional Health Centre	Dryden	Dryden and surrounding area (including Ignace, Vermilion Bay, Wabigoon and Eagle Lake First Nations)
Eabametoong First Nation	Eabamet Lake	Eabametoong First Nation
Eagle Lake First Nation	Migisi Sahgaigan	Eagle Lake First Nation
Fort Frances Tribal Area Health Services Inc.	Fort Frances	First Nations in Rainy River District.
Fort Severn First Nation	Fort Severn	Fort Severn First Nation
Fort William First Nation	Thunder Bay	City of Thunder Bay (Fort William First Nation members)
Grace Haven Lutheran Community Care Centre	Dryden	Dryden and surrounding area in Kenora District
Gull Bay First Nation	Gull Bay	Gull Bay First Nation
HAGI - Community Services for Independence	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District
HAGI – Community Services for Independence	Thunder Bay	City of Thunder Bay and Thunder Bay District
Hospice North West	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District
Kasabonika First Nation	Kasabonika Lake	Kasabonika Lake Nation
Keewaywin First Nation	Keewaywin	Keewaywin First Nation
Kenora Chiefs Advisory Inc.	Kenora	Kenora area (Ochiichagwebabigoining, Grassy Narrows, Iskatewizaagaygun, Shoal Lake 40, Naotkamegwanning, Wabaseemoong First Nations
Kingfisher Lake First Nation	Kingfisher Lake	Kingfisher Lake First Nation
Lac Seul First Nation	Hudson	Lac Seul First Nation
Marten Falls First Nation	Ogoki Post	Marten Falls*
McCausland Hospital (The)	Terrace Bay	Catchment area of Jackfish to Pays Plat (including Terrace Bay, Schreiber and Rossport)
Mishkeegogamang First Nation	New Osnaburgh	Mishkeegogamang First Nation
Municipality of Greenstone	Geraldton	Municipality of Greenstone (including Geraldton, Longlac, Beardmore and Nakina)
Municipality of Machin	Machin	Muncipality of Machin
Muskrat Dam First Nation	Muskrat Dam	Muskrat Dam First Nation
Naotkamegwanning First Nation	Pawitik	Naotkamegwanning First Nation (Whitefish Bay)
Nibinamik First Nation	Summer Beaver	Nibinamik First Nation
North Caribou Lake First Nation	Weagamow Lake	North Caribou Lake First Nation
North of Superior Community Mental Health Program Corporation	Schreiber	Thunder Bay District and surrounding First Nations
North Spirit Lake First Nation	North Spirit	North Spirit Lake First Nation

Organization Name	Head Office Location	Area Served
	Lake	
Northern Chiefs Tribal Council	Balmertown	Northern Communities (including Fort Severn, Deer Lake, Keewaywin, North Spirit Lake, Poplar Hill)
Northwestern Independent Living Services Inc.	Keewatin	Kenora District and Rainy River District
Patricia Region Senior Services	Dryden	Dryden area (including Machin, Oxdrift Wabigoon and Eagle River)
Pikangikum First Nation	Pikangikum	Pikangikum First Nation
Poplar Hill First Nation	Poplar Hill	Poplar Hill First Nation
Riverside Health Care Facilites Inc.	Fort Frances	Rainy River District
Sachigo Lake First Nation	Sachigo Lake	Sachigo Lake First Nation
Sandy Lake First Nation	Sandy Lake	Sandy Lake First Nation
Slate Falls First Nation	Slate Falls	Slate Falls First Nation
St. Joseph's Care Group	Thunder Bay	North West LHIN
The Board of Management of the District of Kenora Home for the Aged	Kenora	Kenora District (including Keewatin, Redditt, Sioux Narrows, Red Lake, Balmertown and Sioux Lookout)
Upsala Volunteer Ambulance Services Association	Upsala	Upsala area
Victorian Order of Nurses – Thunder Bay	Thunder Bay	City of Thunder Bay and surrounding area
Wabaseemoong First Nation	Whitedog	Wabaseemoong First Nation
Wabauskang First Nation	Ear Falls	Wabauskang First Nation
Wabigoon Lake Ojibway Nation	Dryden	Wabigoon First Nation
Wapakeka First Nation	Angling Lake	Wapakeka First Nation
Webequie First Nation	Webequie	Webequie First Nation
Wesway Inc.	Thunder Bay	Thunder Bay City, Thunder Bay District, Kenora District and Rainy River District
Whitesand First Nation	Armstrong	Whitesand First Nation
Wilson Memorial General Hospital	Marathon	Marathon catchment area (including the Ojibways of Pic River and Pic Mobert First Nations)
Windigo First Nation	Sioux Lookout	Windigo First Nation
Wunnumin Lake Indian Band	Wunnumin	Wunnumin First Nation
Community Health Centre (CHC) Sector		
Mary Berglund Family Clinic	Ignace	Kenora District (including Ignace, English River, Borrup Corners, Dyment and Savant Lake)
North West Community Care Access Centre	Thunder Bay	North West LHIN
NorWest Community Health Centres	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District
Home Care Sector - Community Care Access Centre (CCAC)		
North West Community Care Access Centre	Thunder Bay	North West LHIN

Organization Name	Head Office Location	Area Served
Substance Abuse Programs		
3 C's Reintroduction Centre (The)	Thunder Bay	City of Thunder Bay and surrounding area, Thunder Bay District and Northern Communities
Alpha Court Non-Profit Housing Corporation	Thunder Bay	City of Thunder Bay and surrounding area
Atikokan General Hospital	Atikokan	Atikokan and surrounding area
Canadian Mental Health Association – Fort Frances	Fort Frances	Fort Frances and surrounding area
Changes Recovery Homes	Keewatin	Ontario with priority given to residents of Kenora District, Rainy River District and Northern Communities
Children's Centre Thunder Bay	Thunder Bay	City of Thunder Bay and surrounding area
Crossroads Centre Inc.	Thunder Bay	North West LHIN
Dilico Anishinabek Family Care	Thunder Bay	City of Thunder Bay and Thunder Bay District (including Armstrong, Longlac, Nipigon, Pic River and Pic Mobert)
Dryden Regional Health Centre	Dryden	Dryden and surrounding region
Kenora Chiefs Advisory Inc.	Kenora	Kenora area (Ochiichagwebabigoining, Grassy Narrows, Iskatewizaagaygun, Shoal Lake 40, Naotkamegwanning, Wabaseemoong First Nations
Lake of the Woods District Hospital	Kenora	Kenora and surrounding communities
North of Superior Community Mental Health Program Corporation	Schreiber	Thunder Bay District and surrounding First Nations
Red Lake Margaret Cochenour Memorial Hospital	Red Lake	Red Lake and Northern Communities
Reverend Tommy Beardy Memorial Wee Che He Wayo-Gamik	Muskrat Dam	Muskrat Dam and Northern Communities
Riverside Health Care Facilities Inc.	Fort Frances	Rainy River District
Sioux Lookout Meno-Ya-Win Health Centre	Sioux Lookout	Sioux Lookout and Northern Communities
St. Joseph's Care Group	Thunder Bay	North West LHIN
Thunder Bay Counselling Centre	Thunder Bay	Predominantly City of Thunder Bay with some referrals from Thunder Bay District
Thunder Bay Seaway Non-Profit Apartments	Thunder Bay	City of Thunder Bay and surrounding area, Thunder Bay District and Ontario
Weechi-it-te-win Family Services. Inc.	Fort Frances	Rainy River District
Mental Health (MH) Sector		
Alpha Court Non-Profit Housing Corporation	Thunder Bay	City of Thunder Bay and surrounding area
Atikokan General Hospital	Atikokan	Atikokan and surrounding area
Brain Injury Services of Northern Ontario (BISNO)	Thunder Bay	Northern Ontario with services primarily in Thunder Bay

Organization Name	Head Office Location	Area Served
Canadian Mental Health Association – Fort Frances	Fort Frances	Rainy River District with Consumer Survivor Initiatives and Psycho-geriatric programs also offered in Kenora District
Canadian Mental Health Association – Kenora	Kenora	Kenora District, Rainy River District and Court Support in Northern Communities
Canadian Mental Health Association – Thunder Bay	Thunder Bay	Early Psychosis Intervention in City of Thunder Bay, Thunder Bay District, Kenora District and Rainy River District
Centre for Education and Research on Aging and Health (CERAH)	Thunder Bay	North West LHIN
Dilico Anishinabek Family Care	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District including Armstrong, Longlac, Nipigon, Pic River, Pic Mobert
Dryden Regional Health Centre	Dryden	Dryden and surrounding region
Fort Frances Tribal Area Health Services Inc.	Fort Frances	First Nations in Rainy River District
Gizhewaadiziwin Health Access Centre	Fort Frances	Aboriginal people in Rainy River District
Kenora Association for Community Living	Kenora	City of Kenora
Kenora Chiefs Advisory Inc.	Kenora	Kenora area (Ochiichagwebabigoining, Grassy Narrows, Iskatewizaagaygun, Shoal Lake 40, Naotkamegwanning, Wabaseemoong First Nations
Kenora Sexual Assault Centre	Kenora	Kenora area (including Treaty 3)
Lake of the Woods District Hospital	Kenora	Kenora and surrounding communities
Naotkamegwanning First Nation	Pawitik	Naotkamegwanning First Nation
North of Superior Community Mental Health Program Corp.	Schreiber	Thunder Bay District and surrounding First Nations
People Advocating Change Through Empowerment Inc.	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District
Red Lake Margaret Cochenour Memorial Hospital	Red Lake	Red Lake and Northern Communities
Reverend Tommy Beardy Memorial Wee Che He Wayo-Gamik	Muskrat Dam	Muskrat Dam and Northern Communities
Riverside Health Care Facilities Inc.	Fort Frances	Rainy River District
Sioux Lookout Meno-Ya-Win Health Centre	Sioux Lookout	Sioux Lookout and Northern Communities
St. Joseph's Care Group	Thunder Bay	North West LHIN
Sunset Country Psychiatric Survivors	Kenora	Dryden, Kenora and Red Lake in Kenora District and Fort Frances in Rainy River District
Thunder Bay Counselling Centre	Thunder Bay	Predominantly City of Thunder Bay with some referrals from Thunder Bay District

Organization Name	Head Office Location	Area Served
Thunder Bay Regional Health Sciences Centre	Thunder Bay	North West LHIN
Thunder Bay Sexual Assault/Sexual Abuse Counselling and Crisis Centre	Thunder Bay	City of Thunder Bay, Thunder Bay District and Northern Communities.
Waasegiizhig Nanaandawe'iyewigamig	Kenora	All Aboriginal people in Kenora District
Wabaseemoong First Nation	Whitedog	Wabaseemoong First Nation
Wesway Inc.	Thunder Bay	City of Thunder Bay and surrounding area and Thunder Bay District

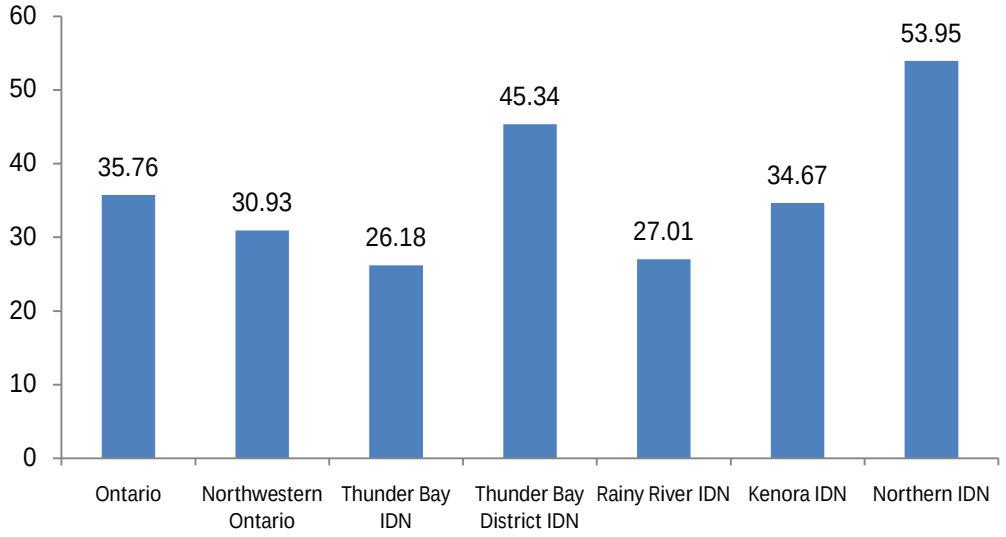
Source: Health Profile –Thunder Bay district, City of Thunder Bay, Kenora, Rainy River and Northern IDN, 2012. [3][4][5][[6][7]

10.3 Regional Health Care Challenges

Based on the 2006 Census, there is a ratio of 35.76 people per healthcare professional across the Province of Ontario. In comparison, Northwestern Ontario has an average ratio of 30.93. The ratios in each IDN are illustrated in Figure 10-4. Northwestern Ontario is the most sparsely populated region of those described in Table 10.4. In 2006, the population density of Northwestern Ontario was 0.4 persons per square kilometer compared to 14.72 persons per square kilometer in Ontario. This presents a unique set of challenges in the delivery of quality healthcare to the residents of Northwestern Ontario that may not be fully reflected by the population to health care professional ratio [1].

Figure 10-4

Ratio of Population to Health Worker



Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

10.3.1 Population Characteristics

The analysis conducted in the recent study by the North Superior Workforce Planning Board (NSWPB) and the Northwest Training and Adjustment Board (NTAB) *Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025* published in March 2013 projects an increase in the population of Northwestern Ontario from its level of 231,475 in 2010 to 243,498 by 2025 [1]. This represents an increase of a 5.19 percent during their forecasting period [1].

The population changes that take into account economic growth from 2010 to 2025 [1] are:

- The City of Thunder Bay IDN population is expected to increase from 121,849 in 2010 to 123,642, an increase of 1.47 percent.
- The District of Thunder Bay IDN is expected to stay relatively constant 24,128.
- The District of Rainy River IND population will increase from 20,390 in 2010 to 23,808, a 16.76 percent increase.
- The District of Kenora IDN population will rise from 44,210 in 2010 to 47,370, a 7.14 percent increase.
- The Northern IDN population will increase from 20,770 in 2010 to 24,551, the largest increase at 17.2 percent.

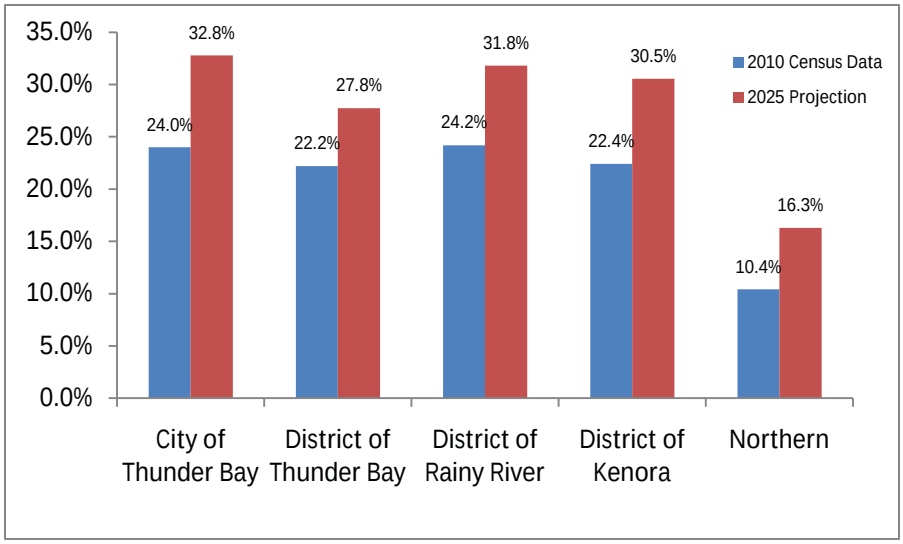
The population of Northwestern Ontario will also age during the period 2010-2025. The percentage share of population aged 60 and over will increase from 22.3 percent in 2010 to 30.8 percent in 2025. In other words, one-third of Northwestern Ontario's population will be 60 years and over in 2025 [1].

- **The City of Thunder Bay IDN's** share of population aged 60 and over will increase from 24.0 percent in 2010 to 32.5 percent in 2025. Similarly, the share of those aged 65 and over will increase from 17.2 percent in 2010 to 24.8 percent in 2025, an increase of approximately 44.2 percent [1].
- The share of population aged 60 and over in the **District of Thunder Bay IDN** will increase from 22.2 percent in 2010 to 36.29 percent in 2025. The percentage share of those 65 and older will rise from 14.4 percent in 2010 to 27.7 percent in 2025, an increase of approximately 92.3 percent [1].
- The population share of those 60 years and over in the **District of Rainy River IDN** will increase from 24.2 percent in 2010 to 31.8 percent in 2025. Similarly, the share of those over 65 years of age will increase from 17.4 percent in 2010 to 24.3 percent in 2025, a rise of approximately 40.0 percent [1].
- The **District of Kenora IDN's** share of population aged 60 and over will increase from 22.4 percent in 2010 to 30.54 percent in 2025. Similarly, the share of those aged 65 and over will increase from 15.37 percent in 2010 to 23.15 percent in 2025. This represents an increase of approximately 50.6 percent [1].
- The **Northern IDN** has the youngest population among all regions in Northwestern Ontario. The share of those aged 60 and over equaled 10.4 percent in 2010. This is expected to increase to 16.3 percent in 2025. The share of those 65 years of age and older will increase from 6.9 percent in 2010 to 10.9 percent in 2025 [1].

Figure 10-5 demonstrates the population age shift in each of the IDNs examined.

Figure 10-5

Forecast of Percentage of the Population 60 years of Age and Over

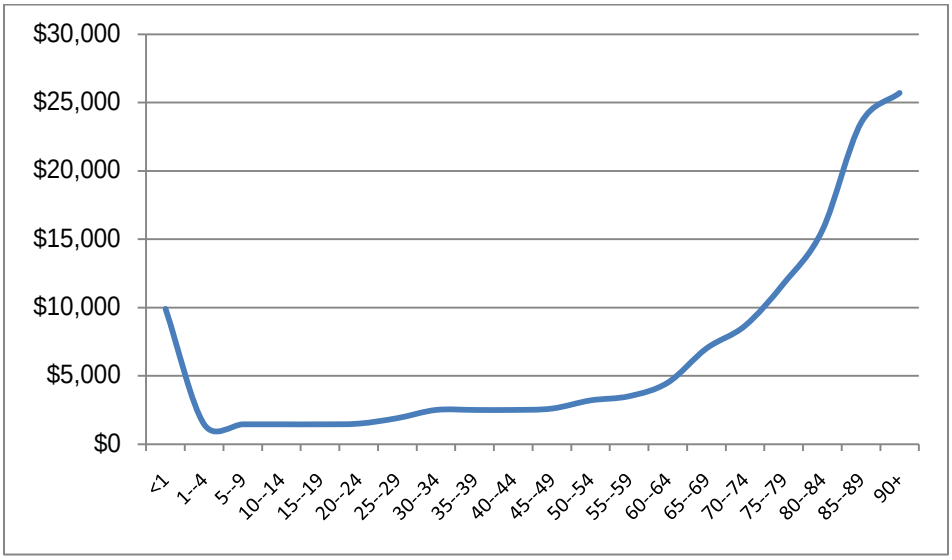


Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

Generally, demand for healthcare services increases with population age. Per capita health expenditures rise from $2,895 per person aged 45 to 49 to $6,556 for individuals between the ages of 65 to 69 [1]. Figure 10-6 demonstrates the relationship between age and health expenditures in Ontario in 2010. [1]

Figure 10-6

Per Capita Health Expenditures by Age in Ontario (2010)



Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

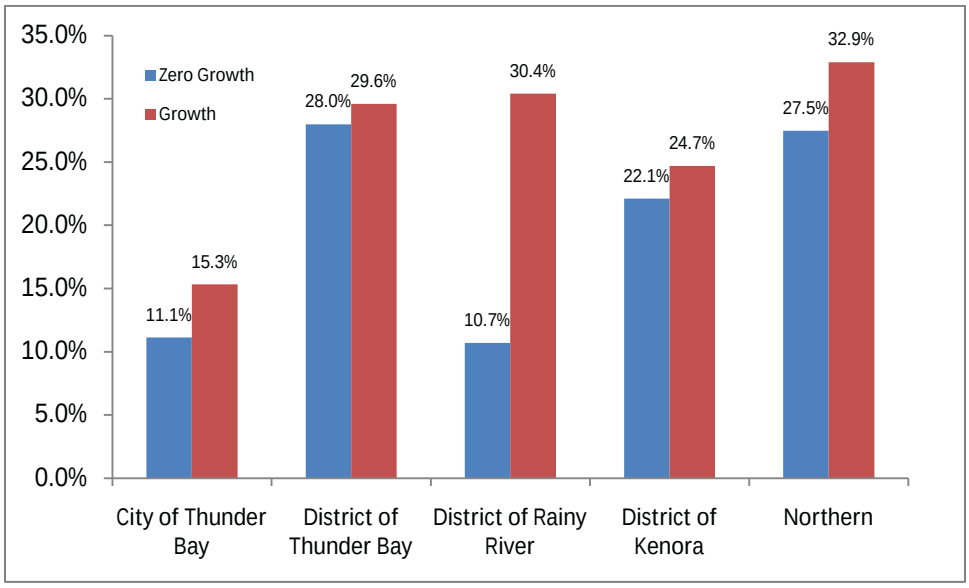
10.3.2 Demand for Healthcare Workers in Northwestern Ontario

The report *Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025* published in March 2013 estimated growth-demand indicators based on Northwestern Ontario's population characteristics as well as information on per capita healthcare expenditure in Ontario [1]. The results show that changes in size and age distribution of Northwestern Ontario's population will have a significant impact on demand for healthcare workers in the coming years. The overall demand for healthcare workers in Northwestern Ontario is expected to increase by 15 to 21 percent during the projection period. During the same period, healthcare demand by the population aged 60 years and older is expected to increase by 38 to 44 percent [1].

The cumulative demand for healthcare workers across **Northwestern Ontario** is expected to increase by 15.87 percent (with no net migration) or 21.03 percent (with projected growth) between 2010 and 2025. This is illustrated in Figure 10-7. The demand for healthcare workers by the population aged 60 years and older is expected to increase by 37.95 percent (with no net migration) or 44.12 percent (with projected growth) during the same period [1].

Figure 10-7

Projected Increase in Demand for Healthcare Workers, 2010 to 2025



Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

- Demand for healthcare workers in the **City of Thunder Bay IDN** will increase by between 11.12 and 15.32 percent during the period of 2010 to 2025. Demand by the population 60 years of age and older will rise by between 28.75 and 33.62 percent during the same period [1].
- Demand for healthcare workers in the **District of Thunder Bay IDN** is expected to increase by between 27.99 and 29.60 percent during the period of 2010 to 2025. Demand by those aged 60 and over is expected to increase by between 74.28 and 76.48 percent during the same period [1].

- Demand for healthcare workers in the **District of Rainy River IDN** is expected to increase by between 10.70 and 30.41 percent during the period of 2010 to 2025. Demand by those aged 60 and over is expected to rise by between 26.80 and 49.39 percent during the same period [1].
- Demand for healthcare workers in the **District of Kenora IDN** is expected to increase by between 22.12 and 24.68 percent during the period of 2010 to 2025. Demand by the population aged 60 and over is expected to rise by between 47.93 and 51.12 percent during the same period [1].
- Demand for healthcare workers in the **Northern IDN** is expected to increase by between 27.48 and 32.89 percent during the period of 2010 to 2025. Demand by the population aged 60 and older is expected to increase by between 72.75 and 80.08 percent during the same period [1].

10.3.3 Profile of Regional Healthcare Professionals

The health care Sector is an important part of the region's economy and accounts for 10.1 percent of total employment in Northwestern Ontario [8]. However, unlike forestry and mining industries, the healthcare sector is a non-cyclical, growing component of the regional economic base and plays a stabilizing role in the regional economy [1]. In addition, the relatively high labour compensation and high value-added nature of the industry results in relatively significant employment and income resulting from each dollar of spending on the regional health industry [1].

Within NSWPB and NTAB's analysis, all the occupations within the structure and skill type of "Health" that start with the number three (3) are referred to as "traditional" healthcare occupations [1]. Occupations in the field of healthcare that did not fall under these NOC codes are referred to as "non-traditional" healthcare occupations. Most are from NOC Major Group 41, Social and community service professionals, which includes: Psychologists, Social Workers, and Family, Marriage and Other Related Counselors [1].

Northwestern Ontario's traditional healthcare sector employs an estimated 7,470 individuals. Employment in the non-traditional healthcare sector equals 3,565. Together, the traditional and non-traditional healthcare sectors account for approximately 11,035 workers in Northwestern Ontario.

Traditional Health Occupations

Table 10.3 shows the top six traditional healthcare professions. These occupations comprise 86.9 percent of total employment in traditional healthcare sector in Northwestern Ontario [1].

Table 10.3

Top Six Categories of Traditional Healthcare Professionals

Selected Occupational Groups	20-49	50-54	55-59	60-64	65+
Nursing - Related Occupations	1,540	415	535	370	170
Assisting Occupations	1,115	255	160	135	85
Medical Technologies	375	80	90	75	10
Therapy Assessment Professionals	290	25	20	40	10
Physicians	175	25	50	15	80
Paramedics	225	55	25	15	20
Total	3,720	855	880	650	375

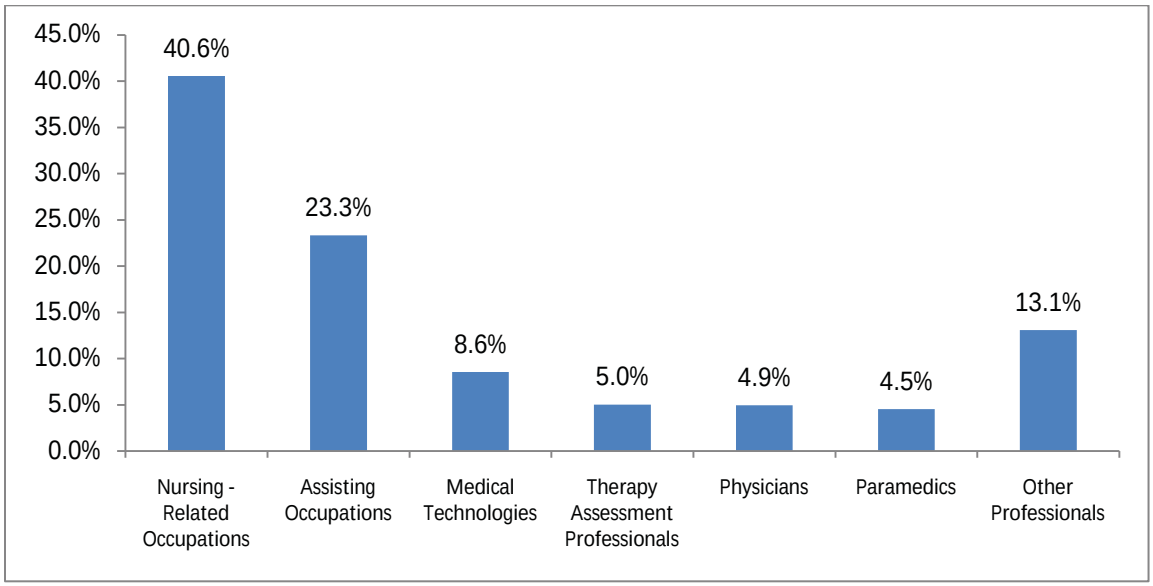
Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

- Registered nurses represent almost 34.0 percent of total employment in Northwestern Ontario's healthcare sector. Licensed practical nurses represent 6.6 percent of the workers. Together, the nursing related occupations represent almost 40.5 percent of employment in Northwestern Ontario's healthcare sector [1].
- Assisting occupations in health care account for 23.3 percent of employment. This group includes nurse aides, orderlies and patient service associates and other assisting occupations in support of the health services. Together, the nursing and assisting occupations in health care account for 63.9 percent of total employment in Northwestern Ontario's healthcare sector [1].
- Medical technologists and technicians account for 8.55 percent of employment followed by therapy and assessment professionals (5.0%), physicians (4.9%) and paramedics (4.6%) [1].
- Women account for the majority of employment in the sector making up 81.8 percent of workforce [1].

Figure 10-8 shows the occupational structure of the traditional health occupations classified under the NOC Health category.

Figure 10-8

Healthcare Sector Occupational Structure of Northwestern Ontario



Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

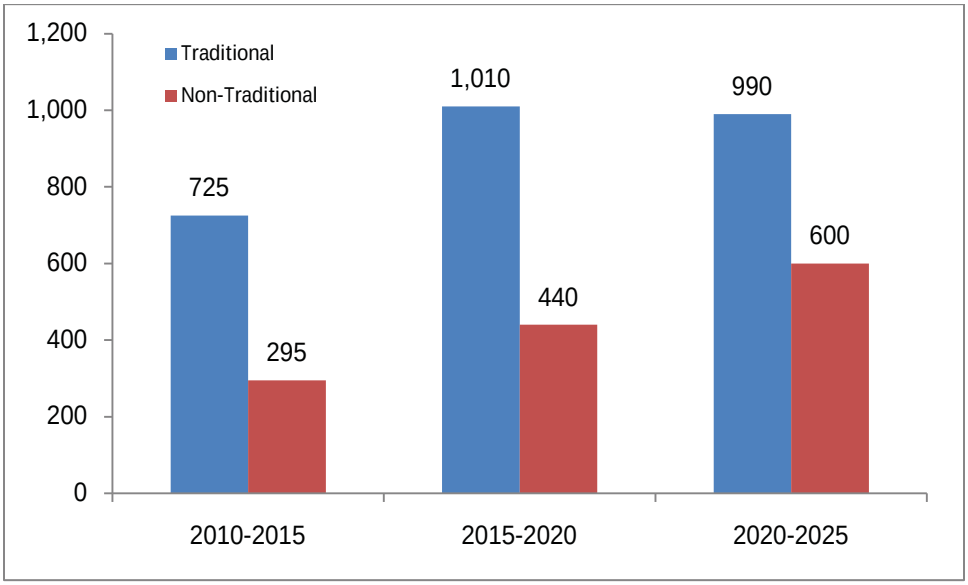
- The healthcare sector employs approximately 4,655 people in the **City of Thunder Bay IDN**. The non-traditional sector employs almost 1,605 people. Together, the traditional and non-traditional healthcare sectors account for 10.6 percent of total employment in the City of Thunder Bay IDN [1].
- There are approximately 535 individuals employed in the traditional healthcare sector of **District of Thunder Bay IDN**. An additional 350 are employed in the non-traditional sector. Together, they comprise almost 7.3 percent of total employment in that region [1]. The sector is dominated by women who account for 80.4 percent and 78.6 percent of employment in the traditional and non-traditional healthcare sectors respectively [1].
- The **District of Rainy River IDN**'s traditional healthcare sector employs approximately 755 individuals. In addition, approximately 375 people work in the non-traditional healthcare sector. Together, they account for 10.9 percent of total employment in the District of Rainy River IDN [1]. The sector is dominated by women who account for 86.1 percent and 72.3 percent of employment in the traditional and non-traditional healthcare sectors, respectively [1].
- Approximately 1,275 persons work in the traditional healthcare sector in the **District of Kenora IDN**. An additional 725 work in the non-traditional healthcare sector. Together, they comprised 9.3 percent of total employment in Kenora in 2005 [1]. The sector is dominated by women who account for 78.4 percent and 72.4 percent of employment in the traditional and non-traditional healthcare sectors respectively [1].
- Approximately 385 people work in the traditional healthcare sector in the **Northern IDN**. An additional 515 individuals work in the non-traditional healthcare sectors in that region. Together, they represent 12.9 percent of total employment in that region [1]. The sector is dominated by women who account for 72.2 percent and 63.1 percent of employment in the traditional and non-traditional healthcare sectors, respectively [1].

10.3.4 Northwestern Ontario Health Care Demand Projections

Within NSWPB and NTAB's analysis, the future demand for healthcare occupations was estimated using two key characteristics. The first is the growth component of total demand for healthcare providers as a result of changes in population characteristics [1]. The second component estimates the need to replace those workers who retire over the forecast period [1]. This constitutes the retirement-replacement, or retirement load component of the future demand for healthcare workers. The retirement load was estimated using detailed data on the occupational distribution of healthcare workers by age in various Northwestern Ontario regions [1].

Figure 10-9

Northwestern Ontario Health Care Demand Projections



Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

Traditional Healthcare Occupation Retirement Load

It was estimated that 725 or 9.7 percent of healthcare workers in Northwestern Ontario will retire during **2010- 2015**. Registered nurses (285) account for the largest number of retirees during that period followed by nurse aides, orderlies and patient service associates (125) and registered practical nurses (85) [1]. During the period of 2010 to 2015, the occupations with the largest retirement rate (% of workers retiring in each occupation) include dental technologists and technicians (33.3%), chiropractors (30%), dentists (17.2%), registered practical nurses (17.2%) and medical radiation technologists (17.1%) [1].

During the **2015-2020** period, a total of 1,010 or 13.5 percent of healthcare workers will be retiring. The occupations with the largest retirement load include registered nurses (410), nurse aides, orderlies and patient service associates (130) and registered practical nurses (125) [1]. The occupations with the highest retirement rate during 2015-2020 include all veterinarians, optometrists (50%), medical technologists (30.0%), registered practical nurses (25.2%) and specialist physicians (22.2%) [1].

Finally during **2020-2025**, 990 or 13.3 percent of healthcare workers will be retiring. The occupations with the largest retirement load include registered nurses (385) and nurse aides, orderlies and patient service associates (210) [1]. The occupations with the highest retirement rate include all denturists, opticians (44.4%), dentists (20.7%) and pharmacists (19.5%) [1].

Non-Traditional Healthcare Occupation Retirement Load

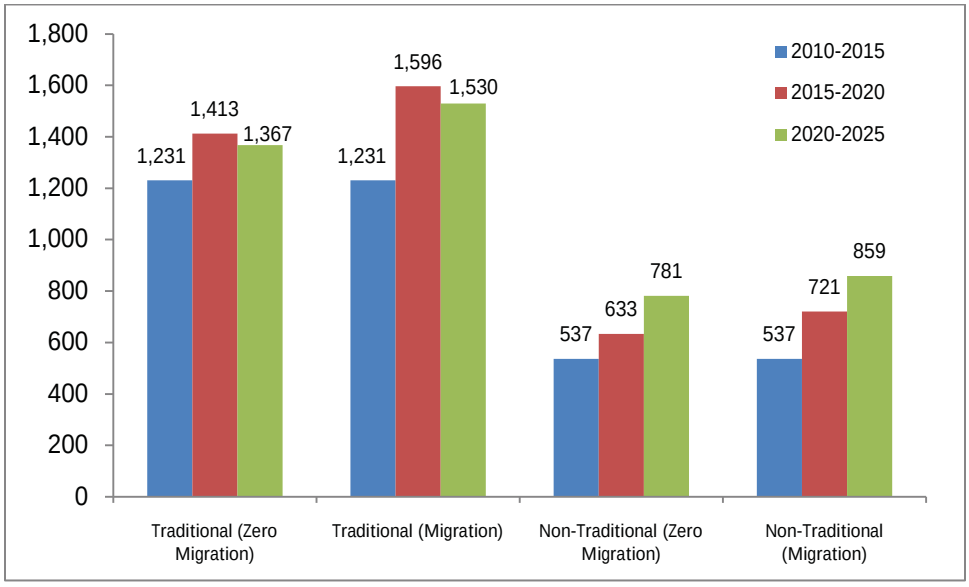
8.2 percent or 295 workers in non-traditional healthcare occupations are expected to retire during **2010-2015**. It was estimated that 12.3 percent or 440 workers are expected to retire during **2015-2020** and 16.8 percent or 600 workers are likely to retire during **2020-2025** [1]. The occupations with the largest retirement load include community and social service workers followed by social workers and family, marriage and other counselors [1].

Total Demand for Healthcare Workers: Number of Required New Entrants into the Healthcare Sector in Northwestern Ontario

Figure 10-10 illustrates the total number of new entrants needed to replace those who retire as well as meet the growing demand for healthcare services caused by demographic changes in Northwestern Ontario. This results in 4,001 in the traditional and 1,951 in the non-traditional sectors during 2010-2025 if there is zero net migration [1]. The expected number of new hires increases to 4,347 and 2,117 in the traditional and non-traditional sectors respectively under a moderate population growth assumption.

Figure 10-10

Total Number of Entrants Required in Health Sector



Source: North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025" [1]

The top 10 occupations in terms of the number of new entrants required to accommodate the expected future needs are [1]:

- Registered nurses (1,517 to 1,634)

- Nurse aides, orderlies and patient service associates (684 to 743)
- Registered practical nurses (326 to 349)
- Other assisting occupations in support of health services (167 to 189)
- Paramedics (153 to 169)
- Pharmacists (114 to 124)
- Medical laboratory technologists and pathologists' assistants (115 to 123)
- Physiotherapists (110 to 120)
- Dentists (106 to 113)
- Medical Radiation Technologists (101 to 109).

In addition, there is a need for approximately 88 to 96 specialist physicians as well as 63 to 71 general practitioners [1]. The nursing occupation remains most vulnerable to shortages because of the large numbers needed. At the same time, a shortage of even a small number of healthcare providers in technical specializations can interrupt healthcare delivery in Northwestern Ontario [1].

The top three non-traditional healthcare occupations in terms of new entrants required are [1]:

- Community and social service workers (975 to 1,065)
- Social workers (441 to 477)
- Family, marriage and other related counselors (283 to 304)

10.4 Health Care for Mining Projects and Support Services

10.4.1 North Western Ontario Industrial Medical and Rehabilitation Services

Northwestern Ontario Industrial Medical and Rehabilitation Services (NWOIMRS), located in Thunder Bay, provides complete medical services for employees, their families and Aboriginal people involved in mining, forestry, transportation, energy and manufacturing industries in Northwestern Ontario. NWOIMRS provides access to highly qualified physicians, specialists and the advanced technology.

The main services provided to industries have been the following:

- Pre-employment medical examinations;
- Priority medical/surgical, mental health (Addiction Services), Workplace Safety and Insurance Board (WSIB) Insurance Claims;
- Priority assessments – imaging, laboratory, medical, specialty assessments;
- Priority surgical procedures; and
- Post traumatic or operative rehabilitation to early return to modified/regular employment.

Service providers within the NWOIMRS include the following:

- Orthopaedic Surgeons;
- Neurosurgeons;
- Neurologists;
- Acute/chronic Mental Health Addition Services; and
- Medical Services (such as cardiac, internal medicine, neurological, general surgical, dermatology/allergies, obstetrical, gynecological, pediatric, physiotherapy and rehabilitation).

NWOIMRS is available 24 hours a day, 7 days a week by calling the telehealth services at the Nurses' Registry at the Ridgeway Clinic to seek assistance in an emergency, semi-emergency, urgent or non-urgent concern about a member of their company, or a family member that may have a medical or non-medical problem or concern. The Nurses' Registry may also arrange for a physician, physician's assistant or nurse practitioner to contact the person that made the call. If necessary, arrangements may be made for the affected individual to be accessed by Telehealth to be transferred to Thunder Bay Regional Hospital by air ambulance, commercial air or by company or personal vehicle.

Non-urgent cases such as WSIB or non-WSIB injuries and non-emergent medical and psychiatric conditions can be referred by any health agency via Telehealth through the Nurses' Registry/Ridgeway, with the physician on call at the Ridgeway Clinic. After the condition has been discussed, arrangements are typically made for investigations and treatment to be undertaken locally in the community closest to the mining, forestry, manufacturing or transportation site.

In addition, NWOIMRS may arrange for appropriate laboratory investigations and imaging assessments such as x-rays, MR, CT, PET and bone scans to be undertaken on an urgent basis with referral to and assessment by medical and surgical specialists.

10.4.2 Ontario Telemedicine Network

Throughout the Districts, technology such as Ontario Telemedicine Network (OTN) are being embraced and used to their capacity. OTN has cut down the amount of time and money spent on travel between communities, facilitates staff training, and has opened up counseling services to rural communities. However, with the opening up of services, there is an increased demand and more pressure on the caregivers. Furthermore, OTN does not reduce the amount of hands-on care that is required, it just shifts it to where the patient is located.

OTN's mandate is to develop and support telemedicine solutions that enhance access and quality of health care in Ontario, and inspire adoption by health care providers, organizations, and the public.

OTN has a number of programs that meet the health needs of the population. They are supported by enabling policies, best practices and protocols. They have been developed to support resources in the broader health sector to increase the use of Telemedicine. The programs offered by OTN include the following [9]:

- **Mental Health & Additions:** OTN supports care and treatment for adults, geriatrics and children and is also used to deliver emergency phychiatry and child and youth mental health services;
- **Teledermatology:** This allows doctors to securely send photographs of a patient's skin condition and other relevant health information to an Ontario-based dermatologist. The dermatologist reviews the file and provides a diagnosis and treatment plan to the referrer;
- **TM LHIN Nurse Program:** This provides more access to health care services while improving quality and accountability for patients;
- **Telestroke:** This provides 24 hours, 7 days a week stroke coverage via OTN, uses CritiCall Ontario to contact a neurologist, and supports discussions between ED physicians and a neurologist regarding the treatment of stroke patients;
- **Teletrauma:** This is an emergency telemedicine application that allows for the assessment and treatment of trauma patients through a "consult" using live, two-way video-conferencing with a remote trauma specialist;
- **Teleburn:** This is an urgent/emergent telemedicine application that allows for the assessment and treatment of burn patients using live, two-way video-conferencing with a remote burn specialist;
- **Chronic Disease Management:** Improving the lives of those with chronic disease through Telehomecare. This is a patient self-management program that engages patients as partners in their care plan in their home;
- **Teleophthalmology:** A primary car provider uses a special camera to take a picture and send it to an ophthalmologist. By accessing the image from a secure server, the ophthalmologist can provide an online assessment, diagnosis and/or treatment recommendation from the convenience of their office as their schedule permits; and
- **Aboriginal Health Access Centres (AHAC):** These centres are Aboriginal community-led, primary health care organizations that provide a combination of health programs and services to First Nations, Métis and Inuit communities both on and off-reserve, in urban, rural and northern locations.

10.5 Recommendations

Due to the increased demand for healthcare and health care professionals that is estimated to result from economic growth, population characteristics and healthcare provider retirement loads, it is recommended that:

- **More educational opportunities** are provided that support the development of healthcare professionals. Integration of cultural training that highlights Aboriginal and Francophone culture into the curriculum would be beneficial. More training in mental health and complex care was also identified as an area that will be needed as geriatric care increases [1].
- A **Recruitment Centre should be established** within Northwestern Ontario that represents a health care services hub that will help to streamline the health care professional recruitment process [1].

- The health sector should **work with colleges, universities, and post-secondary institutions to develop recruitment tools** and provide opportunities for new graduates to appreciate the benefits of living in smaller and rural communities [1].
- Steps should be taken to **reduce the disparity in wages and benefits between hospitals and non-hospitals.** The same qualifications are required, but the pay at hospitals is much more attractive. Similarly, benefits for smaller organizations can't compete with the larger facilities. If they were comparative, people may stay longer. If they were portable, there may be ways to share staff and facilitate learning opportunities between organizations [1].
- **Immigration to increase the availability of trained health care professionals should be strongly supported.** The immigration process is too time consuming and complicated for many of the smaller and rural organizations to tackle. More effort needs to be made to find solutions to eliminate barriers and streamline accreditation of qualified medical professionals from other countries [1].

10.6 Reference

(1) North Superior Workforce Planning Board, Northwest Training and Adjustment Board. "Health Human Resources: Forecasting Needs in Northwestern Ontario 2013-2025". March 2013.

(2) North West LHIN "Health Services Blueprint: Building Our Future". February 2012.

(3) North West LHIN "Health Profile- Northern Integrated District Network". May 2012.

(4) North West LHIN "Health Profile- Thunder Bay District Integrated District Network". May 2012.

(5) North West LHIN "Health Profile- City of Thunder Bay Integrated District Network". May 2012.

(6) North West LHIN "Health Profile- Kenora Integrated District Network". May 2012.

(7) North West LHIN "Health Profile- Rainy River Integrated District Network". May 2012.

(8) Statistics Canada, 2006.

(9) Ontario Telemedicine Network. http://otn.ca/en

11 LABOUR

11.1 Available Labour

Section 5.0 outlines the number of jobs that are estimated to be created as a result of the **direct, indirect and induced economic activity** expected to be generated from growth in the mining sector in Northwestern Ontario over the coming years. This growth in employment represents an **opportunity to put the people of Northwestern Ontario to work in professional, skilled and unskilled jobs** throughout the economy in a variety of sectors, including mining.

Section 6.0 of this Strategy outlines the expected economic growth resulting from increased mining activity, by sector. As discussed, this **growth will cycle through all sectors of the economy**, providing a wide variety of job opportunities. This is good news for the Northwestern Ontario economy. However, in order for the Region to maximize the benefit of this growth in jobs, **it is important that as many of these jobs as possible are created in Northwestern Ontario and remain in Northwestern Ontario.** It is important to understand the extent to which Northwestern Ontario is positioned to maximize retention of these jobs by understanding the current level of employment and the level of skills training of the potential labour force.

This Section of the Strategy characterizes the available workforce in Northwestern Ontario by characterizing the labour force in each District (Thunder Bay, Kenora and Rainy River). This labour force characterization includes a **description of the general level of education attainment** as well as **labour force activity** for both the Aboriginal and non-Aboriginal segments of the population, and compares with provincial averages. Recognizing the **higher than national average population growth of the Aboriginal community**, the young average age of the community, the chronically high rates of unemployment and under-employment, and their knowledge of and cultural and spiritual relationship to the land in Northwestern Ontario, there is a **special opportunity to increase Aboriginal participation in the growing labour force** that must be an important objective of employment growth in the economy of Northwestern Ontario.

11.1.1 Non-Aboriginal Workforce

Thunder Bay District

Table 11.1 shows educational attainment levels for the non-Aboriginal population in Thunder Bay compared to those of Ontario.

Based on the 2006 census data, it is evident that **non-Aboriginal Thunder Bay residents have a higher percentage of those 15 years and over with no certificate, diploma or degree at 25%**. These percentages are higher than the Province of Ontario with 22% of the total population 15 years and over with no certificate, diploma or degree.

Non-Aboriginal Kenora residents have a higher percentage of those 15 years and over with no certificate, diploma or degree, at 25%, although these percentages are higher than the provincial average of 22%.

Rainy River's non-Aboriginal population over 15 years of age has a significantly higher percentage of people with no certificate, diploma or degree at 28% compared to the provincial average of 22%.

Table 11.1

Northwestern Ontario Non – Aboriginal Educational Attainment

	Thunder Bay			Kenora			Rainy River			Ontario		
Educational attainment	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**
Total population 15 yrs and over	111,105	54,360	56,740	31,770	15,810	15,955	13,775	6,825	6,955	9,641,255	4,659,805	4,981,450
No certificate, diploma or degree	25%	25%	25%	25%	26%	24%	28%	29%	27%	22%	22%	22%
High school certificate or equivalent	**26%**	**24%**	**27%**	**28%**	**26%**	**30%**	**29%**	**26%**	**31%**	**27%**	**26%**	**28%**
Apprenticeship or trades certificate or diploma	12%	18%	6%	12%	19%	6%	12%	17%	8%	8%	11%	5%
College, CEGEP or other non-university certificate or diploma	20%	17%	23%	20%	17%	22%	17%	15%	20%	18%	17%	20%
University certificate or diploma below the bachelor level	3%	3%	3%	3%	3%	4%	3%	3%	4%	4%	4%	4%
University certificate, diploma or degree	15%	14%	16%	12%	10%	14%	10%	9%	11%	21%	21%	20%

Source: Statistics Canada, Census of Population, 2006.

Table 11.2 shows the labour force activity for the non-Aboriginal population in Thunder Bay. As shown, the **employment participation rate is lower and the unemployment rate is higher in Thunder Bay than the Provincial average** although the unemployment rate is lower for women than men.

For the non-Aboriginal population in Kenora, the participation rate is higher than the Provincial average. The total unemployment rate is also lower in Kenora than the Provincial average (the lower unemployment rate for women contributes to the lower unemployment rate).

The non-Aboriginal population in Rainy River has a lower participation rate than the Provincial average, although the unemployment rate is comparable with the Ontario average.

Table 11.2

Northwestern Ontario Non –Aboriginal Labour Force Activity

	Thunder Bay			Kenora			Rainy River			Ontario		
Labour force activity	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**
Total population 15 years and over	111,105	54,365	56,745	31,770	15,810	15,955	13,780	6,825	6,955	9,641,255	4,659,805	4,981,450
In the labour force	**64%**	**68%**	**60%**	**68%**	**72%**	**65%**	**64%**	**69%**	**59%**	**67%**	**73%**	**62%**
Employed	92.70%	91.40%	94.00%	94.50%	94.10%	94.80%	93.40%	93.00%	94.00%	93.70%	94.10%	93.20%
Unemployed	7.30%	8.60%	6.00%	5.50%	5.90%	5.20%	6.60%	7.00%	6.00%	6.30%	5.90%	6.80%
Not in the labour force	36%	32%	40%	32%	28%	35%	36%	31%	41%	33%	27%	38%

Source: Statistics Canada, Census of Population, 2006.

11.1.2 Aboriginal Workforce

Thunder Bay

According to Statistics Canada, in 2006, **Aboriginal youth aged 15 to 24 years in Thunder Bay had lower school attendance rates (65%) than the non-Aboriginal youth in this same age group (73%)** [1]. The 2006 Aboriginal Peoples Survey, identified a number of reasons given for not completing high school, including wanting to work; and taking care of children / pregnancy [1]. However, the **mature Aboriginal population is returning to school**. According to Statistics Canada, approximately 11% of the Aboriginal population 35 years of age and older were attending school in 2006, compared to 5% of non-Aboriginal people in the same age group [1].

Table 11.3 shows educational attainment levels for Aboriginal people in Thunder Bay compared to those of Ontario.

Based on the 2006 census data, it is evident that **Aboriginal Thunder Bay residents have a significantly higher percentage of those 15 years and over with no certificate, diploma or degree at 45%**. These percentages are significantly higher than the provincial average of 38% for the total Aboriginal population and 22% of the non-Aboriginal population.

Kenora Aboriginal residents have a much higher percentage of those 15 years and over with no certificate, diploma or degree at 65%. This also far exceeds that of Thunder Bay Aboriginals (45%), which is revealing considering the rates for non-Aboriginal people in Thunder Bay and Kenora were the same at 25% (see Table 11.1). These percentages are higher than the **provincial average of 38%** of the total Aboriginal population 15 years and over with no certificate, diploma or degree.

Rainy River Aboriginal residents have a slightly higher percentage of those 15 years and over with no certificate, diploma or degree at 39% than the provincial average. However, the Rainy River rates are much more comparable to Provincial levels of 38% than those of Thunder Bay and Kenora.

Table 11.3

Northwestern Ontario Aboriginal Educational Attainment

	Thunder Bay			Kenora			Rainy River			Ontario		
Educational attainment	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**
Total population 15 years and over	10,975	5,170	5,810	17,090	8,575	8,520	3,260	1,600	1,655	178,165	84,905	93,260
No certificate, diploma or degree	**45%**	**46%**	**44%**	**65%**	**66%**	**63%**	**39%**	**41%**	**38%**	**38%**	**40%**	**36%**
High school certificate or equivalent	21%	22%	19%	16%	16%	17%	26%	25%	27%	24%	23%	25%
Apprenticeship or trades certificate or diploma	9%	13%	6%	7%	9%	4%	8%	13%	4%	10%	14%	7%
College, CEGEP or other non-university certificate or diploma	17%	14%	19%	9%	7%	11%	18%	14%	21%	19%	16%	22%
University certificate or diploma below the bachelor level	2%	1%	2%	2%	1%	2%	3%	3%	3%	2%	2%	3%
University certificate, diploma or degree	7%	4%	9%	2%	2%	3%	6%	5%	6%	7%	5%	8%

Source: Statistics Canada, Census of Population, 2006.

Table 11.4 shows the labour force activity for the Aboriginal population in Thunder Bay. As shown, the participation rate is lower in Thunder Bay than the Provincial average. The **Aboriginal unemployment rate in Thunder Bay is also higher than the Ontario Aboriginal average**.

The Aboriginal employment participation rate is **much lower in Kenora** than the Provincial average. The Aboriginal unemployment rate in Kenora is also higher than the Ontario average.

The participation rate is slightly lower in Rainy River than the Provincial average. And the Aboriginal unemployment rate in Rainy River is slightly higher than the Ontario Aboriginal average.

Table 11.4

Northwestern Ontario Aboriginal Labour Force Activity

	Thunder Bay			Kenora			Rainy River			Ontario		
Labour force activity	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total population 15 years and over	10,975	5,165	5,805	17,090	8,575	8,520	3,255	1,600	1,655	178,165	84,905	93,260
In the labour force	**59%**	**64%**	**54%**	**56%**	**61%**	**52%**	**64%**	**67%**	**61%**	**65%**	**68%**	**62%**
Employed	82.80%	80.70%	85.20%	84.00%	81.90%	86.40%	86.80%	84.70%	88.60%	87.70%	87.00%	88.40%
Unemployed	**17.20%**	**19.30%**	**14.80%**	**16.00%**	**18.10%**	**13.60%**	**13.20%**	**15.30%**	**11.40%**	**12.30%**	**13.00%**	**11.60%**
Not in the labour force	41%	36%	46%	44%	39%	48%	36%	33%	40%	35%	32%	38%

Source: Statistics Canada, Census of Population, 2006.

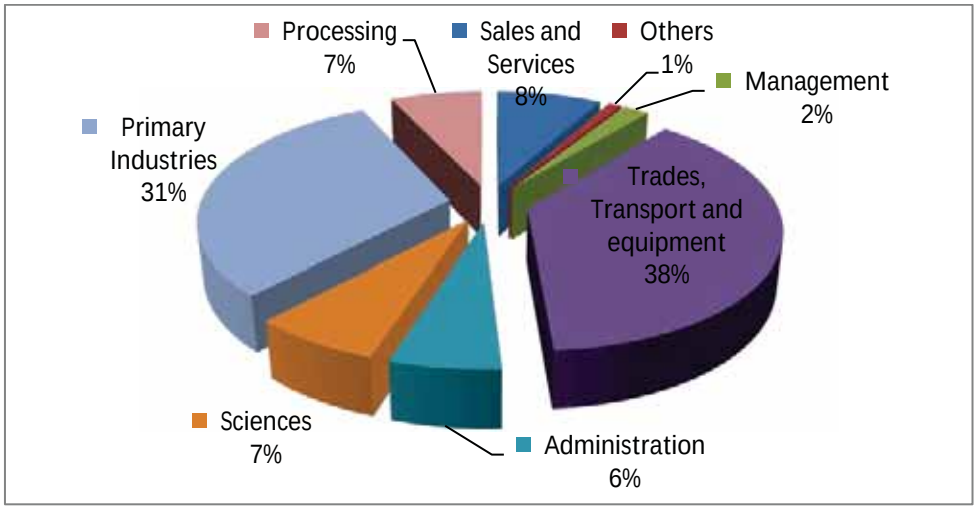
Aboriginal Employment in Mining

According to the 2006 Canadian Census, **7.5% of employed Aboriginal people worked in the mining sector in 2006** [1]. Additionally, according to Ontario Mining Association Industry surveys [2] presented in *Mining: Dynamic and Dependable for Ontario's Future, 2012*, **Aboriginal**

employment in mining was 9.5% in 2010 and 9.7% in 2011. The proportion of Aboriginals in Mining by Occupation is shown in Figure 11-1.

Figure 11-1

Proportion of Aboriginal Workforce in Mining by Occupation, 2006



Source: Statistics Canada, Census of Population, 2006.

As shown on Figure 11-1, Aboriginal people in the mining industry are mostly employed in the trades, transport and equipment sector as well as in primary industries which consist mostly of miners. The proportion of the Aboriginal workforce in management is 2%, a number that remains unchanged from the 2001 Census [3].

Approximately **14% of the Aboriginal mining workforce in 2006 was made up of women**. This indicates an increase from 2001, when it was 11.5%. However, even though Aboriginal women in mining were more likely than Aboriginal men to have completed post secondary education [1], their incomes on average were $15,500 less than men [3].

27 *and* 40

The median age of Aboriginal and non-Aboriginal population in Canada.

Canada Competes: Skills Gap
Globe and Mail Report on Business
Feb. 7, 2013

11.2 Projected Workforce

Direct Mining Employment

Provided that new mining developments proceed as scheduled, there is a **need to accurately characterize the labour requirements** in an effort to prepare the region for the significant positive economic impacts that could be derived from these projects.

This assessment focuses on the projects listed in *Mining in Northwestern Ontario: Opportunities and Challenges, 2012* as the "mature exploration projects" most likely to proceed to the production stage between 2014 and 2017 [4]. The other project included in this assessment is a proposed expansion to the existing Lac des Iles mine.

Table 11.5 reflects the **projected employment data for the ten mining projects** [4]. The data compiled in this table reflects the latest publicly available information obtained from the mining companies as sourced from a combination of project technical reports, company websites as well as client supplied data.

Table 11.5

Project Employment Information

Company Name	Years of Operation	Construction Jobs	Operation Jobs
Cliff's Natural Resources Inc.	2017-2045	750	750
Noront Resources Ltd.	**2016-2026**	**800**	**400**
Rainy River Resources Ltd.	**2016-2028**	**675**	**618**
Rubicon Minerals Corp.	2014-2025	50	278
Osisko Resources Ltd.	**2016-2029**	**1000**	**530**
Stillwater Mining (Canada) Ltd.	2015-2026	400	350
Goldcorp Inc.	2014-2033	100	100
Bending Lake Iron Group Ltd.	**2016-2050**	**700**	**300**
Treasury Metals Inc.	2015-2024	150	200
North American Palladium Ltd.	2012-2018	0	196

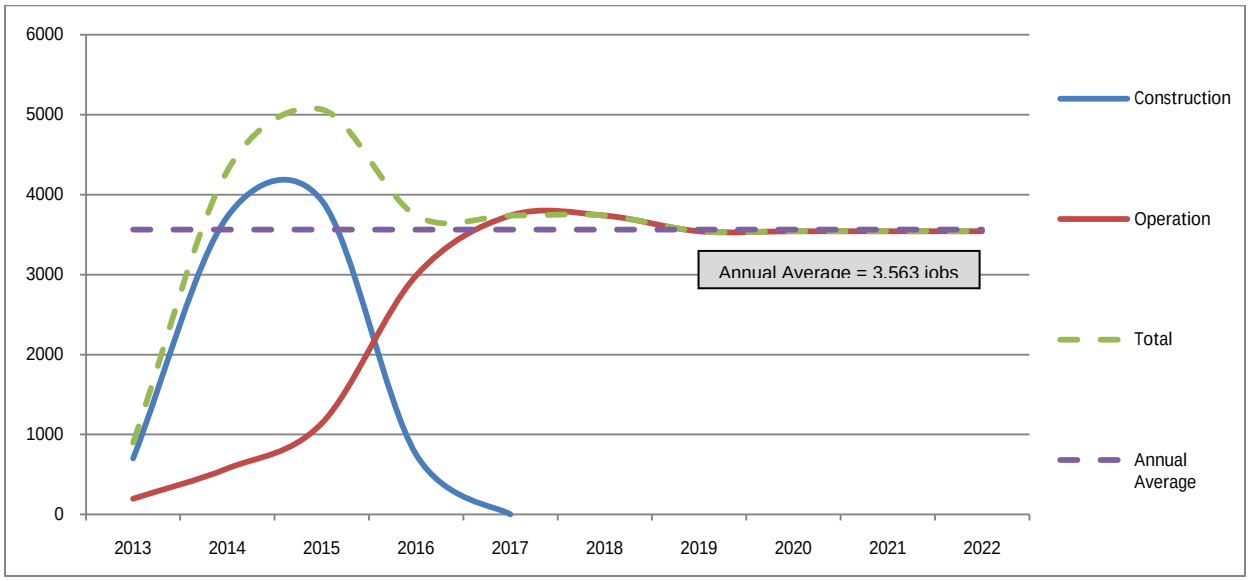
This information was used to estimate direct employment opportunities over the life of these projects, assuming the following:

- The **construction phase encompasses a two year period** before the first year of operation;
- All jobs for a particular phase are created immediately upon the beginning of a phase and all jobs for a particular phase cease at the end of that phase (i.e. no ramp up or ramp down); and
- "Employment" and "jobs" expressed in this analysis are presented in person years of employment. One "employee" may absorb a number of person-years of activity.

The resulting employment requirements are illustrated in Figure 11-2.

Figure 11-2

Direct Mining Employment Projections



As shown, **peak construction employment occurs in 2015 with the creation of 3,925 man-years**[33]. Construction at all ten mine sites is estimated to be completed in 2017. **Operation employment is set to peak in 2017, with the creation of 3,737 man-years of employment.** This level is sustained for eight years. As mines close, these job numbers subsequently decrease. **Total jobs peak in 2015 at 5,064 jobs** when most of the projects are in their construction phases while some have moved into production.

Although this timeline spans a 10 year period, it only reflects the employment generated by the selected 10 mining projects, which only sustains employment until 2024 when all projects are forecast to be completed. As discussed in Section 4.2, there is **significant geological potential for a large number of future projects**, some of which are already in the later stages of exploration. It is reasonable to assume that some percentage of these projects will also generate employment opportunities, although they are not shown in this estimate.

The direct job forecast provided in this Strategy was compared to the "hiring requirement forecasts" presented in the *Custom Labour Market Report- Thunder Bay District Mining Industry* prepared by the **North Superior Workforce Planning Board** (NSWPB) in 2012. The direct job forecasts provided in this report for the Kenora and Rainy River mining projects (Phoenix Gold, Cochenour/Bruce Channel Gold, Bending Lake Iron, and Goliath Gold) were compared to the forecasts presented in the *Kenora and Rainy River Districts Mining Hiring Forecasts* prepared by the **Northwest Training and Adjustment Board** (NTAB) in 2013.

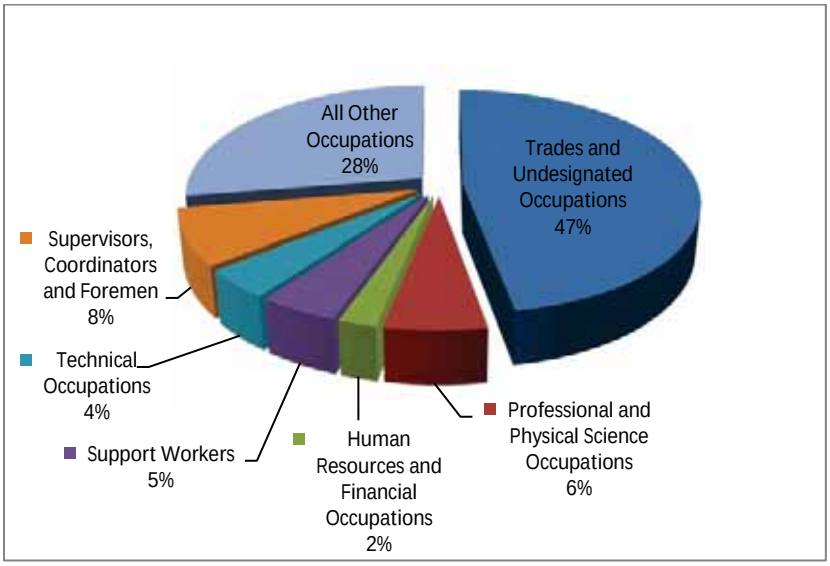
These reports provide a breakdown of mining employment within six major job categories and sixty six individual occupations [5] [6]. These percentages of employment by job categories were applied to the Direct Mining Employment Projections presented in Figure 11-2 to provide an estimate of the direct mining job requirements that would be generated by the selected mining

[33] In person years

projects by individual occupations. The overall percentages of jobs by major job categories are illustrated in Figure 11-3.

Figure 11-3

Major Mining Job Categories



Source: NSWPB Custom Labour Market Report, 2012 and NTAB Kenora and Rainy River Districts Mining Hiring Forecasts, 2013

The percentages of activity for the six main occupation categories in Figure 11-3 were applied to the total direct mining employment data from Figure 11-2. The results are outlined in Table 11.6. The results for each of the 66 occupations are described in more detail in Appendix C.

Table 11.6

Direct Mining Job Occupation Categories

Category	Total jobs (2013-2022)	Peak jobs (2015)
Trades and Undesignated Occupations	16,823	2,377
Professional and Physical Science Occupations	2,123	301
Human Resources and Financial Occupations	797	112
Support Workers	1,660	237
Technical Occupations	1,502	214
Supervisors, Coordinators and Foremen	2,912	412
All Other Occupations	9,818	1,410
Total	35,634	5,064

Of the **35,634 direct mining jobs** to be sustained during 2013-2022, **approximately 28% or 9,818 jobs are expected to be for low skilled workers and 72%, or 25,816 jobs in the skilled labour category**. During the peak mining employment in 2015, it is expected that approximately 1,410 low skilled direct jobs and 3,654 skilled jobs will be sustained.

From Table 11.6, it is expected that the **majority of the direct mining jobs created will be "Trades and Undesignated Occupations**" which could be attributed to the labour intensive nature of the construction [5], production and extraction phases of mining. Because people with **skilled trade qualifications have highly transferable/mobile skills**, the mining sector will face **stiff competition in attracting and retaining them**. NSWPB's latest national survey showed that the average turnover rate for "Trades and Undesignated Occupations" is 8%, which is twice as high as in all other mining occupations [5]. This is also likely to lead to upward pressure on salaries and compensation.

The creation of a substantial number of jobs in the "Professional and Physical Science Occupations", "Technical Occupations" categories demonstrates the **need for individuals qualified in engineering and the sciences**. While not the largest category, these positions can prove challenging to fill, due to qualified talent being **highly mobile** and having **adaptable skill sets** [5].

"Supervisors, coordinators and foremen" jobs are usually filled by employees with substantial experience in the mining industry. The fact that the **majority of people currently in these positions are eligible for retirement in the near future** underscores the need to attract and retain employees so that they can build their experience and move up into management and supervisory jobs [5] over the course of the period 2013 to 2022.

Indirect and Induced Jobs

From the multiplier analysis discussed in Section 5, **significant direct, indirect and induced employment will be generated from GDP growth as a result of mining investment**. The breakdown of employment opportunities will be based on the medium scenario presented the multiplier analysis. The expected timing for this employment growth is illustrated in Figure 11-4.

Figure 11-4

Ontario GDP Induced Employment Projections

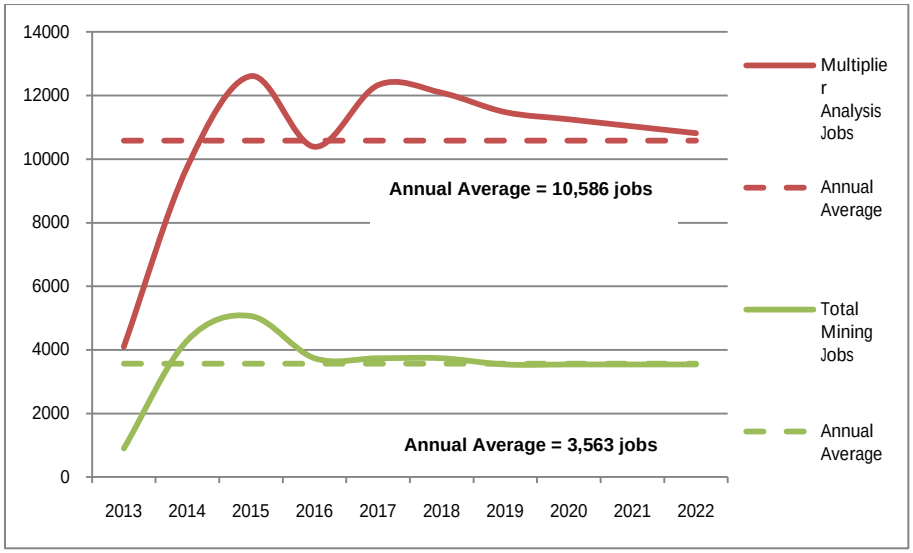
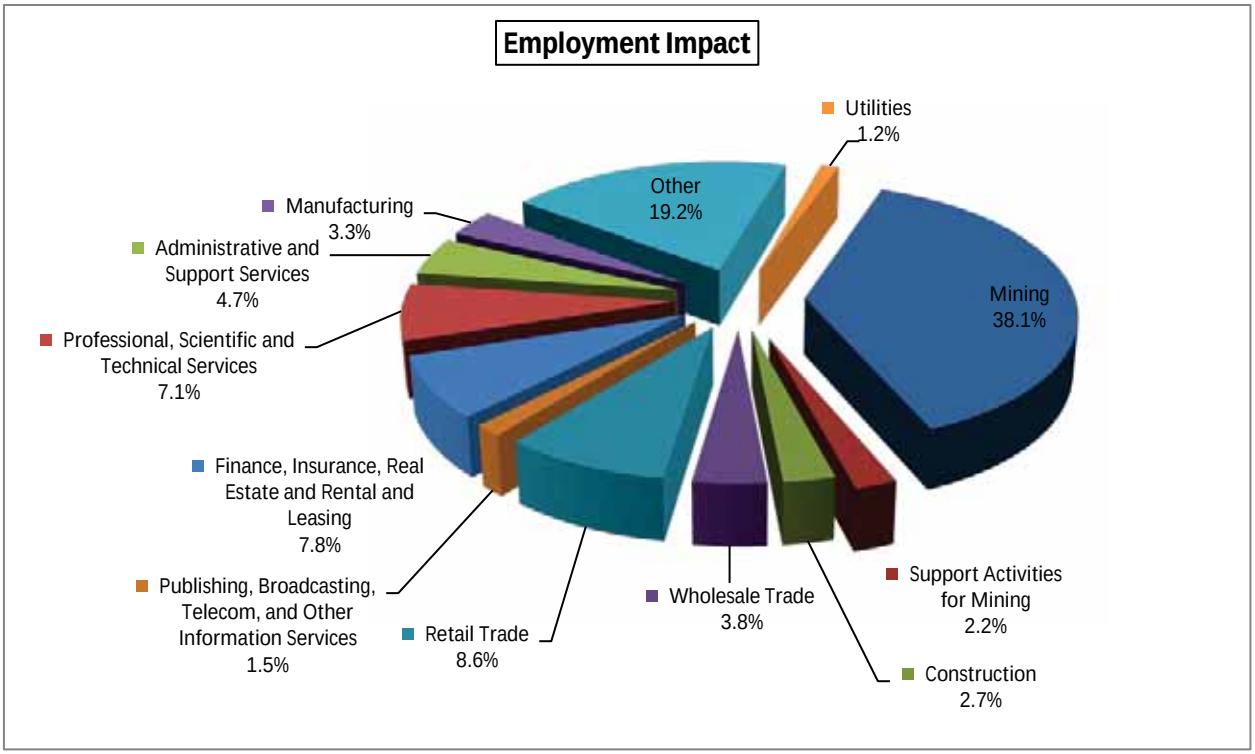


Figure 11-5

Direct, Indirect and Induced Impacts on Employment



From this general breakdown of employment by sector, the number of jobs required in Northwestern Ontario by sector was estimated as shown in Table 11.7.

It is estimated there will be an **average of 10,586 jobs available annually**. This number includes all the direct, indirect and induced employment that is created due to the 10 mining projects. The **employment peaks are expected to occur in 2015 and 2017** at the point when the mining sector capital and operating expenditures are at their maximum. Direct mining employment (**annual average of 3,563 jobs**) is expected to be less than half of the total direct, indirect and induced employment.

As discussed in Section 6, employment resulting from GDP growth is expected to grow in a wide array of supply and service sectors. The analysis in *Mining: Dynamic and Dependable for Ontario's Future* [2] prepared for the Ontario Mining Association in December 2012, shows the relationship of mining investment to employment by sector. The percentages of the employment impact are shown in Figure 11-5.

Table 11.7

Ontario Sector Specific Employment

Sector	Total jobs (2013-2022)	Peak jobs (2015)
Mining	**40,295**	**4,801**
Support Activities for Mining	2,313	276
Construction	2,846	339
Wholesale Trade	4,061	484
Retail Trade	**9,088**	**1,083**
Publishing, Broadcasting, Telecom, and Other Information Services	1,548	184
Finance, Insurance, Real Estate and Rental and Leasing	**8,205**	**978**
Professional, Scientific and Technical Services	7,473	890
Administrative and Support Services	4,943	589
Manufacturing	3,512	418
Other	**20,305**	**2,419**
Utilities	1,264	151
Total Employment (direct, indirect & induced)	105,855	12,612
Total Indirect and Induced employment	65,560	7,811

As shown in Table 11.7 it is estimated there would be **40,295 direct mining jobs created during the 2013-2022 period**, closely matching the estimate of 35,634 direct mining jobs using employment information from each individual mining project.

As described in Section 5, **employment from indirect and induced economic growth is expected to result in 65,560 jobs over the ten year period, peaking in 2015 at 7,811 jobs**. The majority of these jobs are expected to occur in the "Retail Trade" sector, accounting for a projected 9,088 jobs during 2013-2022. Although most of these jobs (76%) will require some level of skills training, roughly 24% of these are expected to be filled by low skilled labour, making **over 15,500 jobs available to a large segment of the population in Northwestern Ontario**, irrespective of education attainment levels.

Employment in the **professional sectors is also expected to be robust**. Estimates of employment in the "Finance, Insurance, Real Estate and Rental and Leasing" sector are expected at near 8,205 jobs, with 7,473 jobs expected in the "Professional, Scientific and Technical Services" sector.

Regional Projections

In the economic analysis provided in Section 5, it was assumed that **79% of the GDP growth** and **66% of employment from growth** in the mining sector from the selected projects will be retained within Northwestern Ontario. It was also assumed that 60% of the Northwestern Ontario GDP employment would be retained in Thunder Bay. Implications for employment growth are shown in Table 11.8.

Table 11.8

Average Annual Employment Due to GDP Growth by Region

Employment		
Ontario Annual Average	N.W.O Annual Average (66% Ontario)	Thunder Bay Annual Average (60% N.W.O)
10,586	6,986	4,192

As shown in Table 11.8, **annual employment across Ontario as a result of GDP growth** during the period 2013-2022 will be **10,586 jobs created in all sectors**. The average annual employment in Northwestern Ontario during this time is projected to be 6,986 jobs. **Thunder Bay should see an annual average of 4,192 jobs created.**

These numbers are based on previously cited economic leakage rates. However, this does not reflect a limit to the opportunity facing Northwestern Ontario and Thunder Bay. By **attracting, training and retaining** a large share of the required workforce, the **leakage rate can be brought down**, resulting in a larger share of the economic benefit to remain within the region.

11.3 Employment Trends and Challenges

The expected increase in mining activity will result in **positive employment growth for both the Aboriginal and non-Aboriginal workforce**. However, to better understand the employment opportunities, it is important to understand the challenges the mining industry is facing. According to NSWPB, challenges include [5]:

- **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 Mining Industry Human resource Council (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**. It has been identified that the average retirement age of mining workers in the region is **59.5 years** of age, which is two years sooner than the retirement age of 62 years. Furthermore, the mining industry is also facing **more of an aging demographic in the exploration** field than in the extraction field, where workers in geosciences and technician roles retire at an average of 62 years of age.

7

Percentage of population aged 60-64 in Thunder Bay.
"… has a greater proportion of people nearing the traditional retirement age than almost any other Canadian city"

Thunder Bay and the Challenge of Seniority
The Globe and Mail, Dec. 26, 2012

Northwestern Ontario is **well positioned to maximize the benefits from the projected employment opportunities**. Based on the discussion in Section 5, **between 5,298 and 7,417 jobs** will be created in Northwestern Ontario as a result of growth in the mining sector. In the context of *The Future of Mining in Canada's North* by The Conference Board of Canada, strategies to address these challenges include the following [7]:

- **Employ Aboriginal Peoples and Other Diverse Groups***:* Although a significant opportunity exists, a challenge to employing Aboriginal people is the **skills gap** between what individuals have and what is required to become employed in the mining industry. These challenges are recognized by Northwestern Ontario as well as the mining industry. As seen in Table 11.7, the average annual employment to be created in Northwestern Ontario is projected to be 6,986 total jobs. There is significant opportunity for those seeking employment in the region to stay and work within Northwestern Ontario.
- **Fill the Retirement Void***:* Due to the aging workforce, it is **imperative that industry and the region prepare for the large pool of retirees**. This can be done through mentoring programs at companies to train workers to fill in positions of the retirees. This will allow for knowledge transfer between employees and helps fill the labour gaps.
- **Attract new talent***:* This can be done by **targeting population groups** such as:
    - **Aboriginal people***:* Aboriginal people are well positioned to take advantage of employment opportunities. It is recommended that **training continues to target Aboriginal people** to ensure that they maximize the employment opportunities.
    - **Women** – the reason there is a low female participation rate in the mining industry is due to women's perception of the industry as a male-dominated sector with very few female role models. Furthermore, issues such as inflexible work arrangements that do not suit mothers, child care, and parental leave practices pose as barriers for women, especially those who work on rotation and have children. It is recommended that the mining industry as a whole put in more work to better accommodate families and retain female workers.
    - **Youth** – the **youth can meet the future workforce demand**. However, it is recognized that youth aren't aware of the type of jobs available in mining and its associated sectors. It is recommended that local educational institutions and governments need to **work together to encourage and educate youth** in obtaining education and training related to mining.

Table 11.9

Regional Unemployment

	Thunder Bay	Kenora	Rainy River	**Total**
Non-Aboriginal	5,191	1,188	582	**6,961**
Aboriginal	1,114	1,531	275	**2,920**

Table 11.9 above provides the number of unemployed people by region within Northwestern Ontario.

In Thunder Bay, there are a total of **6,305 unemployed people** (5,191 non-Aboriginal and 1,114 Aboriginal). This number is significantly less than the 10,586 jobs estimated to be sustained annually between 2013 and 2022, and approximately half of the 12,612 jobs expected to be created in 2015 when expenditures reach their peak. This indicates that **even if 100 percent of the available workforce in Thunder Bay were to be trained and prepared for these jobs, there would still not be enough workers to fill the available jobs**. In fact, across the entire Northwestern Ontario region, there are 9,881 (6,961 non-Aboriginal and 2,920 Aboriginal) unemployed residents; still not enough to fill the jobs available in a single year of production. This places a **strong imperative on Northwestern Ontario residents to acquire their Grade 12 diploma and attain skills that will be in demand as the economy grows.** This will place pressure on training institutions, as discussed in Section 12 of this Strategy.

It is clear that **labour must be obtained from other sources**. Two major means of doing this are:

- **Attracting labour from other sectors within Northwestern Ontario** with transferable skills required in the mining industry e.g. skilled trades, professional and physical sciences, etc.
- **Encourage immigration from countries with strong mining cultures** and trained skilled workers such as **South Africa, Peru, Chile, Australia, Mexico** and certain Eastern European countries. Federal government assistance for such an initiative would be required. If immigrants are to move to Canada (Northwestern Ontario in particular) with their families, economic leakage outside the region would be reduced and local/regional GDP would be increased. Historically, Canada has used immigration to attract skilled/qualified workers as a means to economic growth.

From Section 11.2, the analysis indicated that of the annual average of **10,586 jobs available**, 2,555 of these jobs would require low skilled labour. This means that while significant opportunities exist for individuals with little educational attainment, there is a **much larger potential for higher paying jobs for individuals who enter into training programs** for skilled jobs in time for peak employment from 2015-2017.

135

The average number of immigrants per year (2000-2010) that Thunder Bay attracted – third lowest among Canada's 31 biggest cities.

Thunder Bay and the Challenge of Seniority
The Globe and Mail, Dec. 26, 2012

11.3.1 Employment Opportunities for Aboriginal People

According to NSWPB and NTAB, many employers in the region have adopted proactive strategies to engage and develop the employment potential that exists in local Aboriginal communities. However, while efforts have been made to ensure employment quotas of local and/or Aboriginal workers, outsiders still disproportionately occupy the highest rank and paid positions. As a result, there is a **need for industry and education partnerships to provide advanced education opportunities for local Aboriginal communities**.

The availability of more jobs than unemployed individuals in all of Northwestern Ontario provides an **opportunity for Aboriginal individuals and communities to significantly reduce the unemployment rate**, which is currently more than double (triple in the case of Kenora) the non-Aboriginal unemployment rate. With a wide variety of job types to be created and a large range of skill sets and levels required, there is **ample opportunity for Aboriginal people to gain employment.**

11.4 Recommendations

Due to the employment growth that is estimated to result from growth in the mining sector and the supply chain between 2013 and 2022, it is recommended that:

- Educational and training institutions, First Nations Education Services, government agencies and mining companies should collaborate to **identify training opportunities to help the Aboriginal population maximize their ability to take advantage of the many employment opportunities that will be created** from the growth in the regional economy.
- Companies should **increase their recruitment efforts to focus on the retention of female workers in mining-related jobs.** One of the steps that can be taken to improve the number of female workers in mining sector employment opportunities is to tailor camp/living conditions to families.
- Mining companies should work collaboratively with the Northwestern Ontario chapter of Women in Mining (WIM) to identify other steps that can be taken to promote mining sector employment opportunities for women and to increase the number of female employees.
- Educational and training institutions, government agencies, local school boards, First Nations Education Services, and mining companies should **work collaboratively to**

encourage youth to stay in high school to attain their Grade 12, and aspire to obtain the post-secondary education and training needed to qualify for skilled mining and mining-related employment opportunities.

- Federal and provincial government agencies should **work cooperatively to support the immigration of skilled labour** from countries with strong mining cultures such as South Africa, Peru, Chile, Australia, Mexico and certain Eastern European countries.
- **Employment opportunities should be advertised** to skilled individuals, who are unemployed or employed in other sectors, to meet the labour demands.
- **The City of Thunder Bay and surrounding municipalities should aspire to be "places to live",** providing world class social, educational, commercial and recreational amenities and a variety of residential options to attract workers and families to establish long-term residence in Northwestern Ontario. This focus should include a marketing campaign aimed at markets outside Northwestern Ontario where the future labour market may be sourced. Of particular importance is to target Aboriginal youth living in communities within Northwestern Ontario who may choose the non-Aboriginal communities to the south as places of long-term residence.

11.5 References

(1) Statistics Canada, Census of Population, 2006

(2) Dungan, P., Murphy, S. 2012. Mining: Dynamic and Dependable for Ontario's Future" prepared for the Ontario Mining Association

(3) Natural Resources Canada, 2009. "Aboriginal Participation in Mining". Information Bulletin

(4) Ambassador's Northwest (2012) "Mining in Northwestern Ontario: Opportunities and Challenges"

(5) North Superior Workforce Planning Board, 2012. "Custom Labour Market Report-Thunder Bay District Mining Industry"

(6) Northwest Training and Adjustment Board, 2013 "Kenora and Rainy River Districts Mining Hiring Requirements Forecasts"

(7) The Conference Board of Canada, 2013. "The Future of Mining in Canada's North."

12 EDUCATION AND TRAINING

As discussed in Section 11, it is expected there will be **significant employment growth** arising from growth in mining sector activity over the next 10 years and beyond in Northwestern Ontario. **The ten (10) mining projects** included in the economic analysis described in Section 5 are expected to **generate 5,064 direct mining jobs in 2015** in the mining sector alone, with **6,987 of all (direct, indirect and induced) jobs**[34] to be sustained in Northwestern Ontario. More broadly, across the entire economy, it is expected that economic growth will create, on average, almost **10,586 full-time equivalent positions** across all sectors, with over 60% of these jobs expected to be sustained in Northwestern Ontario. Of these jobs, over **75% will require skilled labour**.

There is a significant opportunity for Northwestern Ontario to supply the labour force needed to address this near term economic growth. Maximizing capture of this employment potential in Northwestern Ontario will require a trained workforce to fill these jobs.

This Section of the Strategy characterizes the key educational institutions and skills training programs available in Northwestern Ontario, and identifies initiatives that educational and training institutions and organizations are taking to ensure that sufficient and effective facilities, programs and strategies are in place to maximize readiness of the local workforce.

12.1 Institutional Capacity Characterization

12.1.1 Training Institutions

A training institution is a school or organization that provides practical, vocational, academic and technical instruction to participants that are interested in obtaining certification in a particular field or program. Northwestern Ontario offers a number of active Aboriginal and Aboriginal/non-Aboriginal training institutions, universities and colleges.

Table 12.1 below presents a list of the educational training institutions located in Northwestern Ontario.

[34] Jobs are expressed in person years as defined in Section 11.2

Table 12.1

List of Training Institutions Reviewed

Institution	Contact
Anishnabek Employment and Training Services (AETS)	John DeGiacomo, Proposal and Partnership Development Officer
Confederation College	Jim Madder, President, Confederation College Don Bernosky, Vice President, Regional Workforce Development Janet Arinobu, Manager, Quality Assurance, Regional Workforce Development John Hatton, Director, Training and Development
Fort William First Nation Employment and Training Division	Renee Boucher
Kiikenomaga Kikenjigewen Employment and Training Services (KKETS)	Morris Wapoose, Program Administrator / Coordinator
Lakehead University	Dr. Brian Stevenson, President Dr. Peter Hollings, Chair/Professor – Department of Geology Barb Eccles, RTTP, Barrister and Solicitor; Manager, Technology Transfer, Economic Development and Innovation Office
Oshki-Pimache-O-Win (Oshki)	Gordon Kakegamic, Learning Coordinator
Shooniya Wa-Biitong Training and Employment Centre for Treaty #3 Area (Shooniyaa)	Shirley Kelly, Program Supervisor
Sioux Lookout Area Aboriginal Management Board (SLAAMB)	Bob Bruyere (now retired), SLAAMB Coordinator

12.1.2 Aboriginal Training Institutes

Aboriginal training institutes typically partner with Colleges and Universities to offer Aboriginal students degree programs, apprenticeships, certificate programs and diploma programs. Some Aboriginal institutes also provide secondary school programming, continuing education, literacy and basic skills training [1]. Table 12.2 below lists the Aboriginal institutes within Northwestern Ontario including a description of services and programs they provide to Aboriginal students.

Table 12.2

Aboriginal Training Institutes in Northwestern Ontario

Aboriginal Institute	Description
Anishnabek Employment and Training Services (AETS)	AETS provides services to assist in the development of a skilled Aboriginal workforce through the provision of individual and community-based employment and training programs. AETS provides program interventions including course purchases, wage subsidies and employment start-ups for participants focused on re-entering the labour force. The following nine (9) First Nation communities are members with AETS: • Animbiigoo Zaagi'igan Anishinaabek (Lake Nipigon Ojibway) • Biinjitiwaabik Zaaging Anishinaabek (Rocky Bay First Nation) • Bingwi Neyaashi Anishinabek (Sand Point) • Kiashke Zaaging Anishinaabek (Gull Bay First Nation) • Michipicoten First Nation • Ojibways of the Pic River First Nation • Pays Plat First Nation • Pic Mobert First Nation • Red Rock Indian Band AETS has approximately 500 program participants per year. AETS offers training programs for Aboriginal people including a Mining Essentials Program and Natural Resources Training to Employment Program (NRTE).
Kiikenomaga Kikenjigewen Employment and Training Services (KKETS)	KKETS offers employment & training services and programs: • Individual Initiative Assistance for Personal Employment or Education; • Financial Support & Assistance; • Post-Secondary Certificate Program Courses; • Literacy & Essential Upgrading of Academic Skills; • Targeted Wage Subsidy for Employers and Employees; and • Apprenticeship Trades Training Program. KKETS is committed to delivering relevant, demand driven programs that meet the needs of employers and trainees by ensuring a better skilled Aboriginal workforce for all Matawa First Nations. Support services are offered to assist First Nations that include financial tools and resources, educational workshops, flexible regional service delivery and on-going access to training, in addition to equity and fairness among all Matawa members. In November 2012, KKETS launched a new training program – Aboriginal Skills Advancement Pilot Program (ASAPP). The purpose of ASAPP is to train Matawa First Nations members in

Aboriginal Institute	Description
	basic skills such as literacy and numeracy, GED, life skills and pre-apprenticeship training [2].
Oshki-Pimache-O-Win (Oshki)	Oshki is mandated to provide education and training opportunities to the people of Nishnawbe Aski Nation and surrounding area. Oshki provides excellence in post-secondary education by meeting the educational and cultural needs of the members and communities of NAN. OSHKI works with regional colleges and universities and other partners to: • Ensure quality programming. • Improve and increase opportunities for access. • Share beneficial resources and information. • Collaborate on the development and delivery of courses, programs and other projects. • Promote the retention and success of Aboriginal students. • Respond to employment and training needs within the communities of Nishnawbe Aski Nation. • Contribute to the advancement of self-governance, sustainable economic development and self-sufficiency within the communities of Nishnawbe Aski Nation. Oshki is currently designing programs to get ready for the activity in the Ring of Fire; however, they have yet to deliver any programs. Programs being designed include: life skills training, essential skills training and pre-employment.
Sioux Lookout Area Aboriginal Management Board (SLAAMB)	SLAAMB addresses the employment and training needs in the geographical area. SLAAMB has 24 First Nations in its area, as well as 6 native organizations located in the town of Sioux Lookout. At the time of research, SLAAMB was not offering programs. Instead, the institute provides information to potential job seekers on future job opportunities within the area. SLAAMB is designing training programs for the following: • Upgrading – to help Aboriginal population obtain Grade 12 math and English credits; • Cross Cultural Training – to help Aboriginal and non-Aboriginal people to learn cultural differences and to work with each other; • Preparing for apprenticeships; and • Programs for the area of trades.
Shooniyaa Wa-Biitong Training and Employment Centre for Treaty #3 Area (Shooniyaa)	Shooniyaa provides administrative and program delivery services for the implementation of the Pathways to Success strategy on behalf of the Grand Council Treaty #3. Shooniya does not deliver training programs; rather they fund individuals and project based training for skills training.

Aboriginal Institute	Description
Fort William First Nation Employment and Training Division	Fort William First Nation Employment and Training division does not have on-going training at the community at the moment. The Employment and Training program provides funding through their Aboriginal Skills and Employment Training Strategy. This funding allows the First Nation to access the fund to take the training.

12.1.3 Lakehead University

Lakehead University, in Thunder Bay, is the **only university located in Northwestern Ontario** and is a comprehensive university. The University evolved from the Lakehead Technical Institute which was established in June of 1946. In 1956, the Lakehead College of Arts, Science and Technology was established by an Act of the Ontario Legislature. Thereafter, the present university site, donated by the City of Port Arthur, was occupied in 1957 [3].

In March of 1962, Lakehead College of Arts, Science and Technology was granted the authority to establish university faculties and to grant university degrees in Arts and Science [3]. In 1965, the Lakehead College of Arts, Science and Technology became Lakehead University [3]. In 2006, the University opened its first branch campus in southern Ontario. The southern Ontario campus is situated in a renovated historic building, Heritage Place, in Orillia, Ontario. This campus has the capacity to accommodate 500 students [3]. The University now has 8,680 students, 7,042 of which are full-time (as of November 1 2011/2012), with 50,041 alumni [3].

At both campuses, faculty, staff, programs and services provide an extensive range of learning choices and alternatives that offer quality education at the undergraduate and graduate levels. Lakehead University is well known for their multidisciplinary teaching approach, and its emphasis on collaborative learning and independent critical thinking, offering a broad range of degree and diploma programs within **ten (10) faculties**, including:

- Business Administration;
- Education;
- Engineering;
- Natural Resources Management;
- Health and Behavioral Sciences;
- Law;
- Medical School (Thunder Bay campus);
- Science and Environmental Studies;
- Social Sciences and Humanities; and
- Graduate Studies.

Lakehead University has become an important institution within the Northwestern Ontario community. Over the years it has taken on the responsibility of gathering knowledge about the Region and incorporating it into social, economic, and cultural development programs for delivery

back into the Region, and more broadly across the rest of the province, the nation and internationally through its rich diversity of students [3].

"Lakehead has played a leading role in Northern Ontario mining since before we were even a University when we were known as the 'Lakehead Technical Institute' and we are committed to furthering the economic prosperity of all our Northern Communities."

Dr. Brian Stevenson
President, Lakehead University
https://www.lakeheadu.ca/about/news-and-events/news/archive/2013/node/15385

12.1.4 Confederation College

Confederation College is the **college of Northwestern Ontario**. Established in 1967, it offers a full range of programs and educational services throughout the Region, including:

- Full-time post-secondary programs;
- Part-time credit courses;
- Non-credit courses;
- Specialty programs for business and industry;
- Pre-employment and skills training;
- Apprenticeships;
- Cooperative/workplace training programs;
- Academic Upgrading programs;
- Centre for Continuing Education;
- School College Work Initiative;
- Apprenticeship training;
- Employment Services;
- Centre for Policy in Aboriginal Learning;
- Applied Research; and
- International Education Centre.

Educational programming is offered through a creative combination of traditional on-campus and distance education modes of delivery.

Confederation College has 662 employees, **4,000 full-time students, 8,000 part-time students** and 31,000 alumni. The College has nine (9) regional campuses across Northwestern Ontario to assist in the delivery of programs in more remote areas. These campuses are [4]:

- **Thunder Bay** (Main Campus);
- Greenstone Campus (**Geraldton**);
- Northshore Campus (**Marathon)**;
- **Wawa** Campus;
- **Dryden** Campus;
- Lake of the Woods Campus (**Kenora**);
- Rainy River District Campus (**Fort Frances**);
- **Red Lake** Campus; and
- **Sioux Lookout** Campus.

The College offers over sixty (60) post-secondary diploma and certificate programs. Approximately 51% of adults received training and education at Confederation. A survey of 2010/2011 graduates indicated the following [4]:

- Approximately **90.3% of graduates** are employed within **6 months** of graduation;
- Approximately **93.8% employer satisfaction** with Confederation graduates;
- **81.2% Graduate Satisfaction** rate; and
- **80.1% Student Satisfaction** rate.

Being a College well **respected for commercially relevant and practical skills training**, the College is well known for its contribution to skills enhancement of young people as well as mature students looking to upgrade or re-orient their skill sets. A description of the wide range of programs offered through Confederation College is provided in later paragraphs of this Section.

12.2 Future Education and Training Requirements: An Assessment

To understand the training facilities and programs required to provide the skilled workforce needed to address the expected employment growth in Northwestern Ontario it is necessary to assess the **future demands of the job market** and the capacity of existing institutions needed to provide the necessary training. The following paragraphs provide a discussion of the training capacity that is expected to be needed as well as a review of existing programs and facilities and their capacity to address this demand. Data pertaining to employment is based on the projections discussed in Section 11.

12.2.1 Employment Market

Section 11 identifies there will be a demand for **10,586 jobs sustained each year between 2013 and 2022** across the Ontario economy, of which approximately **60%** are expected to be created in Northwestern Ontario. **Over 75% of these jobs will require skilled labour**. The source of this labour force is uncertain.

In 2006 there were **9,881** unemployed people in Northwestern Ontario, 6,691 of whom were non-Aboriginal and 2,290 were Aboriginal. This is one source of potential workers that could be trained or re-trained to address the demanding employment growth.

Another source of **potential talent exists in the Aboriginal communities** of Northwestern Ontario. According to the 2006 Statistics Canada census, the Aboriginal population is **growing at six times the rate** of the non-Aboriginal population in Canada, with a very young median age of **27 years** compared to the non-Aboriginal population at **40 years** of age [5]. Although only 4% of the total Canadian population, Aboriginal people have low graduation rates, with secondary school (or higher) education attainment levels between 18% to 25% lower than the non-Aboriginal population, and unemployment rates more than double those of the non-Aboriginal population [5]. This represents a pool of future labour with significant potential and longevity having such a young average age. However, with education attainment levels being so low, there are **many challenges to maximizing the employment potential of the Aboriginal community** which must be addressed through education and training programs.

One of the challenges to delivering education and training to the Aboriginal population in Northwestern Ontario is that many people live in **geographically remote communities**, requiring creative approaches to program delivery. Increasing job-readiness for the Aboriginal and non-Aboriginal population of Northwestern Ontario requires a variety of educational and training programs ranging from enhanced job skills; improved literacy and basic job readiness; trades and apprenticeship training; and technical training, to more highly skilled diplomas and university degrees. The following paragraphs provide a profile of the anticipated employment market that is expected in the coming years.

Direct Mining Employment

The **ten (10) mining projects** which were assessed in Section 5 are expected to generate total employment of **5,064 direct mining jobs in 2015**, for the **construction period alone**. As discussed in Section 11, the types of jobs that are expected to be created will include a very broad range of skilled technical workers, unskilled labourers, professionals (eg. engineering, accounting, legal, medical) plus a wide range of jobs created in the goods and services sector (the supply chain).

Recognizing the importance to Northwestern Ontario of capitalizing on these employment opportunities and maximizing economic opportunities in the Region, it is important that training is available to ensure that the potential labour force acquires the skills that are necessary to succeed.

The **North Superior Workforce Planning Board** (NSWPB) Custom Labour Market Report – Thunder Bay District Mining Industry (2012) [6] and **Northwest Training and Adjustment Board** (NTAB) – Kenora and Rainy River Districts Mining Hiring Requirements Forecasts Report [7] identifies direct mining employment requirements for 66 occupations across six (6) job categories:[35]

- Trades and undesignated occupations;
- Professional and physical science occupations;
- Human resources and financial occupations;
- Support workers;
- Technical occupations; and
- Supervisors, coordinators and foreman.

[35] A detailed description of each of the 66 occupation as indicated in NSWPB's report is in Appendix B.

As the **peak number of jobs** in these categories is **expected to occur in 2015** there is not a lot of time available to deliver the necessary training, highlighting the need to act quickly.

Indirect/Induced Employment

In addition to the direct mining employment, many jobs will be created through indirect/induced employment opportunities. **Indirect employment is generated through mine purchases during operations** such as replacement machinery, transportation, and a variety of other goods and services. **Induced employment is generated by employee purchases within the region** [8].

Section 11 outlines labour requirements across a variety of sectors, with an employment peak in 2015. Similar to the direct mining employment, with time being tight, there is an **urgency to encourage students to complete Grade 12** and enroll in training and education programs in the near future to be job-ready when the market demands their skills.

12.2.2 Education and Training

There is great opportunity for the local workforce to take advantage of the various training courses that are available in order to better prepare themselves for the direct and indirect/induced employment that is expected to be created over the coming years. The **more skilled workers that are trained** within the Region, the higher their participation rate will be in the labour force, and the **broader the economic benefits** to the Region.

The following paragraphs illustrate the many training and education opportunities that are available to Aboriginal and non-Aboriginal jobseekers and students in Northwestern Ontario through the many **training facilities and institutions that are located in the Region**. To maximize the talent pool of candidates for the many training and post-secondary education opportunities, students and educators alike are encouraged to **focus significant effort on increasing the level of attainment of Grade 12** general education development (GED) to increase the number of candidates that are qualified for post-secondary training.

Pathways to Training

Having completed Grade 12 and obtaining a general education diploma (GED) there are a number of training and education opportunities available through the various institutions in Northwestern Ontario. Some of the many available programs are described in the following paragraphs.

12.2.2.1 Confederation College

Confederation College has the **capacity and infrastructure to train Northwestern Ontario's local workforce for many of the direct and indirect/induced mining jobs** that are expected to come available in the coming years. Confederation College has a broad range of training programs to prepare the local workforce of Northwestern Ontario to meet the employment requirements. All locals of Northwestern Ontario – potential students, jobseekers and residents in remote First Nation communities – can easily access programs at Confederation College. The College is part of the **social fabric of Northwestern Ontario** and has been the leading training institution in the region to train its local workforce for jobs that are available. The College will continue to do so by preparing the local workforce to become mining ready for the upcoming project developments.

Confederation College is one of the most important institutions offering vocational training for jobs related to "Trades and undesignated occupations," "Human Resources and Financial Occupations," "Support Workers," and "Technical Occupations." The College also offers training

related to indirect/induced employment in sectors such as: Publishing, Broadcasting, Telecom, and Other Information Services; Finance; Insurance; Real Estate; and Professional, Scientific and Technical Services.

"Confederation College represents $800 million annually in economic impact to the northwest region. We also have expanded our outreach to international markets providing for a rich culture of diversity within our doors."

Jim Madder
President, Confederation College
http://www.confederationc.on.ca/president/student

In addition to these more traditional training programs, the College also offers a number of less traditional training programs that help to increase education attainment levels, particularly for Aboriginal students. The following are the broad program offerings through Confederation College [4]:

- **Academic Upgrading**: This is for individuals that are considering **obtaining post-secondary education but do not have the necessary high school qualifications** to enter into apprenticeship programs or post-secondary programs. Academic upgrading is also for those that would like to obtain a Certificate of High School Equivalency. Individuals that are eligible for Academic Upgrading are those that: 1) do not have a Grade 12 diploma; 2) have a Grade 12 diploma but do not have the subjects or credits to enter further education and/or training; and 3) want to obtain their Academic and Career Entrance (ACE) certificate. Academic upgrading can be done on campus or through distance learning.
- **Dual credit programs:** These programs enable students to **complete their high school diploma** while providing them with the **experience** that will help with the transition to a post-secondary program at a college or an apprenticeship program. This method also increases their awareness of the various college and apprenticeship pathways available to them. The types of dual credit programs offered at Confederation College are:
    - ***Team Taught*** – delivered by a secondary school teacher and a college instructor, known as team-teaching. The dual credit is based on matched college and secondary school curriculum. The program can also include an apprenticeship focus based on team-teaching of matched Level 1 Apprenticeship and secondary curriculum.
    - ***College Delivered*** – Program is delivered by a college instructor involving the dedicated role of secondary school teachers (dual credit teachers). The dual credit is based on a college-delivered college course and may include a college-delivered level 1 apprenticeship in-school training with the dedicated role of secondary teachers.

Dual credit programs are delivered in conjunction with the following school boards of Northwestern Ontario: Keewatin-Patricia District School Board; Kenora Catholic District School Board; Lakehead Public Schools; Thunder Bay Catholic District School Board;

Rainy River District School Board; and Superior Greenstone District School Board. Below is a list of dual credit programs that are offered within the Region:

- Wellness for Life;
- Basic Hand Tools and the Safety of the Construction Industry;
- Baking and Pastry Arts;
- Making the Grade;
- Healthy Cooking Made Easy;
- Introduction to Hospitality;
- Mining;
- Supportive Care Theory I;
- Recreation and Leisure Options;
- Interventions with Children and Families;
- Introduction to Sociology;
- Technological Studies; and
- T-joints welding.

Dual credit programs that are offered in Thunder Bay include the following:

- Aircraft Construction and Science;
- Drafting Techniques
- Basic Hand Tools and Safety of the Construction Industry;
- Electrical, Electronics and Fuel Systems;
- Making the Grade;
- Applied Work Practices;
- Applied Math for Technology I;
- Sound Production;
- Metrology/Machine Shop I;
- T-joints Welding;
- College Link/Jump Start Courses; and
- College Now Courses.

- **Pre-Apprenticeship Programs** – These programs are offered at Confederation College to help potential entrants into the apprenticeship programs develop their job skills and trade readiness and are well prepared to find work as apprentices.
- **Apprenticeship Programs** – Confederation College offers a wide selection of apprenticeship training opportunities for individuals working in skilled trade areas who want to expand and refine their skills to a new level of expertise. Apprentices learn a skilled occupation by obtaining in-school training with paid on-the-job training. Approximately 90% of apprenticeship training is provided in the workplace by an

employer, while the remainder involves in-school training. These apprenticeship programs last between 2 and 5 years, with the majority of the time spent at the work site. Confederation College offers the following apprenticeship programs, that are related to direct mining jobs:

- Automotive Service Technician;
- General Carpenter;
- Cook;
- Electrical Construction and Maintenance;
- Industrial Electrician;
- Instrumentation Co-op Diploma Apprenticeship;
- Heavy Duty Equipment Technician;
- Industrial Mechanic Millwright;
- Truck and Coach Technician; and
- Welding.

- **Postsecondary Programs** – Confederation College has a vast selection of post-secondary programs for students of Northwestern Ontario. There are a number of post-secondary programs that are directly related to the projected mining jobs as a result of the proposed project developments. These postsecondary program areas are in the following fields: Business, Engineering Technology, Hospitality and Tourism, Media Arts, Health Sciences, Aboriginal, Aviation and Skilled Trades. Specific programs in relation to specific occupations will be discussed in the following subsections below.
- **Continuing Education** – Future students and/or jobseekers also have the option of obtaining continuing education at Confederation College. The Centre for Continuing Education (CE) offers both full-time and part-time courses and programs to students both within the City of Thunder Bay and throughout the region. Students can choose how they want to learn:
  - ***Classroom*** – classes taught in traditional classroom setting, either in Thunder Bay or regional campuses;
  - ***Online Learning*** – the online learning allows for students to take courses on their computer while adhering to the course structure and course deadlines. Instructors are accessible through telephone or electronic communication; or
  - ***Distance Education/Virtual*** – students are able to participate in “live” scheduled classes through the internet in their homes. The computer is then used as a communication device between the instructor and the students.
- **Corporate Training** – Corporate training needs vary depending on industry type, business cycle, and the competitive environment. Confederation College works with clients to determine training needs, develop appropriate training programs and deliver programming that is suitable for the client. Clients of corporate training include industry leaders, municipal, provincial and federal government agencies. Current training programs related to mining include [4]:
  - Mining Essentials and Common Core:

- Environmental Monitoring
- Industrial Safety Training
- Welding Certification

- Project Management Training
- Surface Diamond Driller's Helper
- Railway Conductor Training

Confederation College understands that **access to education in Northwestern Ontario is challenging,** due to the size of the region, low population density, poor preparation of many students, high cost of living, and lack of access to technology in remote communities. To address some of these challenges, the College uses **Technology Enabled Learning (TEL)** to support synchronous delivery across multiple campuses to individual students within the Region.

TEL allows for cost-effective training of a small number of students at one site participating in a program. Furthermore, a faculty located at any campus can teach across multiple sites in the Northwest with students supported in each community by regional campus staff. Currently there are **sixteen (16) programs delivered to eight (8) regional campuses** and through distance education [4]. According to the College's Strategic Mandate Agreement Submission, it is their **goal to build a Virtual College** to expand the delivery of certificate, diploma and post-graduate programs offered at the college. This system will **improve the opportunities for Aboriginal learners** in **remote communities** to receive education and training [4].

Also, it is important to note that Confederation College has a strong track record in international education, which ties in effectively with future needs to address skills shortages with skilled immigrants. The College is experienced in recruitment of international students, foreign campus development, international training and development projects and international contracting training. International experience includes China, India, Philippines, Eastern Europe and Latin America. The most logical proposal is to link with Economic Immigrants (skilled, entrepreneur and investor) as it relates to connecting at three distinct stages: pre-arrival, arrival and in-Canada newcomers.

Strategic Directions

Confederation College has set three strategic directions for 2013-2016. These strategic directions will help the College to better serve Northwestern Ontario. Below is a list of the directions, outlining various tactics supporting each strategic direction:

- **Serve Northwestern Ontario:**
  - **Review, renew and revise program mix** in relation to the needs of Northwestern Ontario and resources available. Expand programming through partnerships with colleges and universities.
  - **Support community development** through implementation of an integrated employment services/training network.
  - **Support community based innovation** through the implementation of Innovation and Entrepreneurism Hubs and infusing opportunities for entrepreneurism within programming.
  - **Expand applied research activity** within a context of experiential learning with a focus on alternative energy, wellness and Aboriginal learning.
- **Aboriginal Learning:**

- **Increase and integrate the student support and programming of Negahneewin College** throughout Confederation College.
- Implement the **Center for Policy in Aboriginal Learning**.
- **Expand partnerships with K-12 education providers** to support the success of high school students and their transition to College. There would be a particular emphasis on the success and transition of Aboriginal students.

- **Access and Success:**
  - **Implement Study North** to recruit learners to the College and augment the northern workforce.
  - Expand the **International Education Plan**.
  - Implement the **Student Village** with student success as a major theme in the village. There would be particular support for Aboriginal students from remote communities.
  - Expand **support to employees and students** to support student success.
  - **Implement the Virtual College** including Technology Enabled Learning to expand access to programming and services throughout Northwestern Ontario and beyond.

The successful implementation of these tactics depends on investment in people, infrastructure, and effective partnerships:

- **People**
  - Professional development of all employees
  - Hiring practices that attract and sustain high achieving employees
  - The development of teams that support collaboration and communication
- **Infrastructure**
  - Facilities (student village, improved learning environments and partnership space)
  - Information Technology
- **Partnerships**
  - Education (K-12, Colleges, Universities)
  - Employers (Chambers of Commerce, Mining, Forestry, Manufacturing, etc.)
  - Health (LHIN, TBRHSC, TBRRI)
  - Government (Municipal, Provincial, Federal)
  - Aboriginal Communities and organizations

Best Practices

Confederation College has been working with the Sioux Lookout Area Aboriginal Management Board (SLAAMB) which represents 23 First Nation communities, over the last seven years. Together with industry partners, Confederation College and SLAAMB have developed and delivered programming which was designed to provide training to employment. The initial program Canada Aboriginal Apprenticeship Research (CAAR) project spanned over 3 years and was designed for the construction industry. The program was synchronized with the construction of a $100 million hospital and hostel. The training included foundation skills, pre-trades programs and

Certificate of Qualification trades preparation. This learner centered program included representation from the industry, communities, and government. Based upon the feedback from the Steering Committee and an external evaluator, the program was continuously improved to support student success, retention, a path to employment.

The Medical Interpreter program was identified as a critical need by the Sioux Lookout Meno Ya Win Health Centre (SLMHC) in conjunction with SLAAMB. For 90% of the patients, English is not their first language. Based upon the model and applying best practices from the Canada Aboriginal Apprenticeship Research (CAAR) project at 52 week Medical Interpreter program was designed and developed. The overall program and elements of the final evaluation were overseen by a group of Elders. A Lexicon was developed and the Elders created a new vocabulary to define medical terms where they did not exist. The Lexicon was produced in three (3) languages: Ojibway, Cree and Oji-Cree. Approximately 75% of the learners completed the program and have jobs.

A Maternal Support Worker is being developed and building up the best practices of the previous program including blended learning to address critical need for maternal healthcare in the communities served by SLAAMB.

New Developments:

A partnership alliance has been established between Kiikenomaga Kikenjigewen employment and Training Centre (KKETS), a division of Matawa First Nations, Noront Resources Ltd. and Confederation College of Applied Arts and Technology. This partnership is known as the Ring of Fire Aboriginal Training Alliance (ROFATA). The Alliance is well positioned to support the development of healthy sustainable communities throughout the north through the development and delivery of training to employment programs. Each of the founding partners has the expertise and knowledge to develop a highly skilled future competitive workforce. KKETS understands and knows the needs of the communities it serves and its members. Noront Resources Ltd. through its extensive contractor base will bring organizations to the table that support and demonstrate Aboriginal inclusion in their day-to-day business. Confederation College has provided education and training throughout Northwestern Ontario for over 45 years.

12.2.2.2 Lakehead University

Lakehead University offers a comprehensive variety of programs to prospective students. The University is **well positioned to provide students the education required** to fill the projected direct mining jobs related to “Professional and Physical Science Occupations” and “Human Resources, Business Management and Financial Occupations.” Lakehead University also educates the local workforce for indirect/induced employment in sectors such as: Publishing, Broadcasting, Telecom and Other Information Services; Finance, Accounting, Insurance, Business Economics, Human Resources Management, Industrial Relations, International Business, Information Systems, Marketing, Legal, and Real Estate; and Professional, Scientific and Technical Services.

For students interested in jobs related to “Professional and Physical Science Occupations,” Lakehead University’s Faculty of Engineering offers a number of engineering programs in Chemical, Civil, Electrical, Mechanical, Software, Environmental and Electrical and Computer Engineering. The Faculty of Engineering also offers post-diploma engineering degree programs in Chemical, Civil, Electrical, Mechanical and Software engineering designed specifically for graduate engineering technologists [3]. Lakehead University’s Engineering programs are unique in that their students are able to obtain their technologist diploma after the first two years of study, and then may continue their studies towards their degree. Lakehead University, therefore, also trains

Chemical Engineering Technologists, Civil Engineering Technologists, Electrical Engineering Technologists, Mechanical Engineering Technologists, and Software Engineering Technologists.

The **Faculty of Science and Environmental Studies** (SES) also has programs related to the direct and indirect/induced mining employment in the following fields of study:

- Biology
- Natural Sciences
- Environmental Studies
- Computer Science
- Geology
- Mathematical Sciences
- Physics
- Natural Resources Management Business Administration (including accounting; finance; human resources management/industrial relations; information systems/operations management; marketing; and general management/policy and strategy)

Graduates of the **Geology program** at Lakehead University (H.BSc. and M.Sc.) have a broad background in Geology with a focus on Precambrian geology and mineral deposit studies, skills that are in demand by the minerals industry. This is reflected by the fact that the majority of students find work as industry or government geologists on graduation.

The **Faculty of Natural Resources Management** offers courses and research directions in a number of disciplines with linkages to exploration and mining. These include geomatics (GIS, GPS as well as both air- and space-borne remote sensing and image analysis (multispectral, hyperspectral and LIDAR), economic development and community outreach (including conflict resolution and Aboriginal issues), soils and water assessment, environmental assessment and reclamation, as well as watershed management. The Faculty is also highly involved with mid-career professional training in geomatics, statistics and operations optimization. In addition, the Faculty is host to a number of large geographic high-resolution data bases for external clients.

For students interested in the medical field, Lakehead University Thunder Bay Campus hosts the **Northern Ontario School of Medicine** (NOSM). NOSM offers training and clinical practice to students interested in practicing in northern urban, rural and remote communities.

Lakehead University will also offer a law program through their new **Faculty of Law** which will welcome 55 students in September 2013. The Faculty will focus on the following: 1) Aboriginal law, as well as integrating Aboriginal perspectives into other subject areas; 2) the needs of small practitioners, which will include the business of law; and 3) a concentration on natural resources law from mining rights to employment standards [3].

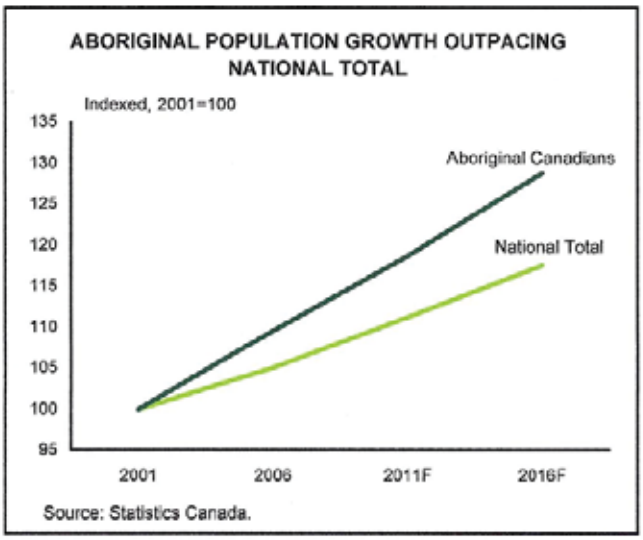
The **Department of Indigenous Learning is committed to providing both Aboriginal and non-Aboriginal students with fundamental understanding of Aboriginal history, culture and values**. It subscribes to the concept that a well-rounded educational experience is acquired through a combination of traditional academic disciplines and culturally relevant/sensitive activities. The Department of Indigenous Learning encourages students to consider both the interdisciplinary opportunities offered by Lakehead University, as well as the knowledge shared by the Aboriginal community of Aboriginal people. The goal of the Department is to help provide for an increasing

awareness and appreciation of the life experience of Aboriginal people with a view to creating an environment of understanding and trust amongst all peoples.

Lakehead University has recently established the **Centre of Excellence for Sustainable Mining and Exploration (CESME).** This Centre will undertake community based research activities related to resource development in Northern Ontario. The Centre will encourage and support research, education and outreach activities pertaining to the nature and impacts of mineral resource exploration and extraction in Northern Ontario. CESME will help to address challenges such as how to undertake sustainable economic development, ensuring environmental protection and respecting Aboriginal and Treaty rights. For example, in addition to mineral deposit and environmental studies CESME will be investigating the social impacts of resource development, including, but not limited to:

- Impact of road access to remote communities,
- New population entering territory that is generally First Nation,
- Impact of increased wealth from wages, and
- How development affects traditional lifestyles.

The three pillars of CESME are: 1) Mining and Exploration; 2) Environmental Impact; and 3) Collaborate with First Nation, Métis and local communities. CESME will be inclusive by taking a collaborative approach and partnering with First Nations, Métis, government and industry. The CESME is currently in its early stages and is engaging with all First Nation communities of the region (communities in Treaty 9, Matawa, Treaty 3, Anishinabek organizations) and mining companies (such as Osisko, Goldcorp Inc., Rainy River Resources) for potential partnering. CESME is currently engaging with communities and companies to determine what they see as key research questions, and how CESME can help address those issues. Through focused research activities and workshops CESME will contribute to the training of culturally sensitive professionals who can work with community partners to develop the resources of Northern Ontario in a sustainable manner.



Estimating The Size Of The Aboriginal Market In Canada
TD Economics Special Report. June 17, 2011

Pathway to Training for Aboriginal Students

Aboriginal people face a **number of barriers in seeking employment** due to reasons such as their **remote locations** to access training and employment, **lack of high school diplomas** and their **need for basic skills**.

There is great opportunity for the Aboriginal population of Thunder Bay and Northwestern Ontario to benefit from the employment opportunities by taking advantage of the training assistance and programs available through a wide variety of institutions and programs.

The Aboriginal population is an **important source of labour for Northwestern Ontario**. It is important to encourage Aboriginal students to stay in high school and obtain their GED in order for them to take advantage of the many training programs. This in turn makes it imperative to ensure that training is easily accessible for Aboriginal people so that they are provided the skills necessary to obtain jobs in the mining industry at all levels of employment from unskilled labourer to professional.

In order to **prepare Aboriginal people for mining employment**, the Aboriginal training institutions assist Aboriginal people (either students or potential jobseekers) in obtaining the right training so that they can enter or re-enter the workforce or provide them with life skills training or essential skills training to do so.

AETS assists Aboriginal community members to stay in or re-enter the workforce. AETS has effective program interventions such as course purchases, wage subsidies, and employment start-ups for participants re-entering the labour force. Additionally, AETS delivers the following training programs that are helpful for Aboriginal people seeking to work in the mining industry [10]:

- ***Mining Essentials Program*** – a work readiness program for Aboriginal people in mining, which aims to ensure Aboriginal people have the essential skills and work readiness training needed to work in the mining industry and to provide a local, employment-prepared workforce.
- ***Natural Resources Training and Employment Program (NRTE)*** – to assist in the development of a skilled Aboriginal workforce in natural resources. This program consists of seven (7) weeks of foundational training and sector training from one or more of the following eight (8) programs:
    - Diamond Driller Helper
    - Sawmill Worker Training Program
    - Aboriginal Hospitality and Tourism Training Program
    - Commercial Fisherman | Deckhand
    - Business Management & Entrepreneurship
    - Line Cutting
    - Truck Driving

In addition to helping Aboriginal people obtain training courses for trades, a number of Aboriginal institutions also assist workers in obtaining **"life skills" or "essential skills" training**. This type of training helps Aboriginal students and jobseekers to be "job-ready" in areas not directly related to employment such as managing personal finances. As shown in Table 12.2, Aboriginal training institutions such as Oshki-Pimache-O-Win, Sioux Lookout Area Aboriginal Management Board

(SLAAMB), and Kiikenomaga Kikenjigewen Employment and Training Services (KKETS) provide training in life skills, literacy and numeracy, academic upgrading and cross cultural training.

12.2.3 Available Education and Training Programs

It is clear that there are **training programs and appropriate training institutions in place** to prepare the local workforce for direct and indirect/induced mining employment. There has been interest in Thunder Bay and Northwestern Ontario to take education and training for positions of mining. Presented below is a characterization of the current training picture to demonstrate the type of training that the local workforce is seeking and for what occupation category. To do so, the training programs and services from the various Northwestern Ontario training institutions were matched with the occupation categories as shown in Table 12.3. Data characterizing the training programs are compared to required maximum number of workers during peak construction period in 2015. This is to identify the capacity of these programs to prepare for the required amount of workers for each of the occupation categories.

Table 12.3

Northwestern Ontario Postsecondary and Apprenticeship Programs related to Direct Mining Occupations

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Capacity Numbers	Enrolment Numbers (2012/2013)	Completion Numbers (2011/2012)
Trades and Undesignated Occupations					
Labourers in mineral and metal processing	**298**				
Construction millwrights and industrial mechanics (except textile)	**282**	Mechanical Techniques - Multi-skilling (Confederation)	30	11	10
Underground production and development miners	**441**				
Heavy equipment operators (except crane)	**198**				
Industrial electricians	162	Electrician: Construction & Maintenance Apprenticeship (Confederation)	-	68	76
Material handlers	116				
Machine operators, mineral and metal processing	126				
Heavy duty equipment mechanics	115	Motive Power Techniques - Heavy Equipment (Confederation)	26	21	15
Central control and process operators, mineral and metal processing	112				
Truck drivers	103	Truck & Coach Technician (Confederation)	-	50	41
Welders and related machine operators	92	Welding Techniques (Confederation)	70	68	36
		Welder Apprenticeship (Confederation)	-	7	10
Underground mine service and support workers	75				
Mine labourers	67	Mining Techniques (Confederation)	30	25	11
Construction trades helpers and labourers	45	Construction Techniques (Confederation)	25	23	8
Steamfitters, pipefitters and sprinkler system installers	36				
Drillers and blasters - Surface mining, quarrying and construction	23				
Crane operators	67				

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Capacity Numbers	Enrolment Numbers (2012/2013)	Completion Numbers (2011/2012)
Carpenters	8	General Carpenter Apprenticeship (Confederation)	-	127	104
Plumbers	5				
Other trades helpers and labourers	5				
Professional and Physical Science Occupations					
Geologists, geochemists and geophysicists	**75**	Geology (Lakehead)	-	80	17
		Earth Science (Lakehead)	-	24	
		Geology with Concentration in Physics (Lakehead)	-	5	-
Mining Engineers	**56**				
Industrial and manufacturing engineers	**39**				
Metallurgical and materials engineers	28				
Mechanical engineers	28	Mechanical Engineering (Lakehead)	-	212	48
Other professional occupations in physical sciences	23	Physical Geography (Lakehead)	-	2	4
Chemists	11	Chemistry (Lakehead)	-	61	11
Electrical and electronics engineers	8	Electrical Engineering (Lakehead)	-	152	57
Chemical engineers	8	Chemical Engineering (Lakehead)	-	81	15
Civil engineers	8	Civil Engineering (Lakehead)	-	314	79
Geological engineers	5				
Other professional engineers, n.e.c.	5	Program within the Faculty of Engineering (Lakehead)	-	16	9
		Computer Science, BSc. (Lakehead)	-	2	-
		Computer Science, MSc. (Lakehead)	-	5	1
Biologists and related scientists	5	Water Resource Science (Lakehead)		28	4
		Water Resource Science, MSc. (Lakehead)		17	
		Water Management (Lakehead)		7	-
		Biology, BSc (Lakehead)	-	25	6

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Capacity Numbers	Enrolment Numbers (2012/2013)	Completion Numbers (2011/2012)
		Biology, HBESc. (Lakehead)	-	20	2
		Biology, HBSc. (Lakehead)	-	107	22
Human Resources and Financial Occupations					
Financial auditors and accountants	**47**	Business Admin - Accounting (Confederation)		13	13
Human resources managers	23	Business Admin - Human Resources (Confederation)		23	23
		Business - Human Resources (Confederation)		47	24
Financial managers	23	Business - Accounting (Confederation)		88	19
Specialists in human resources	11	Human Resources - Post Diploma/Degree (Confederation)		18	9
Financial and investment analysts	8	Economics, BA (Lakehead)			
		Economics with Mathematics, BA (Lakehead)	-	7	3
		Economics, HBA (Lakehead)	-	6	2
		Economics, MA (Lakehead)	-	18	4
Support Workers					
Inspectors and testers, mineral and metal processing	**93**				
Dispatchers and radio operators	**33**				
Secretaries (except legal and medical)	31				
Transportation route and crew schedulers	16				
Administrative clerks	17				
Production clerks	20				
Construction estimators	5				
Cooks	5	Cook Co-op Diploma Apprenticeship (Confederation)	-	6	4
		Cook Apprenticeship	-	9	6

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Capacity Numbers	Enrolment Numbers (2012/2013)	Completion Numbers (2011/2012)
Inspectors in public and environmental health and occupational health and safety	11				
Engineering inspectors and regulatory officers	5				
Technical Occupations					
Geological and mineral technologists and technicians	**75**				
Chemical technologists and technicians	**36**				
Industrial engineering and manufacturing technologists and technicians	31	Instrumentation Engineering Technician - Process Automation & Control (Confederation)	32	43	6
Electrical and electronics engineering technologists and engineering	17	Electronics Engineering Tech - Computer Control (Confederation)	32	75	10
		Electronics Engineering Technology - Computers (Confederation)	32	32	18
Mechanical engineering technologists and technicians	17	Power Engineering Technician (Confederation)		31	14
		Mechanical Engineering Technician (Confederation)	32	12	
Land surveyors	8				
Drafting technologist and technicians	8				
Civil engineering technologists and technicians	5	Civil Engineering Technology (Confederation)	40	82	28
Mapping and related technologists and technicians	5	Certificate Program in Mapping Sciences	-	15	8
		Program within the Faculty of Natural Resources Management	50	25	15
Land surveying technologists and technicians	5				
Biological technologists and technicians	5	Environmental Technician (Confederation)	40	94	26
		Forest Ecosystem Management Technician (Confederation)	32	44	12
		Program within the Faculty of Natural Resources Management	50	25	15

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Capacity Numbers	Enrolment Numbers (2012/2013)	Completion Numbers (2011/2012)
Supervisors, Coordinators and Foremen					
Supervisors, mineral and metal processing	**162**				
Supervisors, mining and quarrying	**134**				
Primary production managers (except agriculture)	67				
Contractors and supervisors, pipe fitting trades	22				
Engineering managers	17				
Construction managers	5				
Contractors and supervisors, mechanic trades	5				

It is important to note the following regarding Table 12.3:

- **Business and Human Resources courses at Confederation College do not have a maximum enrollment**. Rather, these courses are considered "open" courses, where there are no rejections into the programs.
- It is recognized that **programs at Lakehead University relate to "Professional and Physical Science Occupations" through the Faculty of Engineering, Faculty of Natural Resources Management, and Faculty of Science and Environmental Science.** There are programs at Lakehead University that also relate to "Human Resources and Financial Occupations" through the Faculty of Business Administration, as well as a Master of Science in Management and a Master of Business Administration. Programs through the Faculty of Business Administration and Faculty of Engineering would be related to occupations included as "Supervisors, Coordinators and Foreman."

Table 12.4 below outlines the training programs provided by Aboriginal training institutions and Confederation College. These programs are not considered as postsecondary programs. Rather, these are training programs that are customized according to industry needs and are delivered to group participants. Data pertaining to these programs demonstrate the number of people that completed the training in 2011.

Table 12.4

Northwestern Ontario Non-Postsecondary Training Programs related to Direct Mining Occupations

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Completion Numbers (2011/2012 + 2012/2013)
Trades and Undesignated Occupations			
Truck drivers	143	Truck driving (AETS)	5
		Truck Driver (AZ or DZ) (Confederation)	19
Underground mine service and support workers	104	Common Core Underground (Confederation)	24
Heavy equipment operator (except crane)	274	Heavy Equipment Operator (Confederation)	47
Industrial electricians	224	Introduction to Electrical (Confederation)	7
Mine labourers	93	Sawmill Worker Training Program (AETS)	20
		Brush Saw Training (FWFN)	30
		Mining Essentials (AETS / Confederation)	22
		Introduction to Construction (Confederation)	5
Construction trades helpers and labourers	62	Line Cutting (AETS)	12
		Basic Line Cutting (Confederation)	18
Drillers and blasters - Surface mining, quarrying and	31	Diamond Driller Helper (AETS)	53
		Surface Diamond Driller (Shooniyaa)	31

OCCUPATIONS	Maximum Number of Workers	TRAINING PROGRAM/SCHOOL	Completion Numbers (2011/2012 + 2012/2013)
construction		Surface Diamond Drilling (Confederation)	120
		Surface Diamond Driller Helper (Confederation)	77
		Surface Mining – Common Core Workshop (Confederation)	19
		Drilling for Blast (Confederation)	6
Carpenters	12	Introduction to Carpentry (Confederation)	8
		Carpentry Level I (Confederation)	2
Support Workers			
Secretaries	42	MS Office (Confederation)	13
Administrative clerks	23	Aboriginal Hospitality and Tourism Training (AETS)	36
		Introduction to Office (Confederation)	13
Cooks	8	Remote camp operation (Confederation)	26
		Assistant Cook (Confederation)	9
		Remote Cook Helper (Confederation)	8
Supervisors, Coordinators and Foreman			
Supervisors, mineral and metal processing	224	Project Management (Confederation)	13

Based on the data from Tables 12.3 and 12.4, the **training institutions of Northwestern Ontario have training programs in place to respond to growth in the mining sector and its related supply chain**. Not only are the appropriate training institutions and programs in place, it would appear they also have the ability and facilities to provide training for the required number of jobs when they are required, assuming that the programs are filled.

It is apparent that **Confederation College offers a significant number of training programs and services for the Thunder Bay and Northwestern Ontario local workforce**. Based on the data presented, the programs at Confederation College can prepare potential job seekers for the following occupation categories: “Trades and Undesignated Occupations” (e.g. construction millwrights and industrial mechanics, heavy duty equipment mechanics, welders and related machine operators, construction trades helpers and labourers); “Human Resources and Financial Occupations” (e.g. human resources managers, financial managers); and “Technical Occupations” (e.g. industrial engineering and manufacturing, electrical and electronics engineering technologists, civil engineering technologists, biological technologists and technicians).

Lakehead University has the capacity to educate potential jobseekers for “Professional and Physical Science Occupations” and “Technical Occupations” (e.g. geologists, mechanical engineers and technologists, electrical engineers and technologists, civil engineers and technologists, and chemical engineers and technologists). There are also programs in place to prepare students for “Human Resources and Financial Occupations” and “Supervisors, Coordinators and Foreman” through their Faculty of Business Administration. Lakehead has also taken an increased institution-wide focus on mining through its Centre of Excellence for Sustainable Mining and Exploration (CESME).

Furthermore, data shows that training programs through corporate or group training at Confederation College, Lakehead University's programs including those in the Department of Indigenous Learning, or the Aboriginal institutions are preparing the Aboriginal workforce for positions related to "Trades and undesignated occupations" and "support workers."

12.3 Conclusions and Recommendations

It is apparent that **training opportunities in Northwestern Ontario are well suited to preparing the local workforce for employment opportunities** in the growing economy. The training institutions of Northwestern Ontario have built relationships and have extensive knowledge of the Region's residents. They provide students and jobseekers with traditional educational training for skilled and professional employment, as well as more non-traditional training to help increase educational attainment levels and success in the workforce following graduation. Most of the institutions, most notably the Aboriginal training institutions, are helping to provide programs tailored specifically to the needs of Aboriginal students and prospective students.

It is recommended that:

- **Education and training institutions should increase training capacity in Thunder Bay and Northwestern Ontario by increasing the number of students that can enroll in existing programs, and by implementing new training programs to address different types of skills training.** Although current levels of training are exemplary, Northwestern Ontario is encouraged to continue its current endeavors to increase training capacity to have the local work force ready to take up the 9,100 construction jobs and 26,534 operation jobs projected between 2013 and 2022.
- **Education and training institutions are encouraged to establish new training programs to address gaps in training for skilled mining jobs**, including:
    - Underground production and development miners;
    - Underground mine service and support workers;
    - Drillers and blasters – surface mining, quarrying and construction; and
    - Inspectors and testers, mineral and metal processing.
- **Education and training institutions are encouraged to collaborate to create a community of mining education and thought leadership.** To attract the local workforce of Thunder Bay and Northwestern Ontario, a council of mining education should be created. This can be done through partnerships with industry leaders, training institutions (Confederation College, Lakehead University and Aboriginal training institutions), all orders of government, and community leaders to promote education in the mining sector to the local workforce and develop research and development for the mining sector. This educational community can help the training institutions to align their training initiatives with industry's employment projects in order for the Region to be prepared for mining employment. Research and development in the resource sector can also be done through this community of mining, creating a community of innovation through research and the development of innovative technology and services.
- **Education and training institutions, local school boards, teachers' federations and mining companies should collaborate, perhaps through a newly created community of mining education, to introduce and advance mining sector**

employment opportunities into high schools. This will require that teachers are provided with the necessary education and knowledge of the mining sector and related supply chain economies to be well equipped to educate students on employment opportunities in the mining sector and its related supply sectors.

- **Local school boards and teachers federations and mining sector companies should encourage students to enroll in dual credits/programming in order to allow students to complete their high school diploma while transitioning to college and apprenticeship programs.** This also exposes the students to jobs in the mining sector. As students are being educated about the available jobs in the mining sector, high schools are encouraged to provide clear career paths in mining. It is important to make connections between employers and students in the mining sector.
- **The provincial government, through the various Ministries involved in funding post-secondary training and education should be given the resources to increase investment in a more comprehensive Integrated Service Delivery (ISD) model.** Increased investment in ISD will provide tools and support to advance education-to-employment, lifelong learning and lifelong employment. Applicable directly to the Ring of Fire, the proposed ISD model uses a blended learning approach to reach potential learners within urban, rural and remote locations in Northwestern Ontario on an equitable, timely and cost effective basis. This system is linked with important employment related services, including readiness training, job profiles, job posting, individualized records of employment, related education and learning, and on-going career development. Also, this system involves individualized career planning and development, complete with electronic resumes, educational records, participant tracking, program monitoring and career goal attainment. Part of this investment would cover evidence-based research and evaluation to demonstrate streamlined government services, costs reductions or mitigation, critical successes factors, best practices and bench marking metrics.
- **The City of Thunder Bay and the CEDC, in collaboration with the Thunder Bay Multicultural Association, regional and local Chambers of Commerce and the provincial and federal governments are encouraged to develop an international recruitment and retention strategy for Thunder Bay and the Northwestern Ontario region targeted at Economic Class immigrants, including skilled immigrants, to help fill skill shortages, help entrepreneurs to launch new enterprises, and encourage investors to fund new business development.** This strategy would include a focused approach to linking with Economic Class immigrants from Canada's top 5-6 source countries (India, China, Philippines, Europe, United Kingdom). Marketing efforts should be developed and implemented to target pre-arrival, arrival and resident Economic Class immigrants across Canada. Confederation College would play a supportive role in promoting immigrant recruitment, providing additional technical training and designing employment retention programs.
- **The provincial and federal governments, local school boards, Confederation College, and mining sector companies are encouraged to work cooperatively to develop specialized training programs tailored to the needs of the mining sector within the accelerated timelines required to respond to the growing demands of the mining and construction sectors over the coming years.** These types of programs are not part of the regular inventory of training programs, nor are they readily available from third party sources. These programs must be developed in a comprehensive fashion to support in-class, online or blended delivery. The nature of work involves needs

assessments, instructional design, content sourcing, curriculum development, media production and instructional delivery. It is recommended that funds be invested in a full-service training team that offers a consistent approach to quality programs.

- **All training programs should include, to some degree, curriculum that builds awareness and understanding of social issues and how to effectively deal with them. It is further recommended that funds be invested to conduct socio-economic research in order to better understand the types of social issues that are likely to be encountered, leading to improved curriculum and program development.** Creating and sustaining a steady and reliable labour force for Thunder Bay and Region means more than just skills training and development; it means a holistic approach to healthy and sustainable individuals, families and communities. Helping employees better deal with personal and social elements that may prevent them from going to work and being productive is critical to employment retention. Personal difficulties with such issues as family planning, substance abuse and mental health can negatively impact the labour force.

- **Provincial and federal governments are encouraged to collaborate to identify the necessary resources to expand and refine existing employment and retention support services to meet a growing level of demand, diversity and complexity amongst the labour force.** Developing a labour force of people within Northwestern Ontario, especially those from rural and remote communities, requires additional levels of support to ensure their active participation and retention in the labour market. These support systems are in various areas of personal advisement and counseling across a spectrum of areas, including personal, life skills, upgrading, job readiness, interview skills, resume development, employment postings, referrals, employer recruitment, job search, job maintenance and career planning.

- **Education and training institutions and other organizations are encouraged to design, develop and deliver educational and training programs to provide both early stage entrepreneurial thinking and business start-up skills, to promote long-term diversification and development of the economy beyond mining and the mining supply chain.** Educational and training programs need to be designed to foster long-term sustainability of the economy. Running as a parallel track to mining-related skills training, programs must be developed to foster growth of a diversified economy. This will help to ensure future employment and sustainability for communities beyond specific mining-related business. This requires a broad range of alternative economic activity, including new business development, entrepreneurship, business incubators, export-oriented companies, strategic partnerships, import substitution, local supply-chain, youth enterprises, foreign investments, etc. This level of enterprise development encompasses both for-profit business development and not-for-profit social entrepreneurship and innovation.

- **Provincial and federal governments are encouraged to provide the funding and resources necessary to establish a Regional education-to-employment 'Systems Integrator' position to be located at one of the regional educational institutions such as Confederation College.** The System Integrator would have the responsibility or stewardship to oversee the "big picture" involving all stakeholders - government, education, employers, social and community. With a high-level perspective on the entire regional economy, the System Integrator would be expected to develop strategic thinking for today and into the future, plus develop skills solutions, gather data and disseminate

information for today and into the future [11].

"We have to up our game, we have to change."

(speaking on the 32-page Advantage Ontario Report)

Kevin Lynch
Vice President
BMO Financial Group

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13 PROJECT DEVELOPMENT AND FINANCING STRATEGIES

There is a **wide variety of business partnership and financing models** available to Aboriginal and non-Aboriginal communities or other organizations that are interested in developing infrastructure and related projects that could help to support mining development in Northwestern Ontario. A number of these models have been tried and tested, and the relative merits are known. Others are less well known, but could have some merit. The following sections of this Strategy attempt to describe some of the **more common of these models, identifying key characteristics and issues to be considered** when choosing an appropriate level of project participation.

There are some differences between the approaches that might be taken towards project development and financing by a First Nation or Aboriginal organization compared to a municipality or other non-Aboriginal organizations. These will be discussed in the following paragraphs.

13.1 Aboriginal Community Involvement in the Business of Resource and Land Development

The **physical footprint of potential mining** and related activities in Northwestern Ontario will be large, affecting traditional territories of the Nishnawbe-Aski Nation (Treaty No.9), the Union of Ontario Indians, Anishinabek, Treaty No.3, and Robinson-Superior Treaty. Traditional lands of the Métis people may also be affected.

Aboriginal communities typically have a number of objectives when considering their potential involvement in major developments including mining or related activities such as **all-season roads** or **high voltage transmission lines**:

- **Maintaining a significant role in land stewardship** where the Aboriginal community has a decision-making role in land use management within their traditional territory;
- **Maintaining traditional culture** where the Aboriginal community will want to ensure that any major project affecting their traditional territories does not result in significant and irreversible impacts to their traditional culture;
- **Commercial participant** in the proposed developments with the resulting benefits flowing to the community that could include impacts and benefits agreement, royalties and/or equity involvement in the Project;
- **Employment and contracting opportunities** for community members; and
- **Training and capacity building** to ensure more meaningful role in project development and longer term economic success.

Land management and governance within traditional Aboriginal territory **differs from region to region**, even community to community, and often reflects the previous experience of the Aboriginal community or organization with land development issues, as well as the capacity available within the community or organization to address these issues.

Establishing businesses with, and potential financial involvement of communities in major resource or infrastructure projects is a complex process that can be negatively affected by many issues. A number of factors can potentially cause financial risk to the entire project(s) due to perceived risks to the permitting schedule (potential delays to production), perceived social risks of community opposition, and other risks that can cause challenges to obtaining project financing. These risks can be discussed openly with potentially affected Aboriginal communities during community engagement as part of early project development and the negotiation of partnering agreements. Because of the importance of coming to consensus between the project proponent and communities, the process of completing a mutually acceptable agreement is of paramount importance to the success of projects.

Some key issues that can affect project financing and project development are discussed in the following paragraphs.

13.1.1 Project Permitting

Land management and permitting outside municipal boundaries in Northwestern Ontario has traditionally been the responsibility of federal and provincial agencies. Historically, the government agency responsible for key permits for a project would consult with, and seek the concurrence of the affected Aboriginal communities during the permitting phase of project development. The Aboriginal community(s) would concur or oppose the project and there might be no discussion of community participation in project development and operation.

Today, following many decisions of the Supreme Court of Canada and significant project experience within and beyond Ontario, it is well known that **consultation must occur early in the planning process** and must have meaningful results that respect and acknowledge the Aboriginal and treaty rights of affected communities in relation to the impacts that could be caused by a project that lies in the community's traditional territory. Determining accommodation for impacts that could potentially result from a project is leading to a diverse array of economic Agreements between the Crown, proponents and Aboriginal communities.

The Aboriginal communities of Northwestern Ontario expect **early and on-going engagement by project proponents** regarding any proposed development within their traditional territories. They expect that a prospective developer will contact them prior to applying for any permit required by the Federal and or Provincial governments to work in their traditional territory, and will continue to engage the community throughout the exploration, design and permitting phase of the project. Some communities may choose to enter into a formal agreement prior to signing off on an Environmental Assessment and other permits. Although an Agreement will not always result in Aboriginal community involvement in project ownership, it is likely that **the agreement will identify economic benefits to the affected communities** as well as governance aspects around community input into decisions involving land management, cultural protection, impact management and environmental controls.

The risk of not **"getting it right"** in the early stages of project development can have a profound effect on project schedules as well as the potential to develop the positive long-term relationships with communities that is essential to obtaining "**a social license to operate**". Increasingly, a proponent must demonstrate its ability to achieve "social license" in order to obtain project financing.

A number of **socio-political factors** can have a significant effect on project scheduling, project financing and the ability to execute a project within Aboriginal traditional territories.

Grievances

In Ontario many Aboriginal communities have grievances and claims against government agencies which have developed and operated projects within their traditional territories, where they were not properly consulted and that resulted in impacts that have not been adequately compensated. These are often claims against a historical breach of treaty rights and fiduciary duty on the part of the responsible government agency(s) from years past. Historical grievances may emerge as a new project moves forward through the permitting process, and cannot be addressed by private sector proponents. This can lead to **significant financing risk** as a result of uncertain project development schedule and uncertain conditions arising from negotiation of the grievance settlement that could affect project design and/or development and operation potential.

Traditional Culture

The development of major projects in Northwestern Ontario, in particular within remote areas, can cause profound cultural and community change as a result of the establishment of new access points into the traditional territories of communities that still **value traditional culture and traditional economic pursuits.** These access points are typically the result of new air strips, road connections, transmission lines, etc.. The impact of these new access points can include an erosion of traditional culture by making it easier to bring illegal drugs, alcohol and other social challenges into the communities. New access points can also open the area to prospecting, hunting, fishing, and tourism opportunities to people from outside the local community, even outside the broader Aboriginal community, without permission. These also provide new opportunities for Reserve residents to relocate to urban areas thereby reducing the leadership component of the Reserve.

It is important to discuss the **social and cultural issues** associated with new access points with the Aboriginal communities potentially affected by the establishment of a new road, transmission line, etc., as early in the project development schedule as is feasible.

The potential positive impacts of a better future for the youth and future generations as a result of improved access to education, health services, etc., must be weighed against the negative impacts of potential impacts to culture and community values. This is particularly relevant in the discussion of dedicated access roads with restrictions on the use of the road by local community members. Without a **positive community endorsement** of the road or transmission line, there will be perceived risks of not being able to implement not only the infrastructure project but the mining project at the end of the road or transmission line that requires reliable access and power supply. **Lack of certainty around this reliability can have negative consequences for project financing**.

13.2 First Nations Financial Participation in Major Project Development

Most of the Aboriginal communities in Northwestern Ontario **do not have the financial resources to invest in a large project** such as a mine, a transmission line or an all-season road. However, if the project is to have the full support of the First Nations who will be impacted, it is important for the project developer(s), together with the communities affected by the project (directly and indirectly) to design a **framework for community involvement in the business of the project** which is financially attainable and financially sustainable over the long-term; that is without significant financial risks to the community; and that is responsive to community culture, community planning and the future economic development goals of the community(s). Finding and executing the most appropriate model can take time.

Participation in the development/ownership/operation of a major project often entails an Aboriginal community(s) entering into a business Agreement with the project proponent, such as a partnership, joint venture, etc.. In turn, the project proponent will typically negotiate an Impacts and Benefits Agreement (IBA) with the Aboriginal community which defines the proponent's role and the communities' role in the overall development. This role may or may not involve ownership, but will most likely involve commitments towards Aboriginal employment and the procurement of Aboriginal goods and services. Today, these agreements typically also include commitments to skills and employment training, community involvement in on-going environmental monitoring and closure planning, plus a financial arrangement that could include royalties. Resource revenue sharing between a proponent and an Aboriginal community has not yet become a common practice in the resource development industry in Ontario.

Many projects will potentially affect more than one community. This is particularly evident with linear projects like roads and transmission lines. This will bring the added challenge of negotiating an Agreement with a number of communities. It is possible that not achieving an Agreement with one of many communities could affect the ability to finance, develop and operate the linear project as well as the mine that is being serviced. This can be a substantial challenge to proponents and can add significant time (and need for financial resources) to the project definition and development stages of a project.

13.2.1 Financial and Funding Models for Aboriginal Participation

There is a wide variety of project financing models available for including Aboriginal communities and organizations in the business of major projects. **Different models result in different levels of financial commitment, financial risk, ownership and control.**

Sources of capital available to Aboriginal communities to become involved as a party to the project includes traditional funding from government sources such as Aboriginal Affairs and Northern Development Canada (AANDC) capital funding for infrastructure projects; other federal and provincial government programs such as FedNor and the Northern Ontario Heritage Fund Corporation (NOHFC); funds from the community's own source of capital such as trust funds from land claim agreements or grievance settlements; funding/loan from the project proponent; private financing through chartered banks and other lenders; and/or third party equity financing available through specialty investment groups like the Ontario Municipal Employees Retirement System (OMERS), the Ontario Teachers Pension Plan and Capital for Aboriginal Prosperity and Entrepreneurship (better known as CAPE) Fund.

Each of these sources of capital results in **varying degrees of financial risk** to the Aboriginal community or organization (often a community economic development corporation or some other special purpose private sector entity set-up for the purposes of participating in the business). As stated earlier, many of the Aboriginal communities in Northwestern Ontario are without the means to secure traditional sources of financing, and few have trust funds to draw upon. This leaves the issue of **financial accountability as an important discussion** between the Aboriginal business entity and the project proponent when defining applicable business partnership models.

The **type of funding or financing** available for the project will depend on several factors:

- Project cost
- Project ownership (private versus public)
- Project operation (private versus public)

- Source of revenue
- Operational period (project life span)
- Environmental and social risks
- Permitting risks

The following paragraphs provide an overview of some of the more common project financing options.

Federal/Provincial Funding and Replacement Costs Model

The **primary source of funding for municipal-type community infrastructure projects** such as water supply/treatment, sewage collection/treatment and roads is through the federal government (Aboriginal Affairs and Northern Development Canada). This type of funding would not typically apply to a mine, an all-season road or a transmission line. Other funding sources that could be applied to the initial capitalization of the Aboriginal component of a project include the following:

- Canada Strategic Infrastructure Fund
- Canada Strategic Partnership Initiative (SPI)
- Municipal Rural Infrastructure Fund
- AANDC capital and/or economic development funding
- FedNor
- Northern Ontario Heritage Fund Corporation (NOHFC)
- Ministry of Energy (Ontario)
- Ministry of Infrastructure (Ontario)

There are **opportunities for more creative government capitalization/financing** if it is for a new asset to replace the need for an older, perhaps less efficient asset. This is particularly evident with power generation where interconnection to the provincial grid could be cheaper and more efficient for a remote community over the long term than generating power with diesel generators. In a limited number of similar cases, including the Five Nations Energy Inc. (FNEI) transmission line in Northeastern Ontario, the federal government has agreed to provide loan guarantees for project financing (usually debt finance component) on the basis of “replacement costs”. In the case of the FNEI transmission line, the new grid interconnection would be cheaper for the federal government to subsidize over the long term than diesel generators, thereby significantly reducing the federal government financial commitment to power supply to the connected communities. In the case of FNEI, the Aboriginal project proponent was willing to assume ownership and operation of the transmission line, thereby discontinuing the federal government responsibility to fund the capitalization, operation and maintenance of the community diesel generators which were being replaced. **The long term savings to the federal government were used to establish loan guarantees for the initial capitalization of the new asset**. These loan guarantees could be enough to attract equity partners and additional debt financing.

Most of these funding and financing programs are designed for start-up and do not necessarily represent a source of full project financing, especially for major infrastructure projects.

Community and National Level Funding

Some funds, typically small amounts, can be made available through community economic development programs. Although these funds are not likely to cover project financing, it is possible that funds could be obtained to cover study costs, and even training. Bank Financing (on-balance sheet financing)

Bank loans or debt financing typically make-up the majority of the required capital for a project (60 to 80%). Loans are secured against assets or property owned by the project developer (equity holder). Bank loans are relatively straightforward if the developer can provide sufficient security for the loan and demonstrate a revenue stream. Good security will also tend to result in lower borrowing costs. However, this route is **normally closed to a developer with limited financial resources and unsecured assets** (i.e., most Aboriginal communities and organizations).

Co-development with a financially strong partner

A project can be developed as a joint venture with a financially strong partner. A strong partner may provide equity capital and offer security for bank loans (assets/property). In addition to their risk-sharing potential, the partners may also be selected based on their ability to provide expertise important for the project (engineering, finance, and potentially operations). A typical example of co-development might be a First Nation community who has a waterfall within their traditional territory. A power utility in the area may agree to finance, develop and operate a hydropower project at the site. **In return for this the First Nation may be allocated a number of shares in the project**, a royalty payment or electricity supply, etc..

Limited Recourse Project Financing

The principal difference between on-balance sheet financing and limited-recourse project financing is the way in which the bank loans are secured. **In limited recourse project financing the future cash flows from the project are the lenders' main security**.

There are **two important reasons** for wanting to access limited recourse project financing. The **developer may not have sufficient assets** to secure a bank loan, or the **developer may not wish to bear all the project risk** involved in the development.

As the lenders cannot rely on the liquidation value of the project (or sponsors) as a means of securing repayment, they will "take security". This involves exercising tight control over most aspects of the project development:

- Charge over the physical assets
- Assignment of the project contracts
- Contract undertakings
- Shareholder undertakings
- Insurance
- Bonding

All aspects of the project would be arranged to control the risk for the lenders, who will wish to see evidence of the project's economic viability. The lender will require an independent technical report by a credible consultant. They will scrutinize important agreements such as the operating agreement, shareholders' agreement, etc. The lenders will expect contractors, suppliers and operators that have a strong record of accomplishment in their field to participate in project

development. Whenever possible the risk is transferred to third parties. A contractor working on a turnkey fixed-price basis can be used to minimize the completion risk. A long-term Power Purchase Agreement mitigates the market risk. The lenders will even ensure that they have the right to step in and operate the project in the case that it is not paying its debts.

Limited-recourse project financing involves a series of complex contractual agreements. The initial arrangement costs can be relatively high. This makes financing difficult for projects with a capital cost of less than US$ 5 - 10 million.

Leasing

Leasing assets is an alternative to ownership. A lease typically involves an agreement between an Owner of an asset such as land or a facility, and another company to use the land or facility at a specified cost for a specified period.

In general, the types of leases available in the market today can be classified as either **operating leases or financial leases**. An operating lease is written for a short period of time, from a few months to a few years. The lessor assumes most of the responsibilities of ownership including maintenance, service, insurance, etc. The operational lease is not a long-term financial commitment, and is unlikely to be used for securing financing to develop the physical assets of an infrastructure project.

A financial lease (capital lease) is a long-term contract by which the lessee agrees to pay a series of payments that in sum will exceed the purchase price of the asset, and provide the lessor with a profit. The lessor would typically take responsibility for obtaining project financing. The lessee would typically take on the fundamental ownership responsibilities such as maintenance, insurance, property taxes, etc. Normally the agreement is not cancellable by either party, but may provide clauses that allow cancelling should certain circumstances occur. Upon termination, the asset is returned to the lessor.

Build Own Operate (BOO)

In a BOO project the owner of the land grants the development rights to an independent developer. The developer controls the design, construction, and operation of the project. In return, he pays a fee to the rights owner. In many cases, there is an agreement that the project will be transferred back to the owner after a specified period of time (BOOT). BOO/BOOT projects are typically financed using the methods described above.

13.2.2 Factors Affecting the Financing Strategy

Securing financing is often a **major obstacle in developing any infrastructure project** which is not funded through traditional government sources. This has been a particular challenge for Aboriginal communities, organizations and small companies, including junior mining companies.

The principal question for the prospective developer is: should the project be financed by the use of in-house funds, by co-development with a financially strong partner, by ordinary bank loans secured against the developer's other assets or property, or by limited recourse project financing? The financing strategy will affect the developer in several ways. Risk, revenue, and control over the project are all closely related to the project financing arrangements.

A financially strong developer can use in-house funds or access debt financing through bank loans. This gives a large degree of control over the project. However, it also means tying up

financial resources for a long period of time. With fewer financial resources, the developer must look for other routes of financing to develop other projects. This model does not likely work well for an Aboriginal community, organization or a First Nation owned company that does not have security through the ownership of assets and/or a steady source of revenue from other projects.

The size of the debt component is important when considering limited recourse project financing of smaller projects. The high arrangement costs make small projects unattractive to project lenders. From the experience of SNC-Lavalin in securing limited recourse financing, CDN$10 million is considered an approximate lower limit, which makes it an unlikely financing option for small infrastructure projects.

Co-development with a financially strong partner may be one of the more accessible options for financing an infrastructure project. At an early stage, the developer should consider possible partners for co-development. It may be worth approaching companies that are already involved in the successful operation of a similar project. Such companies are well qualified to judge the feasibility of the project and will already possess much of the expertise necessary for developing the project in-house.

Management of project risks is another important consideration. In general, a high level of debt means a high cash-flow risk. Debt service has first claim on project earnings. The developer will receive revenue only if there is a surplus after interest and repayments.

The size of the financial obligations is important if the project is a failure. If the project fails, the developer in the case of in-house funding or ordinary bank loans carries all the losses. Using the same methods as in limited recourse project financing can mitigate much of the risk. However, the developer should consider the consequences if the project is a failure.

With on-balance sheet financing, cash flow risks are higher, but the involvement is limited. In a project financed by non-recourse financing the involvement is limited to the equity. In a limited recourse project the developer has accepted additional undertakings, but the involvement is still limited. The developer will have to pay a price for reducing the risk. The arrangement costs are high and third parties accepting a risk will require a premium.

The developer's desire to control the project is also affected by the financial arrangements. With the project, a high degree of equity control will remain with the developer. With much unsecured debt the financiers will control the project until it has been repaid. If control over the project development is important to the developer, he must also accept a larger financial involvement.

13.3 Funding and Financing Strategies for Non-Aboriginal Communities and Organizations

It is well recognized by the non-Aboriginal communities and organizations in Northwestern Ontario that there is **both a need and opportunity to provide infrastructure in support of mining and related economic activity**. This can range from providing serviced residential and industrial/commercial lots and local infrastructure, to the broader regional public infrastructure that would help with the interconnection of more remote projects, such as roads and power facilities. There are many challenges faced by these communities in deciding how best to approach this challenge and opportunity:

- The **certainty of the mining projects** going forward is always in some jeopardy based on a variety of economic factors. This also includes the double edged sword of the

project not being as feasible without interconnecting infrastructure and support infrastructure in the local communities. This can challenge the revenue stream required to support the initial investment.

- **Securing the funding** to implement these projects is challenging. If funded internally, the initial costs can be a significant "hit" for local resources, if the funds are even available. If financed through external sources, primarily loans, the risks to taxpayers can be high. Funding through grants requires cooperation from more senior levels of government who must weigh the regional benefits versus benefits to their broader tax base.
- Providing the **type of infrastructure** required for some projects such as lengthy all-season roads and transmission lines, bring jurisdictional challenges, requiring consensus across a broad range of partners such as First Nations communities, non-Aboriginal communities as well as other levels of government, which may have differing priorities, even competing interests.

Financing and funding arrangements for non-Aboriginal communities and organizations tend to be broader than those for Aboriginal communities and organizations. This is in part due to the non-Aboriginal community's ability to levy taxes and user fees, plus their ability to borrow against community-owned assets. This opens the range of options for financing infrastructure projects.

The **types of project financing traditionally utilized by municipalities** include the following more common sources [1]:

- ***General Operating Revenues.*** Rural municipalities, towns and smaller cities tend to rely more on local taxes, user fees and grants than on borrowing, partly because borrowers view them as higher risk than larger cities, thus raising their borrowing costs.
- ***Earmarked User Fees.*** An earmarked user fee is dedicated to a specific project; for example, water and sewer charges for water infrastructure, disposal fees for solid waste facilities, and admission charges for recreational complexes.
- ***Reserves.*** Financing capital projects through funds set aside for capital spending is the reverse of financing through borrowing. A "capital levy" — usually a few percentage points of the local property tax — is set aside and accumulates in interest earning accounts segregated from general revenues. These reserves may be earmarked for general capital projects or for specific projects.
- ***Development Charges.*** Most large municipalities and many smaller ones impose a specific dollar value per lot on developers to finance the off-site capital costs of new development. Developers are generally responsible for on-site services, such as local roads, sidewalks, and street lighting. Historically, development charges have financed "hard" services, such as water supply, sewage treatment, trunk mains and roads.
- ***Grants.*** Although municipal reliance on provincial and federal government grants for infrastructure has declined over the past 15 years in most provinces, some limited capital assistance is available for water, sewer, and transportation projects.
- ***Public-Private Partnerships (P3):*** A P3 involves the direct participation of the private sector in a venture controlled by the public sector. The public sector's role is to facilitate, regulate, and guarantee provision of an asset and the private sector's role is to design, finance, build and operate the asset in a formalized partnership agreement. Recently in Canada, there has been a growing interest in public-private partnerships. Although there

may be wide variation in the structure of a P3, it generally includes one of the following features:

- The private sector operates the facility for a fee. The public sector retains responsibility for capital costs.
- The private sector leases or purchases the facility from the public sector, operates the facility, and charges user fees.
- The private sector builds or develops a new facility, or enlarges or renovates an existing facility, and operates it for a number of years before transferring ownership to the public sector.
- The private sector builds and operates the facility and is responsible for capital financing. The public sector regulates and controls the operation.

Any one of these sources of funds could be accessed by municipalities where a clear decision is made to act as the primary developer of infrastructure. The questions remain; what infrastructure is the best investment for a municipality and at what cost and risk?

Although not a common approach to developing infrastructure in Ontario, P3 models are gaining influence and experience is growing, particularly on the part of the Province of Ontario. Whether or not this is a good model for developing the required infrastructure in the Northwestern Ontario region, whether the municipality is the appropriate "public" stakeholder in the provision of this infrastructure, and how the risks of what will be a significant initial capital investment, will be assessed and managed, remains a key factor in the consideration of P3 models for the type of infrastructure required to maximize the economic potential of the mining sector throughout Northwestern Ontario.

13.4 Project Development and Financing Strategies – Some Examples

Strategies for financing/developing pivotal projects is available in many forms. This section does not comment on financing mining projects themselves, but rather focuses on the key projects that could be executed to facilitate the development of mining projects.

Developing infrastructure into the remote areas of Northwestern Ontario to unlock the rich mineral and energy resources in Northwestern Ontario will be key to their development. However, the cost of developing infrastructure into the remote parts of Northwestern Ontario will be an expensive undertaking. Based on initial estimates, the **cost to build a 300 km road** into the McFauld's Lake region of the Ring of Fire is estimated at **approximately $1 billion (2013)** [2]. These costs will rise each year with the cost of inflation. No one of the mining Companies with properties in the Ring of Fire is likely willing to accept the full financial responsibility for capitalizing and operating this type of infrastructure facility. In fact, it is also unlikely that any level of government will be willing to assume 100% of the cost either. Capital costs for an alternative rail link are estimated at approximately $1.36 billion, but annual operating costs would be significantly lower than for a road [2].

The **cost of upgrading and extending the electricity infrastructure brings similar financial challenges**. Without a project Owner that is willing and capable of providing guarantees on a revenue stream to help re-pay the development and operating costs, it remains a challenge to secure the necessary financing to develop the hundreds of kilometers of high voltage transmission line that would provide a clean, reliable source of electricity to as yet undeveloped mining projects as well as remote First Nations communities. Another challenge is the identification of an

Owner/Operator for these transmission facilities. As described in Section 7, traditionally, high voltage power has been publically funded and provided through Hydro One. All of the existing high voltage transmission facilities in place in Northwestern Ontario are owned and operated by Hydro One. Many of the diesel-powered generation facilities in the remote communities of Northwestern Ontario are also owned and operated by Hydro One Remote Communities Inc., a wholly-owned subsidiary of Hydro One. Independent communities rely on fuel subsidies from the federal government. Uncertain future costs of diesel and the high costs of maintenance and replacement of generators provides **opportunities to potentially finance new transmission line facilities into the remote northwest on the basis of "avoided cost" or "replacement cost" financing formulae.**

In September 2012, the Government of Ontario stepped up to the task of assisting with financing the much needed road, announcing that it would help to facilitate development of a transportation corridor into the Ring of Fire through financial and political support. The exact extent of the Province's involvement has yet to be publically defined. However, **it is clear that without partners, it is unlikely the Ontario Government will develop the corridor on its own**, despite the magnitude of the resource potential. How the partnering arrangement will be designed; which partners will come to the table; and how the actual financing will be structured remain to be seen. However, it is clear that without, at minimum, involvement of the First Nations, the private sector (including the Ring of Fire mining developers and financiers), and potentially the federal government, the Ontario Government is unlikely to fully capitalize the $1 billion to $1.4 billion required for a road or rail line. This leaves the door open for **creative partnering and financing** where each party plays an important role. The mining companies must agree to pay their fair share of the costs to operate and maintain the road/rail line, providing a revenue stream. Governments must be prepared to backstop any gaps in the revenue stream that pose perceived risk to equity investors and financiers, and even potentially provide seed capital to "kick-start" equity investment. **Working together, it is possible to frame an ownership and financing structure that could facilitate development of the most feasible corridor**. This will be a complex undertaking that will require creative ownership and financing approaches that will likely require significant involvement of First Nations and benefits to the First Nation communities to be successful.

***"Ontario's economy is undergoing rapid evolution …
our business models and public policies must adapt accordingly."***

Emerging Stronger, 2012: A Transformative Agenda for Ontario

13.5 Conclusions

Successful and timely development of the mineral sector in Northern Ontario will require **creative approaches to ownership, financing/funding and partnering**. The **key to this development** is likely in the **partnering.**

Effective partnering arrangements that involve public and private sector and the First Nations communities, are likely to enhance opportunities to provide the **creative financing necessary** to develop key projects that will enhance the feasibility of many mining projects and facilitate development of many others. Key among these projects are **transportation infrastructure** and **power supply.**

Effective partnering must include the First Nations. Without significant involvement of the First Nations, the political risk of developing projects could be a significant barrier to project equity and finance. Opportunities for First Nation ownership and control, in addition to significant social and economic benefits will be key to establishing the level of partnership that is necessary. The challenge of providing First Nations the necessary financial support to secure an equity position in projects will require creative approaches to partnering and share holding that will require significant buy-in of the private sector equity owners and financiers. **Without significant involvement of the First Nations in these projects the opportunity for successful execution is in serious jeopardy**.

The **Provincial and Federal governments must accept their responsibility and accept their leadership role** in the facilitation of partnering arrangements and providing security for financing, particularly in support of infrastructure and power system development. The risk to ratepayers will be an important factor in determining the extent to which governments will participate. Unnecessary exposure of public resources is unlikely to occur. However, creative contributions through unconventional funding arrangements, financial securities through low risk revenue guarantees, and support for the "replacement" or "avoided" cost model of financing could provide the financial leadership necessary to encourage private sector investment in what might otherwise be considered higher risk investments. The **financial returns that could be realized** with the development of successful projects, through the future tax revenues realized from mine operation, as well as return on investment in the infrastructure and power projects, should provide the **incentive necessary** to foster political support. The role of loan guarantees by both Federal and Provincial governments and their agencies should be promoted. **Effective partnering through public-private partnerships** will help to dilute the risk to the ratepayer while encouraging the meaningful involvement of the First Nations. Ultimately, support for development of the mining sector in Northwestern Ontario requires **government support**. With this support in place the management of financial risk will become more manageable for private sector investors. **Success of the early stage mining projects, facilitated through the development of necessary infrastructure, will lead to further exploration, the identification of more mining projects and the success of mining projects for years to come**. Ensuring that Aboriginal and treaty rights are well respected and that First Nations are provided meaningful, sustainable and long-term involvement in all facets of mining sector development will help to secure long-term success.

13.6 Recommendations

It is recommended that:

1) **The Provincial and Federal governments are encouraged to play a leadership role in the facilitation of partnering arrangements and providing security for project financing for projects such as transportation infrastructure and power system development.** Managing the balance of risk and benefits to ratepayers and shareholders of investing in these types of projects will determine the extent to which public and private sector entities will participate in project financing. In the case of government, high risk exposure of public resources is unlikely to occur. However, creative contributions through

unconventional funding arrangements, financial securities through low risk revenue guarantees, and support for the "replacement" or "avoided" cost model of financing could provide the financial leadership necessary to encourage private sector investment in what might otherwise be considered higher risk investments. The **financial returns that could be realized** with the development of successful projects, through the future tax revenues realized from mine operation, as well as return on investment in the infrastructure and power projects, should provide the **incentive necessary** to foster political support. The role of loan guarantees by both Federal and Provincial governments and their agencies should be promoted.

2) **The Provincial and Federal governments are encouraged to foster effective partnering through public-private partnerships (P3s), especially for the development of infrastructure and energy projects.** P3s will help to dilute the risk to the ratepayer while encouraging the meaningful involvement of the First Nations in project development, ownership and operations. Ultimately, support for development of the mining sector in Northwestern Ontario requires government support. With this support in place the management of financial risk will become more manageable for private sector investors and First Nations. Success of the early stage mining projects, facilitated through the development of necessary infrastructure, will lead to further exploration, the identification of more mining projects and the success of mining projects for years to come. Ensuring that Aboriginal and treaty rights are well respected and that First Nations are provided meaningful, sustainable and long-term involvement in all facets of mining sector development will help to secure long-term success.

3) **The provincial and federal governments together with Aboriginal Associations and leaders, are encouraged to explore methods of project financing and ownership that help First Nations and Aboriginal organizations become equity holders in large-scale projects such as transportation infrastructure and power systems.** Without the same ability as large private sector companies to secure initial equity financing, Aboriginal entities and individuals are often frozen out of start-up opportunities to invest in large projects which could be located in their traditional territory and/or could affect the social, economic and environmental sustainability of their community(s). Providing more control over employment, procurement and the distribution of financial benefits from project ownership and operation could help to increase the level of support for projects.

13.7 References

(1) C.D. Howe Institute. 2006. "A State of Disrepair: How to Fix the Financing of Municipal Infrastructure in Canada (Harry Kitchen for the Howe Institute, CD Howe Institute Commentary, Issue No. 241, 2006)

(2) Tetratech. 2013. "Canada Chrome Corporation Rail vs. Road Trade-off Study"

14 RECOMMENDATIONS AND IMPLEMENTATION

The following Section provides a summary of recommendations and general observations arising from the discussion and analyses presented in this Strategy Report.

14.1 Socio-Economic Opportunities for Northwestern Ontario and Thunder Bay Region

14.1.1 Potential Mining Contribution to GDP

Sections 4 and 5 of this report illustrate the massive potential that exists for the mining industry to **contribute substantially to the GDP of Thunder Bay, Northwestern Ontario, the remainder of Ontario and the whole of Canada**. Economic analyses have been completed on 10 projects that are in an advanced stage of exploration and feasibility studies. They were selected because there is a higher degree of confidence that these projects will be developed based on the information obtained to date, than many others which are not included in the economic analyses conducted for this Report. However, there are no guarantees that these projects will come to the market, or if they do, that they will come to the market in the timeframes discussed in this report. Similarly, **there are hundreds of other exploration projects on-going in Northwestern Ontario, any number of which could lead to additional mining activity** in the region over the coming years that could also provide significant additional benefits to the region.

Based on the 10 projects that have been analyzed the **potential growth to Ontario's annual GDP growth over the period 2012 to 2021 is likely to be in the order of $1.5 billion** with increased government revenues (all levels combined) in the order of $0.5 billion per annum.

Highly respected geologists with much knowledge and experience in Northern Ontario are convinced that the resource potential of Northwestern Ontario should be similar to that of Northeastern Ontario and given that Northwestern Ontario is almost double the size of Northeastern Ontario, there is potential for the Region to become a more important mining region.

Some of these **projects will require substantial infrastructure investments** in transportation and energy supply which when implemented will likely have a positive impact on further exploration activities, creating a "snowball" effect.

14.1.2 Potential Mining Contribution to Job Growth

It is estimated that almost 10,000 jobs per year will be created in Ontario from the 10 projects analyzed in the study through direct, indirect and induced economic activity. A majority of the jobs created by increased mining activity require high skill levels and are compensated accordingly. All of the projects are located within or close to First Nations communities and accordingly will provide substantial opportunities for Aboriginal employment, contracting opportunities and project ownership and control, in meaningful and challenging sectors of the economy.

14.1.3 Potential Quality-of-Life Improvements for First Nations Communities

The planned mining developments and their associated transportation and energy infrastructure provide a major opportunity for quality-of-life improvements for First Nations communities. Not only will there be the employment and business development potential but **improved transportation and energy infrastructure will have significant quality of life benefits**, including significant reduction in the cost-of-living in remote communities; improved environmental quality through the replacement of diesel-powered electricity generation with cleaner sources of electricity; improved reliability of the electricity supply; improved electronic access to markets with the extension of fibre-optic cable; improved access to education, health and other services; improved access to employment; and improved access to other communities, providing increased opportunities for social and economic interchange and collaboration. These are the most obvious benefits. Many others are likely to be realized.

14.2 Realizing the Mining Potential-How to Make it Happen

14.2.1 Introduction

The scale of benefits from mining development that could be realized to all segments of the population and all sectors of the economy in Northwestern Ontario, is potentially massive. Realizing this potential will require overcoming many formidable challenges. This section of the report summarizes the key challenges which must be addressed by all participants that will benefit from the opportunities.

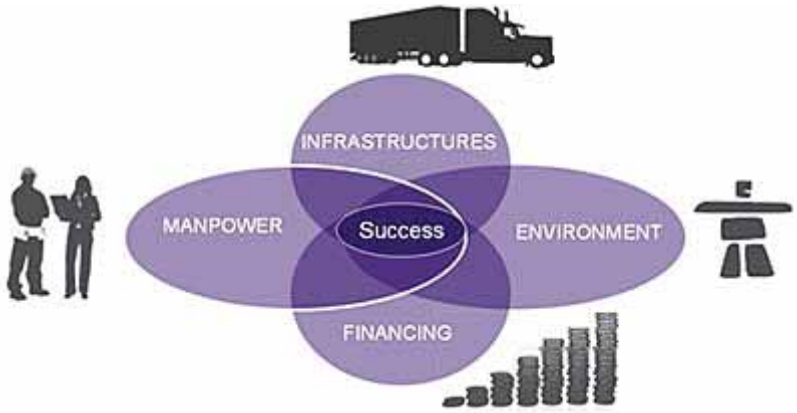
14.2.2 Infrastructure

As discussed in Section 8.0, many important and recent planning reports relating to mining development in Northern Canada and Ontario have consistently emphasized the **pivotal role of electrical and transportation infrastructure in realizing the mining potential throughout Canada's North**, including Northwestern Ontario. However, these reports are also consistent in their identification of the fiscal and financial challenges associated with putting this infrastructure in place. Provincial and federal government planners and decision-makers are required to prioritize investments in infrastructure and to work in a fiscally responsible way to ensure that public monies are appropriated in an economically and politically defensible manner.

As shown in Figure 14-1, below, the interaction of infrastructure, manpower, environmental sustainability and financing create success, in the form of resource development and the growth of regional, provincial, and even the national economy.

Figure 14-1

Northern Development Infrastructure Challenges



Source: Raymond Chabot Grant Thornton [1]

Finding the formula to successfully develop the infrastructure that will help to facilitate the increase in exploration, project development and subsequent job creation and economic success, is an imperative for Northwestern Ontario. In their review of the 2013 federal government Budget, the Canadian Federation of Municipalities estimates that:

- **Each $1 billion invested in new infrastructure creates more than 11,000 total jobs**, including 5,500 new jobs in the slowing construction sector.
- **Infrastructure investments were responsible for creating over half of the 220,000 jobs created under the Economic Action Plan in 2009-11**.
- **For each dollar they invest, federal and provincial/territorial governments receive a total of 35 cents in increased income and sales tax revenues and related savings.**

How to develop this infrastructure will require creative approaches to project financing, be it private-public partnerships, similar to the Route 167 example discussed in Section 8, or even partnerships between various levels of government to "seed" the projects will require cooperative planning and a shared vision of the future of the resource sectors in Northwestern Ontario.

14.2.3 Government Funding

Federal, provincial and municipal governments are all faced today with high deficits that cripple their ability to make significant investments in major facilities. Serious efforts are being made at all levels of government to reduce and ultimately eliminate these deficits. Accordingly, although government funding and guarantees are going to be required to realize the mining potential of Northwestern Ontario, **now is the time to be examining alternative financial models** as discussed below.

The economic multiplier analysis described in Section 5, estimates that there will be significant potential tax revenues derived from mining activity in Northwestern Ontario. These new revenues

will contribute to overall deficit reduction/surplus creation efforts that will benefit all Ontarians and Canadians. As first recommended in the "Mining in Northwestern Ontario Opportunities and Challenges" report, **there should be serious consideration given to leveraging a portion of these future revenues towards development of the infrastructure required** to mobilize much of the mining potential.

14.2.4 Social License to Operate (Social License) and Sustainable Development

The permitting process for new mines in Ontario is reviewed in Section 4 of this report. It is increasingly evident that no new mining project will proceed without obtaining the informal "social license to operate" from affected local communities, many of which are First Nations in Northwestern Ontario. Developing new mining projects and interrelated infrastructure will require active consultation and **fair dealings with local First Nations** to ensure that the environmental, social and economic foundations and principles of these projects **aligns with the cultural and social values and economic aspirations of the communities**.

While a network of other stakeholders is involved in the granting of a social license, the local community is the key. Problems that have been encountered and lessons that have been learned are numerous but the following are common failings of developers seeking social license:

- Delays in engaging the First Nations, the stewards of the affected land.
- Lack of understanding that it is a trustful relationship that the First Nations require, rather than a series of tasks; and underestimating the time required to develop such relationships. A trustful relationship is more than one of co-operation.
- Failure to deliver on promises.
- Misunderstanding (over estimating) the quality of the relationship.
- Lack of understanding of the real needs of an Aboriginal community.

The mining industry today has available all the tools and technologies necessary to design, construct and operate a mine in accordance with strict environmental requirements and regulations. **Meeting the strictest environmental standards is an important element of obtaining a "social license".** However, these tools and technologies will not themselves be used to forge good community relations and nor will they be used to form the basis of the types of partnerships that are required to obtain a "social license" today. Together, environmental standards and community relations/partnerships will be the cornerstones of "social license", and the path forward for project development.

The most commonly used definition of Sustainable Development is "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*". [3] All major mining companies have policies incorporating environmental, health and safety and sustainability issues. It is reasonable to assume that, for the purposes of this Strategy, **all future mining development in Northwestern Ontario will respect the classic definition of sustainability**, with the additions necessary to obtain "social license".

14.2.5 Labour and Skills Training

To meet the demand for skilled labour that mining development in Northern Ontario will require, substantial training efforts are necessary. Fortunately, through their existing facilities and programs Lakehead University and Confederation College (including the campuses outside of Thunder Bay) and other regional training institutions, are already innovating to meet this challenge for both the Aboriginal and non-Aboriginal workforce, and have both committed to further innovations in future.

Establishing a centre for specific mining skills training, beyond the existing program offered by Confederation College will help to attract people to Thunder Bay, will provide a pool of skilled workers in mining, and will help to retain these workers as residents once they are employed.

Training Northwestern Ontario residents, including Aboriginal people, women and skilled immigrants, to fill the posts in mining and related industries is **one of the most efficient ways of reducing economic leakage from the region.**

The opportunities afforded by the potential mining development in Northwestern Ontario present the very real possibility of Thunder Bay becoming a world class centre of excellence in mining education and research. It has been shown that **Thunder Bay and Northwestern Ontario must build on their existing training facilities to meet the demands of the mining industry for skilled workers** and to minimize leakage of the economic benefits from the region. This will be realized through collaborative efforts between the education sector, the public sector (especially the City of Thunder Bay) and the mining industry, including the mining supply chain. Formally establishing a forum for a dialogue around the **creation of a Centre of Excellence for Mining is recommended.**

14.2.6 Mine Development Models

All prospective mine developers must be persuaded, even regulated to “do it right” when proceeding with their projects. This not only means responsible environmental and sustainability policies but includes the social license. Meeting regulations has been demonstrated to be insufficient in the case of many mining developments in Canada. To establish the leadership necessary to ensure that miners in Northwestern Ontario “do it right” requires collaboration among the various levels of government involved in regulating mining projects, as well as First Nation leaders. Together, this group can establish informal standards and policies for mining in Northwestern Ontario that will help to facilitate smoother project development. This could be a topic of discussion for the Centre of Excellence for Mining.

14.2.7 Project Financing

Successful and timely development of the mineral sector in Northwestern Ontario will require creative approaches to ownership, financing/funding and partnering. Effective partnering arrangements that involve public and private sector and the First Nation and Métis communities, are likely to enhance opportunities to provide the creative financing necessary to develop key projects that will enhance the feasibility of many mining projects and facilitate development of many others. Key among these projects are transportation infrastructure and power supply.

Effective partnering must include First Nations and Métis people. Without significant involvement of the Aboriginal community, the political risk of developing projects could be a significant barrier to raising project equity and financing. **Opportunities for Aboriginal ownership and control**, in addition to significant social and economic benefits will be key to establishing the level of partnership that is necessary. The challenge of providing First Nations and Métis the necessary financial support to secure an equity position in projects will require creative approaches to partnering and share holding that will require significant buy-in of the private sector equity owners and financiers. Without significant involvement of the First Nations and Métis in these projects the opportunity for successful execution is in serious jeopardy.

14.3 Recommendations

The following section provides a summary of recommendations provided throughout this Strategy. Recommendations, roles and responsibilities, and timelines are also summarized in Table 14.1.

14.3.1 Supply Chain

It is recommended that the CEDC, the City of Thunder Bay, local and regional Chambers of Commerce, the provincial government and local businesses:

- **Initiate the development of a mining supply chain industrial cluster** through the establishment of a Northwestern Ontario Mining Service and Supply Association, made up of representatives from mining companies, key supply chain companies, the CEDC, the local and Regional Chambers of Commerce and the provincial government (Ministry of Northern Development and Mines and/or Consumer and Commercial Relations). Among other things, this Association would:
  - Help promote collaboration between mining companies and supply chain companies
  - Provide a forum for the exchange of commercial and technological innovation
  - Provide a forum for communicating market intelligence between and among mining companies and suppliers to ensure local businesses are aware of upcoming opportunities and market changes
  - Provide opportunities to foster strategic business partnering to enhance opportunities for creative business and project financing
  - Provide knowledge of regulatory changes and challenges
  - Provide a forum for advocating to local, provincial and federal government agencies about issues related to and affecting mining supply chain businesses
  - Enhance competitiveness of the Northwestern Ontario mining supply chain
  - Provide a conduit for discussions with the education sector around innovative technologies and business practices, including the opportunity for collaborative research and development.
- The **Fort William First Nation (FWFN) is encouraged to complete their plans for initiating an industrial cluster** aimed at guiding development of available industrial lands in the Fort William First Nation community. It is further recommended that the

FWFN industrial cluster and the Thunder Bay industrial cluster collaborate by meeting on a regular basis and sharing information on opportunities that are coming available, land requirements, access requirements, etc.. This collaboration has significant potential to provide direct benefits to the mining sector, FWFN, Ring of Fire First Nations (including their urban members living in Thunder Bay), and the City of Thunder Bay.

- FWFN and the City of Thunder Bay's economic development planners are encouraged to **pursue the development of a mining cluster with the key Ring of Fire First Nations** including Webequie, Nibinamik, Neskantaga, Eabametoong, Marten Falls. Consideration should also be given to communities in the east and west including: Mishkeegogamang, and Lac des Milles Lacs Long Lake 58 and Ginoogaming First Nation. These First Nations all have community members residing in Thunder Bay and are currently participating in the regional mineral exploration sector with companies such as Cliffs Natural Resources, Noront, Premier Gold, PC Gold, Osisko and Panoramic.

14.3.2 Energy

It is recommended that**:**

- The Ontario government, through the Ministry of Energy and the Ontario Power Authority, the federal government, through Aboriginal Affairs and Northern Development, the municipalities of Northwestern Ontario, the First Nations of Northwestern Ontario and the private sector, should **convene an Energy Planning Committee whose task it is to develop a regional electrical infrastructure plan for Northwestern Ontario**. This Plan should include consideration of forecasted growth in demand, available and future sources of electricity generation, challenges and opportunities of interconnecting remote First Nations, remote mining projects and remote renewable energy generation projects, timelines and sources of financing to execute identified projects.
- **Hydro One, the Ontario Power Authority, the Ministry of Energy plus private sector and First Nations partners should expedite engineering and construction of high voltage transmission lines** to strengthen the supply source at Pickle Lake and Red Lake to provide a new, clean and reliable supply of electricity to mining projects, and to interconnect remote First Nations and new sources of renewable energy generation.
- **Plans to connect mining loads, new hydro and wind resources, and remote First Nations should be better coordinated by the Ontario Power Authority and the Ministry of Energy between First Nations, First Nations organizations, as well as the provincial and federal levels of government**. This coordination will tend to decrease the cost of transmission development for all parties.
- **Alternative supply options to meet the short to medium term supply-demand gap should be identified and evaluated by the Ontario Power Authority and the Ministry of Energy, together Thunder Bay Hydro, prior to the closure of the Thunder Bay (coal-fired) Generating Station (TBGS)** at the end of 2014, until the East West tie expansion is completed and in-service (say 2018). The closure of TBGS is expected to create a serious gap in the supply of reliable energy to the mining sector over the short to medium term. The amount of mining sector development that will occur in that timeframe will depend to a large extent on the availability of reliable power to meet forecast demand.

- The Ministry of Energy, Ontario Power Generation, the Ontario Power Authority and Thunder Bay Hydro should support the efforts of the Common Voice Northwest Energy Task Force, the City of Thunder Bay and the Fort William First Nation are encouraged to **identify cost-effective and practical options for retaining and converting (alternate fuel) the Thunder Bay Generating Station (TBGS) to help address the gap in reliable energy supply that is expected between 2012-2019**, prior to the earliest projected in-service date of the East-West Tie high voltage transmission line. TBGS is considered to be a key contributor to this reliable supply going forward. Options for TBGS conversion from coal that should be considered include:
  - Utilizing torrefied wood pellets that could replace coal by December 31, 2014 without requiring any major retrofit of the TBGS.
  - Investigate the potential for conversion of TBGS to natural gas by December 31, 2014, without requiring a major retrofit
  - Investigate the potential to utilize other biomass fuels that could also have TBGS converted and operational by 2015 without a major retrofit.

14.3.3 Transportation Infrastructure

It is recommended that:

- **A Northwestern Ontario Infrastructure Planning Committee be established**, made up of representatives of the Ontario government (including Ministry of Northern Development and Mines, Ministry of Natural Resources, Ministry of Transportation, Infrastructure Ontario), federal government agencies (including NRCan, FedNor, Aboriginal Affairs and Northern Development Canada), First Nations leaders and the mining sector, to **prepare a regional transportation system plan** that provides access into the areas of highest mineral exploration and project development activity, considering the contribution that can be made by winter roads, all-season roads, private access roads, public highways rail lines, and combinations of surface transportation that will facilitate development of the mining sector as well as **enhance the social and economic interests of the remote First Nations communities.** This Committee should address the following:
  - Identify the needs of various mine and resource developers in respect of transporting goods and services for mine construction and development, as well as the cost-effective transportation of mining products to market, that might include a combination of winter roads, all-season roads, airports and rail.
  - Consider the feasibility of restoring previous (and now closed) CN Rail Subdivisions as cost effective methods of facilitating mining development transportation. Two Subdivisions in particular should be examined:
    - the Graham Subdivision which would connect the Lake St. Joseph area to the CN mainline and the Port of Thunder Bay
    - the Kinghorn Subdivision which connects the Longlac area (Municipality of Greenstone) to the Port of Thunder Bay.
  - Identify the timing of developing new infrastructure that would include consideration of cost, schedule, constructability and political support from local communities. It is

possible that shorter roads into areas of more advanced mine development might become a priority for financing and development.

- Consider the impacts and benefits of establishing any new all weather road on the establishment of new forest harvesting areas in the boreal forest.
- Identify the regulatory issues and other requirements that will influence project selection and implementation.
- Examine the structures and frameworks established by the Province of Quebec to fund/finance development of Route 167, and broader structures established by the Plan Nord, including methods of Aboriginal consultation and accommodation; methods of procurement to maximize the involvement of local labour and businesses; and methods of on-going operation and maintenance.
- Evaluate the social, economic, and cultural issues associated with the routing of various infrastructure projects identified, as well as the challenges and opportunities associated with public access versus dedicated roadways, ensuring the long-term needs and interests of the mining sector and local communities are addressed.
- Evaluate various methods of financing transportation infrastructure that might include participation by various levels of government and the private sector and that address the risk management concerns of the private sector.

It is suggested that this Committee be **chaired by a senior representative of the Ontario Ministry of Northern Development and Mines**, appointed by the Minister. This Committee should be given a **timeframe of no more than nine (9) to twelve (12) months** from inception to provide its preliminary findings in the form of a high level regional infrastructure plan, including the nomination of a lead agency or proponent to continue functional development of high priority, lower risk projects. As projects are identified and shifted to a responsible agency or proponent, the Committee should re-focus its attentions to the areas remaining and the issues that are outstanding to develop the more complex projects.

- The Ministry of Northern Development and Mines in conjunction with First Nations Tribal and Treaty Associations should **establish a sub-committee of the Northwestern Ontario Infrastructure Planning Committee, made up of Aboriginal leaders, that is overseen by an independently appointed Moderator,** and jointly funded by the provincial and federal governments. The purpose of the sub-Committee would be to examine and coalesce social, economic, financial and cultural challenges and opportunities associated with major infrastructure projects. Initially, it is suggested that the sub-Committee be made up of representatives of Tribal Council Organizations, Treaty Organizations and other higher level associations to address over-arching issues and principles associated with regional infrastructure development in Northwestern Ontario. Issues of specific routing within a broad regional context, could be left to subsequent planning processes that will involve local communities. This sub-Committee should examine frameworks and structures that could be implemented to broadly address: Aboriginal involvement in ownership and operation; treaty and Aboriginal rights associated with infrastructure development; the perception of imbalanced benefits and impacts at the local community level; and other high level issues that could affect project approval and implementation. The sub-Committee should report to the Planning

Committee on a monthly basis, providing regular updates and identifying any specific challenges that require broader resources to address.

- The Northwestern Ontario Infrastructure Planning Committee, in its consideration of a regional infrastructure plan, should specifically address the challenges and opportunities surrounding planning and implementation of a **road or rail system into the Ring of Fire**, considering the many challenges and opportunities identified above.
- The Ministry of Northern Development and Mines with the Ontario Premier's Office should require the **appointment of the Major Project Management Office, or an equivalent agency of the government to coordinate the regulatory approvals process** and Aboriginal consultation to ensure that timelines for major infrastructure projects are actively managed and that approval timelines are minimized, while ensuring that all social, economic, cultural and environmental impacts are minimized through effective mitigation and community engagement.

14.3.4 Municipal Infrastructure

Housing

It is recommended that:

- The **need for more rental housing units in the local Thunder Bay market** should be reflected in the municipality's on-going Official Plan update. In addition, the City should continue to monitor trends within what has become an extremely tight local rental housing market and respond as needed to facilitate the development of additional units.
- **Administrative mechanisms which encourage investment in new rental housing development should be investigated**. These might include offering a preferred municipal tax rate for new multi-residential developments. By establishing a "new multi-residential" property class, and setting the tax rate at or similar to that used for "residential", private sector interest in bringing new units into the local market may be increased.[36]
- **The City of Thunder Bay should strengthen and/or broaden its current provisions allowing for residential intensification** where appropriate, as a way of encouraging additional housing unit development, and particularly rental housing, within the community. Efforts in this regard were begun with the introduction of the new comprehensive zoning by-law in 2010 which increased the opportunities for rental unit development through infill and conversion within many areas of the City.
- The City should investigate the establishment **of a Development Permit System (DPS).** While Development Permit Systems have been promoted by the Province as a tool for integrating zoning, site plan, and minor variance approvals into one application and thereby can aid in reducing review and approval timelines, this feature would likely not provide much benefit to the City of Thunder Bay as there already exists the option to have multiple applications for a property processed together. However, the rules and regulations under the Development Permit System do provide for additional restrictions

[36] See: City of Greater Sudbury municipal tax rates as well as the Cities of Toronto, Ottawa, Kingston, Guelph, Hamilton, Orillia, Timmins, the Town of Parry Sound, and Region of Waterloo.

on the timing and eligibility of third party appeals regarding development applications. These restrictions may serve to facilitate quicker market responses to demand and may encourage the development of additional infill housing units.

- Thunder Bay, in conjunction with private sector developers, is encouraged to **work together on a "place to live" strategy that includes aggressive marketing of Thunder Bay's educational, health, recreational and commercial/business assets** in addition to creating and maintaining an attractive and diversified local housing market. It is expected that this marketing campaign will attract resident population growth resulting from mining sector growth. Although it is certain new employment will be created by growth in the mining sector, it is uncertain and unpredictable as to where these employees will choose to reside on a permanent basis, being a personal/family choice. This in turn makes housing supply forecasting uncertain. However, it is certain that the re-sale home and rental housing markets are currently short on supply, leading to higher prices. While there is currently a significant inventory of buildable lots, the location and availability of lots is not necessarily in keeping with market demands, nor is the supply and type of available housing. The marketing strategy should **address the supply of new homes (for sale and rental)**.
- The City should continue to **closely monitor housing absorption rates, vacancy rates, housing prices and rental rates**, as well as input from the development community and realtors.
- The City should establish, in the Official Plan Review process, a "sunset" clause providing the City **a mechanism to rescind approvals for draft plans of subdivision for undeveloped lots that are unlikely to come to market in the near term**. These lots would then be removed from the building lot inventory used for planning purposes.
- The City should investigate **options to lower the cost of bringing lots to registered plan status ahead of anticipated demand**. Any initiatives pursued must be measured against the potential impacts they may have on existing buildable lots, whether infill or under registered plans of subdivisions, as well as pressures that may be placed on the municipality to extend services prematurely.
- If the inventory of buildable lots declines over the near term (3 years) the City should, in conjunction with the development community, the City should explore the opportunity of **taking a more active role in land development**. This could include the provision of specific or upgraded infrastructure assets financed through the application of area specific development charges.
- The federal government should **support the FWFN in achieving their community goals to improve housing and housing conditions**. These include the following:
    - Higher number of well-maintained units;
    - Affordable, suitable and accessible housing options for all (singles, people with disabilities, special needs, single mothers/fathers, Elders);
    - Quality, professionally built homes;
    - Policies in place that are effective, fair, consistently followed and transparent;
    - Increase housing administration to accommodate growing housing needs and demands;

- Enhanced measures of accountability and reporting requirements to membership;
- Flexible finance options;
- Fully operational housing program;
- Established committee with terms of reference;
- Long term sustainable housing plan for FWFN;
- Maintain an Arrears free housing program;
- A positive working relationship with membership;
- Elder's Emergency Home Repairs and Renovations Program; and,
- Options for off-reserve residents.

Industrial and Commercial Lands

It is recommended that:

- The City of Thunder Bay through the CEDC, and working closely with private property owners, should **investigate and document remediation requirements for the many available lots that are designated for heavy industrial and large industrial use**, to ensure their market availability for potential mining sector related development is as clear as possible.
- Opportunities should be identified for **partnering between the private sector and senior levels of government to remediate contaminated lands** that could then be made available as application-ready industrial development sites to the industrial developer market.
- The City should **investigate the feasibility of extending sewer service to Mission Island** to facilitate the development of available industrial lands. The feasibility of this development will likely be based on: 1) whether the Thunder Bay Generating Station is converted to natural gas, providing potential gas line connection to the Island; and 2) the rate of uptake of existing serviced industrial lots within other areas of the City and the Fort William First Nation.
- Fort William First Nation and the City of Thunder Bay should collaborate to build on the comparative tax and location advantages enjoyed by FWFN through the creation of an economic plan, **supporting policies and a regulatory environment conducive to development on First Nations industrial/commercial lands.**
- Fort William First Nation should be supported by Thunder Bay in their efforts to **attract commercial development along Chippewa Road (City Road)** east of James Street as well as the vacant 800 acres of CN lands in the area.
- The City, through the CEDC, together with Fort William First Nation, should **explore the feasibility of developing a smelter on serviced industrial lands** that are adequately connected to sources of high voltage power and heavy transportation systems, for the purposes of receiving ore from Marathon copper and all of the other potential mines in Northwestern Ontario, as well as neighbouring markets in the United States.

Infrastructure Demands

It is recommended that:

- The City continue to **pursue the development of the Northwest Arterial road in order to facilitate the long term growth potential of the northwest section of the City** and lessen current congestion at both John Street and the Thunder Bay Expressway (Highway 11/17) as well as Red River Road and the Thunder Bay Expressway. This should be coordinated with the Province's recently announced design study and environmental assessment of possible improvements to the Thunder Bay Expressway (Highway 11/17) between Arthur Street and Balsam Street. That study is to look at possible widening of the highway and building new interchanges. The City should be in a position to influence the Provincial process to help ensure it reflects current local needs.
- The City **continue to monitor growth patterns and demand for development within the northwestern section of the community** and proceed with necessary planning, engineering and environmental assessment studies so that additional sewer capacity to this area can be delivered expediently prior to demand outstripping capacity.
- The federal and provincial governments, the CEDC and the City of Thunder Bay are encouraged to support the Fort William First Nation and the City of Thunder Bay in their **joint review of a new fixed link bridge to replace the aging CN Rail-owned James Street Swing Bridge over the Kaministiquia River**. The new bridge is to be located to the south side of the existing bridge to resolve safety issues while enhancing development opportunities on the First Nation's Commercial Lands.

Fort William First Nation Economic Development Initiatives

- The CEDC and the City of Thunder Bay are encouraged to **facilitate the Fort William First Nation in their efforts to develop small businesses as identified in their Economic Development Strategy**. These activities could be enhanced by collaboratively developing joint industrial clusters.
- The FWFN should be supported in their initiatives to position itself in acting upon unprecedented development opportunities and create social change by taking advantage of the regional mineral exploration and Northern Ontario's "Ring of Fire" developments (and other Northwestern Ontario mining activity). In support of these efforts, the federal government is encouraged to **support the First Nation by approving their recently submitted application for funding to prepare a Comprehensive Community Development Strategic Plan.**
- The FWFN Project and Economic Opportunity and Evaluation Policy should be a key driver in selecting business activities with the FWFN. Economic development initiatives that should be supported include:
    - *Waterpower development:* Fort William First Nation has the potential to develop electricity from the former Loch Lomond Water Supply System, located on reserve lands. The community is also engaged in discussion with Xeneca Power Development and Lac des Mille Lacs First Nation on two crown land waterpower projects located off of reserve lands.
    - *Impact Benefits Agreement with Lac des Iles and Panoramic:* Presently there is one operating mine and another mineral exploration project that is nearing advanced

exploration within the First Nation's traditional lands. These projects present a variety of opportunities for new sources of revenue while supporting mineral development in Northern Ontario.

- *Industrial Park Development on the former CN Lands:* Both Cliffs Natural Resources and Noront Resources have been active in reviewing the former CN Industrial Lands owned by FWFN as potential sites for mineral processing.
- *Development of On-Reserve Residential Subdivision and Business Park:* There is an opportunity for First Nations involved in the Ring of Fire to create urban business partnership between FWFN and industry. This would create on-reserve employment opportunities for the residents of the Ring of Fire communities who live in the City of Thunder Bay and surrounding area.
- *Mineral Exploration in the Thunder Bay Region:* It is expected that mineral exploration companies in the region will identify new First Nation opportunities associated with mineral exploration and mine development.

- Aboriginal Affairs and Northern Development Canada is encouraged to **provide financial support for development of a Comprehensive Strategic Economic Development Plan to identify and quantify synergies between remote First Nations, FWFN, the mining sector and the City of Thunder Bay**. The strategic plan should identify any remote First Nation mining opportunities that can be pursued within the urban environment of FWFN and Thunder Bay. Any proposed plan should strive identify the business and partnership opportunities that have potential to create stable sources of revenue and employment for the urban First Nation population in and around Thunder Bay.

14.3.5 Labour

Due to the employment growth that is estimated to result from growth in the mining sector and the supply chain between 2013 and 2022, it is recommended that:

- Mining companies, education and training institutions and government agencies and associations responsible for employment should **collaborate on the identification of labour requirements** and timing to ensure accurate labour forecasts. They should also **prepare strategic plans and share data among all parties on an on-going basis to ensure the proper flow of training and skills development, immigration, etc**., to maximize economic opportunities and the participation of Northwestern Ontario residents in the labour force.
- Educational and training institutions, First Nations Education Services, government agencies and mining companies should collaborate to **identify training opportunities to help the Aboriginal population maximize their ability to take advantage** of **employment opportunities**.
- Mining sector companies should increase their recruitment efforts to **focus on the retention of female workers in mining-related jobs.** One of the steps that can be taken to improve the number of female workers in mining sector employment opportunities is to tailor camp/living conditions to families.

- Mining companies should work collaboratively with the Northwestern Ontario chapter of Women in Mining (WIM) to identify other steps that can be taken to **promote mining sector employment opportunities for women** and to increase the number of female employees.
- Educational and training institutions, government agencies, local school boards, First Nations Education Services, and mining companies should work collaboratively to **encourage youth to stay in high school to attain their Grade 12**, and aspire to obtain the post-secondary education and training needed to qualify for skilled mining and mining-related employment opportunities.
- Federal and provincial government agencies should work cooperatively to **support the immigration of skilled labour from countries with strong mining cultures** such as South Africa, Peru, Chile, Australia, Mexico and certain Eastern European countries.
- Employment opportunities should be advertised to skilled individuals, who are unemployed or employed in other sectors, to help meet the labour demands.
- The City of Thunder Bay and surrounding municipalities should **aspire to be "places to live",** providing world class social, educational, commercial and recreational amenities and a variety of residential options to attract workers and families to establish long-term residence in Northwestern Ontario. This focus should include a marketing campaign aimed at markets outside Northwestern Ontario where the future labour market may be sourced. Of particular importance is to target Aboriginal youth living in communities within Northwestern Ontario who may choose the non-Aboriginal communities to the south as places of long-term residence.

14.3.6 Education and Training

It is recommended that:

- Education and training institutions should increase training capacity in Thunder Bay and Northwestern Ontario by increasing the number of students that can enroll in existing programs, and by implementing new training programs to address different types of skills training. Although current levels of training are exemplary, Northwestern Ontario is encouraged to continue its current endeavors to increase training capacity to have the local work force ready to take up the 9,100 construction jobs and 26,534 operation jobs projected between 2013 and 2022.
- Education and training institutions are encouraged to **establish new training programs to address gaps in training for skilled mining jobs**.
- Education and training institutions are encouraged to collaborate to **create a community of mining education and thought leadership.** To attract the local workforce of Thunder Bay and Northwestern Ontario, a council of mining education should be created. This can be done through partnerships with industry leaders, training institutions (Confederation College, Lakehead University and Aboriginal training institutions), all levels of government, and community leaders to promote education in the mining sector to the local workforce and develop research and development for the mining sector. This educational community can help the training institutions to align their training initiatives with industry's employment projects in order for the region to be prepared for mining

employment. Research and development in the resource sector can also be done through this community of mining, creating a community of innovation through research and the development of innovative technology and services.

- Education and training institutions, local school boards, teachers' federations and mining companies should collaborate, perhaps through a newly created community of mining education, to **introduce and advance mining sector employment opportunities into high schools.** This will require that teachers are provided with the necessary education and knowledge of the mining sector and related supply chain economies to be well equipped to educate students on employment opportunities in the mining sector and its related supply sectors.
- Local school boards and teachers federations and mining sector companies should **encourage students to enroll in dual credits/programming** in order to allow students to complete their high school diploma while transitioning to college and apprenticeship programs**.** This also exposes the students to jobs in the mining sector. As students are being educated about the available jobs in the mining sector, high schools are encouraged to provide clear career paths in mining. It is important to make connections between employers and students in the mining sector.
- The provincial government, through the various Ministries involved in funding post-secondary training and education should be given the resources to **increase investment in a more comprehensive Integrated Service Delivery (ISD) model.** Increased investment in ISD will provide tools and support to advance education-to-employment, lifelong learning and lifelong employment. Applicable directly to the Ring of Fire, the proposed ISD model uses a blended learning approach to reach potential learners within urban, rural and remote locations in Northwestern Ontario on an equitable, timely and cost effective basis. This system is linked with important employment related services, including readiness training, job profiles, job posting, individualized records of employment, related education and learning, and on-going career development. Also, this system involves individualized career planning and development, complete with electronic resumes, educational records, participant tracking, program monitoring and career goal attainment. Part of this investment would cover evidence-based research and evaluation to demonstrate streamlined government services, costs reductions or mitigation, critical successes factors, best practices and bench marking metrics.
- The City of Thunder Bay and the CEDC, in collaboration with regional and local Chambers of Commerce and the provincial and federal governments are encouraged to **develop an international recruitment and retention strategy for Thunder Bay and the Northwestern Ontario region** targeted at Economic Class immigrants, including skilled immigrants, to help fill skill shortages, help entrepreneurs to launch new enterprises, and encourage investors to fund new business development. This strategy would include a focused approach to linking with Economic Class immigrants from Canada's top 5-6 source countries (India, China, Philippines, Europe, United Kingdom). Marketing efforts should be developed and implemented to target pre-arrival, arrival and resident Economic Class immigrants across Canada. Confederation College would play a supportive role in promoting immigrant recruitment, providing additional technical training and designing employment retention programs.
- The provincial and federal governments, local school boards and mining sector companies are encouraged to **work cooperatively to develop specialized training**

programs tailored to the needs of the mining sector within the accelerated timelines required to respond to the growing demands of the mining and construction sectors over the coming years. These types of programs are not part of the regular inventory of training programs, nor are they readily available from third party sources. These programs must be developed in a comprehensive fashion to support in-class, online or blended delivery. The nature of work involves needs assessments, instructional design, content sourcing, curriculum development, media production and instructional delivery. It is recommended that funds be invested in a full-service training team that offers a consistent approach to quality programs.

- All training programs should include, to some degree, curriculum that **builds awareness and understanding of social issues and how to effectively deal with them. It is further recommended that funds be invested to conduct socioeconomic research in order to better understand the types of social issues that are likely to be encountered, leading to improved curriculum and program development.** Creating and sustaining a steady and reliable labour force for Thunder Bay and Region means more than just skills training and development; it means a holistic approach to healthy and sustainable individuals, families and communities. Helping employees better deal with personal and social elements that may prevent them from going to work and being productive is critical to employment retention. Personal difficulties with such issues as family planning, substance abuse and mental health can negatively impact the labour force.
- Provincial and federal governments are encouraged to collaborate to **identify the necessary resources to expand and refine existing employment and retention support services to meet a growing level of demand, diversity and complexity amongst the labour force.** Developing a labour force of people within Northwestern Ontario, especially those from rural and remote communities, requires additional levels of support to ensure their active participation and retention in the labour market. These support systems are in various areas of personal advisement and counseling across a spectrum of areas, including personal, life skills, upgrading, job readiness, interview skills, resume development, employment postings, referrals, employer recruitment, job search, job maintenance and career planning.
- Education and training institutions and other organizations are encouraged to **design, develop and deliver educational and training programs to provide both early stage entrepreneurial thinking and business start-up skills, to promote long-term diversification and development of the economy beyond mining and the mining supply chain.** Educational and training programs need to be designed to foster long-term sustainability of the economy. Running as a parallel track to mining-related skills training, programs must be developed to foster growth of a diversified economy. This will help to ensure future employment and sustainability for communities beyond specific mining-related business. This requires a broad range of alternative economic activity, including new business development, entrepreneurship, business incubators, export-oriented companies, strategic partnerships, import substitution, local supply-chain, youth enterprises, foreign investments, etc.. This level of enterprise development encompasses both for-profit business development and not-for-profit social entrepreneurship and innovation.

- Provincial and federal governments are encouraged to provide the funding and resources necessary to **establish a Regional education-to-employment 'Systems Integrator' position to be sponsored by one of the regional educational institutions such as Confederation College.** The System Integrator would have the responsibility or stewardship to oversee the "big picture" involving all stakeholders - government, education, employers, social and community. With a high-level perspective on the entire regional economy, the System Integrator would be expected to develop strategic thinking for today and into the future, plus develop skills solutions, gather data and disseminate information for today and into the future [4].

14.3.7 Project Financing and Partnering

It is recommended that:

- FWFN and the City of Thunder Bay through the CEDC should **prepare a comprehensive strategic economic development plan to identify and quantify synergies between remote First Nations, FWFN, the mining sector and the City of Thunder Bay.** The strategic plan should identify any remote First Nation mining opportunities that can be pursued within the urban environment of FWFN and Thunder Bay. Any proposed plan should strive identify the business and partnership opportunities that have potential to create stable sources of revenue and employment for the urban First Nation population in and around Thunder Bay.
- The Provincial and Federal governments are encouraged to **play a leadership role in the facilitation of partnering arrangements and providing security for project financing for projects such as transportation infrastructure and power system development.** Managing the balance of risk and benefits to ratepayers and shareholders of investing in these types of projects will determine the extent to which public and private sector entities will participate in project financing. In the case of government, high risk exposure of public resources is unlikely to occur. However, creative contributions through unconventional funding arrangements, financial securities through low risk revenue guarantees, and support for the "replacement" or "avoided" cost model of financing could provide the financial leadership necessary to encourage private sector investment in what might otherwise be considered higher risk investments. The financial returns that could be realized with the development of successful projects, through the future tax revenues realized from mine operation, as well as return on investment in the infrastructure and power projects, should provide the incentive necessary to foster political support. The role of loan guarantees by both Federal and Provincial governments and their agencies should be promoted.
- The Provincial and Federal governments are encouraged to **foster effective partnering through public-private partnerships (P3s), especially for the development of infrastructure and energy projects.** P3s will help to dilute the risk to the ratepayer while encouraging the meaningful involvement of the First Nations in project development, ownership and operations. Ultimately, support for development of the mining sector in Northwestern Ontario requires government support. With this support in place the management of financial risk will become more manageable for private sector investors and First Nations. Success of the early stage mining projects, facilitated through the

development of necessary infrastructure, will lead to further exploration, the identification of more mining projects and the success of mining projects for years to come. Ensuring that Aboriginal and treaty rights are well respected and that First Nations are provided meaningful, sustainable and long-term involvement in all facets of mining sector development will help to secure long-term success.

- The provincial and federal governments together with Aboriginal Associations and leaders, are encouraged to **explore methods of project financing and ownership that help First Nations and Aboriginal organizations become equity holders in large-scale projects such as transportation infrastructure and power systems.** Without the same ability as large private sector companies to secure initial equity financing, Aboriginal entities and individuals are often frozen out of start-up opportunities to invest in large projects which could be located in their traditional territory and/or could affect the social, economic and environmental sustainability of their community(s). Providing more control over employment, procurement and the distribution of financial benefits from project ownership and operation could help to increase the level of support for projects.

14.4 Roles and Responsibilities

The previous sub-section which outlines recommendations flowing from the analysis conducted for this MRS Strategy, also outlines roles and responsibilities for a number of agencies and associations. Without a concerted effort by all stakeholders and communities, the Strategy will not be implemented. **Success will depend very much on collaboration between all stakeholders**.

Many of the papers referred to and used in the preparation of this report refer to the need for better collaboration between stakeholders in the development of new mines. While each stakeholder has its own interests and responsibilities significant mining development will not be achieved without a collaborative effort amongst all.

One entity has to take the leadership in ensuring this collaboration. It would be most effective for this leadership to be provided by the Ontario government, either through the Ministry of Northern Development and Mines and/or a collaboration of provincial agencies with jurisdiction in Northwestern Ontario. In the same way that partnering arrangements for financing most likely have to be led by government(s), the same approach is recommended to fostering stakeholder collaboration.

The key roles of the stakeholders must be defined and respected by all parties as summarized below.

14.4.1 First Nations/Métis

- Provide project requirements to the project owner in a timely manner
- Participate actively in mine design
- Participate meaningfully in permit processes
- Participate in Training Programs
- Participate in entrepreneurial ventures in the mining supply chain

- Establish the partnering arrangements needed to participate in ownership and control of projects (particularly infrastructure projects)

14.4.2 The Project Owner

- Exploration
- Engineering studies and securities commissions' reports
- Financing of the mine and associated facilities and infrastructure
- Participation in any P3 financing of infrastructure
- Permitting
- Construction, commissioning and operations
- Delivering and selling products
- Remediation at end of project
- Effective partnering with First Nations and government agencies

14.4.3 Institutional Training Organizations

- Providing appropriate academic and practical courses to train sufficient personnel with the skills required to build and operate the mines and the mining supply chain.
- Include First Nations/Métis in training plans, including remote training facilities/opportunities.
- Continue the valuable work done by Confederation College in its dual credit program.

14.4.4 Government

- Provide leadership in collaborative efforts
- Funding and financing
- Ensure adequate electrical (supply and transmission) and transportation infrastructure is in place
- Participation in any P3 financing of infrastructure
- Timely Permitting
- Facilitate effective partnership arrangements

14.4.5 Local (non-Aboriginal) Government (Thunder Bay)

- Facilitation of the Projects

- Create livable environments; maintain a high level of healthcare and educational facilities to attract people to the city
- Help develop and support the service "hub"
- Facilitate involvement of the banking and financing sector
- Provide serviced land for housing and commercial/industrial development
- Provide incentives for mining supply chain companies to expand and/or relocate to Thunder Bay.

14.5 Implementation

Many of the activities that have been recommended in this Strategy will take some time to implement as **funding and approvals will be required**. To implement a number of the major projects that are discussed in this Strategy, there will also be planning processes to undertake that will involve multi-agency involvement and First Nation consultation/involvement. Also, many of these projects will require extensive capital financing that may require creative approaches to partnering and ownership.

As highlighted throughout this Strategy, **transportation and energy infrastructure are critical to the success of a number of the key mining prospects** highlighted in the Report. It is also argued that the implementation of key infrastructure is central to the future of the mining sector in Northwestern Ontario, laying the foundation for future exploration and the identification of new mining projects that may be developed for generations to come.

In addition to the direct benefits of infrastructure to the mining sector, many of the key projects discussed in this report, such as all-season roads, rail lines and transmission lines, will provide **interconnection of Northwestern Ontario's remote First Nations communities, providing increased access to employment, health and education services, community interaction, and a significant decrease in the cost of living**. Of course, all of these benefits must be measured carefully against the potential impacts to environmental, social, economic and cultural sustainability. However, if implemented together with the First Nations communities, there is general optimism that this growth will have net positive outcomes for the entire Region, for many future generations.

The timing of when these mining projects come to market has been estimated by many analysts from many different perspectives. The estimated timing presented in this Strategy largely reflects the estimates provided by the mining companies responsible for developing the projects. **Many of the expected timelines are aggressive,** requiring that many other steps in the development process, often steps that are not totally within the control of the mining developer, are undertaken with the same aggressive approach to scheduling. This is particularly true for transportation infrastructure. Although many goods and services can be provided to a number of the proposed mining projects via the existing transportation network of all-season roads, winter roads, airports and ports, many other projects will require infrastructure upgrades to bring their product to market cost-effectively.

Figure 14-2 demonstrates estimates of the timing interrelationships between projects and planning processes as it might affect the 10 projects chosen for discussion in this Strategy. Although these timelines are also estimates in themselves, the chart demonstrates the critical nature of getting

many of the supporting projects and processes underway if the estimated timelines for the mining projects are to be realized. This was undertaken to demonstrate that **there is an urgency to implementing many of the recommendations contained in this Strategy** if the benefits of the growth of the mining sector in Northwestern Ontario are to occur in a reasonable timeframe.

The importance of maintaining pressure on the implementation of this Strategy is demonstrated in these timelines. This underscores the need for all participants to contribute the necessary resources in a timely fashion. Leadership from the provincial and federal governments will be required to ensure that many of the recommendations are implemented with their political and financial support. Leadership from the First Nations communities will be required to ensure that processes can be found to achieve consensus in the necessary planning processes in a timely manner. Leadership from the mining sector is required to ensure that social, cultural and environmental values are respected and that projects are designed to avoid and/or minimize negative effects to the environment and local communities, and that the positive effects of employment and economic growth are maximized within the Region.

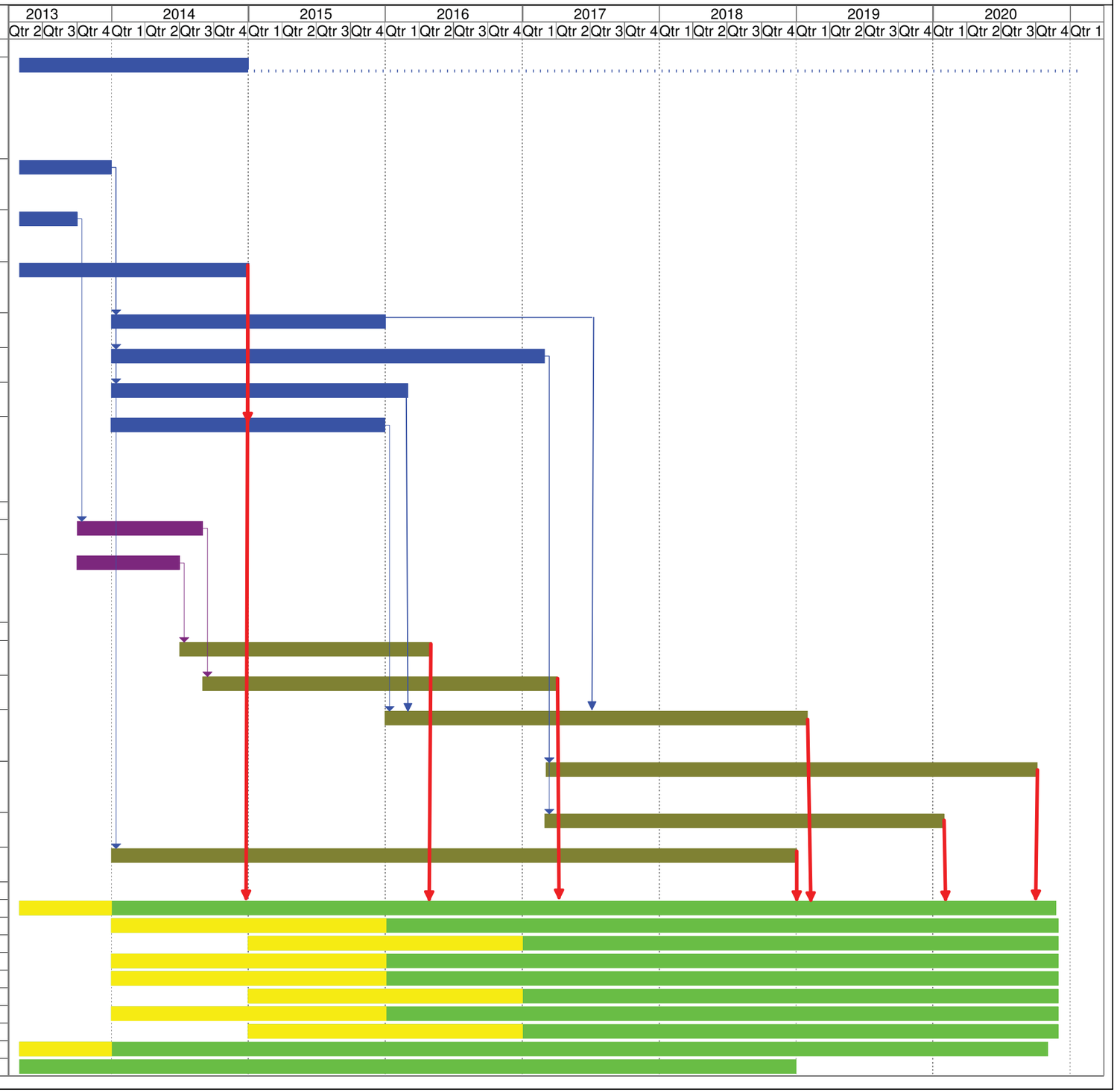
14.5.1 Implementation Recommendations

Implementation of this MRS Strategy will require that all parties identified throughout the Strategy take **a leadership role within their jurisdictional mandate and carry out their responsibilities in a timely fashion**. The following are recommendations to help facilitate implementation:

- To ensure a coordinated approach to implementing the Strategy, **it is recommended that the Thunder Bay CEDC play the role of Coordinator** through a **Mining Readiness Coordinator** to oversee the execution of the Strategy and its recommendations. In this capacity it is suggested they also monitor progress of the implementation and report to the City of Thunder Bay and the Fort William First Nation, and other stakeholders as directed by these agencies, on a regular basis as to the progress being made.
- It is recommended that an **MRS Implementation or Execution Plan be developed** that outlines specific procedures for ensuring the Mining Readiness Strategy moves forward in a timely manner. The CEDC Mining Readiness Coordinator would be the most likely candidate to lead the development and execution of this Plan.
- **The MRS Implementation Plan should include Key Performance Indicators (KPIs) should be established for implementation of this Strategy** which help the CEDC Mining Readiness Coordinator monitor progress in accordance with milestone objectives and specific schedule targets.
- It is recommended that **funding arrangements for development of the MRS Implementation Plan and the CEDC Mining Readiness Coordinator be discussed collaboratively** between the Canadian Government (through the federal Ring of Fire Coordinator, Minister Tony Clement and FedNor), the Province of Ontario (through the Premier's Office, the Northern Ontario Heritage Fund Corporation, and the Ontario Ministry of Northern Development and Mines), the City of Thunder Bay and the Northwestern Ontario Associated Chambers of Commerce and the Northwestern Ontario Municipal Association.

Figure 14.2
Suggested Timelines for Infrastructure and Energy Planning and Project Implementation

Recommended Action	Responsible Authority
Planning Studies	
Facilitate intergovernmental discussions around energy and infrastructure planning and development and coordination of funding and permitting for major projects	Ring of Fire Secretariat (MNDM), OPA, federal Treasury Board (and/or an executing agency such as NRCan or AANDC), Major Projects Management Office (MPMO), First Nations Organizations
Conduct regional energy and infrastructure energy plan	Infrastructure Ontario, MTO, Ministry of Energy, OPA, ON Ministry Aboriginal Affairs, AANDC, NRCAN
Conduct short to mid term energy plan for NWO (biomass, renewables, TBGS conversion)	Ministry of Energy, OPA
Complete community planning studies to facilitate transmission/road and power generation projects	First Nations communities, MNR, ON Ministry Aboriginal Affairs
Finalize transmission routing and permitting	City of TBay, OPA, Hydro One, private partners
Finalize transportation routing and permitting	IO, MNDM, MNR, private partners, First Nations partners
Community studies to identify regional power generation projects	First Nations orgs, private sector partners
Conduct Transmission Plan for grid connection of remote First Nations communities, potential regional sources of power generation, and mining projects	Ministry of Energy, OPA, FedNor, First Nations Organizations, private sector partners
Feasibility Studies	
Conduct feasibility study for conversion of TBGS to natural gas	Ministry of Energy, OPA, City of Thunder Bay
Complete feasibility studies for interconnection of high voltage transmission lines to Pickle Lake and Red Lake	OPA, AANDC
Project Development/Implementation	
Permitting/EPC of TBGS conversion	OPG, City of Tbay, private partners, First Nations partners
Permitting/EPC for HVAC line to Pickle Lake/Red Lake	Hydro One, private partners, First Nations partners
Permitting/EPC of HVAC transmission line into remote communities and mining projects	Hydro One, First Nations orgs, private partners
Permitting/EPC to Interconnect HVAC transmission lines to community/regional power projects	First Nations orgs, private sector partners
Permitting/EPC of road/rail link to RoF	Infrastructure Ontario, MTO, ON Ministry Aboriginal Affairs, AANDC, NRCAN
Permitting/EPC of East-West Tie transmission Line	IESO, OEB, MoE
Mining Project	**Owner**
Phoenix Gold Project	Rubicon Minerals Corporation
Eagle's Nest Nickel, Copper, Platinum, Palladium P	Noront Resources Ltd.
Black Thor Chromite Project	Cliffs Natural Resources Inc.
Richardson Township Gold Project	Rainy River Resources Ltd.
Hammond Reef Gold Project	Osisko Resources Ltd.
Marathon Copper-PGE Deposit	Stillwater Mining (Canada) Ltd.
Bending Lake Iron Property	Bending Lake Iron Group ltd.
Goliath Gold Project	Treasury Metals Inc.
Cochenour/Bruce Channel Gold Project	Goldcorp Inc.
Lac des Iles Project	North American Palladium Ltd.



14.6 Next Steps

A number of activities will be undertaken following release of this Strategy to ensure that implementation is successful and that on-going activities recommended in the Strategy are executed. The following is a list of activities to be conducted:

- **Establish Key Performance Indicators and milestones for the Strategy** to be used as a method of monitoring the progress of recommendations, the rate of employment and economic growth, and the success of the recommendations.
- **Continue meaningful community engagement** to ensure that all interested parties in the Region have an opportunity to learn more about the Strategy and opportunities in mining and related sectors, and to ensure that the objectives of the MRS are continuously reviewed and improved.
- **Establish a Mining Readiness Coordinator within the City of Thunder Bay Economic Development Commission** who is responsible for implementing the MRS, participating in the various multi-stakeholder committees and associations to be established, coordinating with municipalities and Aboriginal groups throughout the Region, conducting performance monitoring and updating the Strategy periodically as the economy changes and adapts to growth.
- **Meet with key representatives of Provincial and Federal governments** to prioritize recommendations and identify a path towards implementation.

14.7 References

(1) Raymond Chabot Grant Thornton, 2012. “Infrastructure Financing: A Key Component of Resource Projects’ Success”. December 12, 2012.

(2) Federation of Municipalities of Canada. “FMC Analysis of Budget 2013”. March 21, 2013.

(3) United Nations. 1987. "Report of the World Commission on Environment and Development." General Assembly Resolution 42/187, 11 December 1987. Retrieved: 2007-04-12

(4) McKinsey & Company. “*Education to Employment: Designing a System that Works”*. 2012.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Supply Chain			
Initiate the development of a mining supply chain industrial cluster through the establishment of a Northwestern Ontario Mining Service and Supply Association	CEDC, City of Thunder Bay, MNDM, Ministry of Consumer and Commercial Relations, local and regional Chambers of Commerce, mining sector business representatives	Initiate Q3 2013	- Promote collaboration between mining companies and supply chain C3; - Provide a forum for the exchange of commercial and technological innovation; - Provide a forum for communicating market intelligence between and among mining companies and suppliers to ensure local businesses are aware of upcoming opportunities and market changes; - Provide opportunities to foster strategic business partnering to enhance opportunities for creative business and project financing; - Provide knowledge of regulatory changes and challenges; - Provide a forum for advocating to local, provincial and federal government agencies about issues related to and affecting mining supply chain businesses; - Enhance competitiveness of the Northwestern Ontario mining supply chain; - Provide a conduit for discussions with the education sector around innovative technologies and business practices, including the opportunity for collaborative research and development.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Energy			
Establish an Energy Planning Committee whose task it is to develop a regional electrical infrastructure plan for Northwestern Ontario.	Ministry of Energy, Ontario Power Authority, IESO, the federal government, through Aboriginal Affairs and Northern Development, the municipalities of Northwestern Ontario, the First Nations of Northwestern Ontario	Initiate Q2 2013; on-going through 2022	This Plan should include consideration of forecasted growth in demand, available and future sources of electricity generation, challenges and opportunities of interconnecting remote First Nations, remote mining projects and remote renewable energy generation projects, timelines and sources of financing to execute identified projects.
Expedite engineering and construction of a high voltage transmission line aimed at strengthening the supply source at Pickle Lake and Red Lake to provide a new, clean and reliable supply of electricity to Ring of Fire mining loads, and to interconnect remote First Nations and new sources of renewable energy generation.	Min Energy, OPA, Hydro One, FedNor and other federal government agencies, First Nations organizations, private sector partners	Initiate feasibility planning Q2 2013 for completion Q1-Q2 2014	- Delay to in-service date will delay mine development activity and interconnection of remote First Nations communities north of Pickle Lake - Funding to be shared between prov and fed gov't agencies and possibly private sector
Coordinate plans to connect mining loads, new hydro and wind resources, and remote First Nations between First Nations, First Nations organizations, as well as the provincial and federal levels of government. This coordination will tend to decrease the cost of transmission development for all parties.	Min Energy, OPA, Hydro One, First Nations organizations, private sector		- Coordinate with work being undertaken by Central Corridor Energy Group, OPA, NADF and others that have conducted planning and transmission routing studies in Northwestern ON

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Identify and evaluate alternative supply options to meet the short to medium term supply-demand gap prior to the closure of the Thunder Bay (coal-fired) Generating Station (TBGS) at the end of 2014, until the East West tie expansio.	CEDC, TBay Hydro, Min Energy, OPA, Hydro One, federal government agencies responsible for funding, First Nations organizations, private sector partners	Initiate Q2 2013 for completion in 2014	Timing of East-West Tie transmission interconnection is uncertain; reliability of system supply in short to medium term is uncertain - The closure of TBGS is expected to create a serious gap in the supply of reliable energy to the mining sector. The amount of mining sector development that will occur in that timeframe will depend to a large extent on the availability of reliable power to meet forecast demand.
Support the efforts of the Common Voice Northwest Energy Task Force, the City of Thunder Bay and the Fort William First Nation in identifying cost-effective and practical options for retaining and converting the TBGS to help address the gap in reliable energy supply that is expected between 2012-2018, prior to the in-service date of the East-West Tie high voltage transmission line. TBGS is considered to be a key contributor to this reliable supply going forward.	CEDC, TBay Hydro, OPA, Min Energy, OPG, Hydro One, First Nations orgs, privtae sector partners	Initiate Q2 2013 for completion Q4 2013	Options for TBGS conversion from coal that should be considered include: Utilizing torrefied wood pellets that could replace coal by December 31, 2014 without requiring any major retrofit of the TBGS; Investigate the potential for conversion of TBGS to natural gas by December 31, 2014, without requiring a major retrofit; Other biomass fuels that could also have TBGS operational by 2015 without a major retrofit.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Transportation Infrastructure			
Establish Northwestern Ontario Infrastructure Planning Committee to prepare a regional plan of a system of transportation access into the areas of highest mineral exploration and project development activity, considering the contribution that can be made by winter roads, all-season roads, private access roads, public highways rail lines, and combinations of surface transportation that will also facilitate development of the mining sector as well as enhance the social and economic interests of the remote First Nations communities.	MNDM, IO, federal government reps, CEDC, City Tbay, other municipal reps, First Nations organizations, mining sector reps	- Initiate Q2 2013; - This Committee should be given a timeframe of no more than nine (9) to twelve (12) months from inception to provide its preliminary findings in the form of a high level regional infrastructure plan (which would include a baseline of existing NWO transportation access assets and liabilities), including the nomination of a lead agency or proponent to continue functional development of high priority, lower risk projects. As projects are identified and shifted to a responsible agency or proponent, the Committee should re-focus its attentions to the areas remaining and the issues that are outstanding to develop the more complex projects.	It is suggested that this Committee be chaired by a senior representative of the Ontario Ministry of Northern Development and Mines, appointed by the Minister. This approach is consistent with the Growth Plan for Northern Ontario, as an identified "action".

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Establish a sub-committee of the Northwestern Ontario Infrastructure Planning Committee, made up of Aboriginal leaders, that is overseen by an independently appointed Moderator, and jointly funded by the provincial and federal governments.	Aboriginal Association leaders, Grand Chiefs, representation of Community Chiefs	The sub-Committee should report to the Planning Committee on a monthly basis, providing regular updates and identifying any specific challenges that require broader resources to address.	The purpose of the sub-Committee would be to examine and coalesce social, economic, financial and cultural challenges and opportunities associated with major infrastructure projects. Initially, it is suggested that the sub-Committee be made up of representatives of Tribal Council Organizations, Treaty Organizations and other higher level associations to address over-arching issues and principles associated with regional infrastructure development in Northwestern Ontario. Issues of specific routing within a broad regional context, could be left to subsequent planning processes that will involve local communities. This sub-Committee should examine frameworks and structures that could be implemented to broadly address: aboriginal involvement in ownership and operation; treaty and aboriginal rights associated with infrastructure development; the perception of imbalanced benefits and impacts at the local community level; and other high level issues that could affect project approval and implementation. The sub-Committee should report to the Planning Committee on a monthly basis, providing regular updates and identifying any specific challenges that require broader resources to address.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Develop a cost-effective method of financing, developing and operating road/rail infrastructure into the Ring of Fire	The Office of the Premier (Ontario), the Ontario Treasury Board, Infrastructure Ontario, the Ministry of Northern Development and Mines (Ring of Fire Secretariat?), the federal government (through Aboriginal Affairs and Northern Development and FedNor), mining and infrastructure companies and First Nation leaders	Initiate Q2 2013; to be complete Q2 2014 for public review	The solution must provide social and economic benefits to remote First Nations communities, including consideration of project ownership and operations.This approach would facilitate increased participation of Aboriginal people in future economic growth, with the Growth Plan for Norther Ontario.
Consideration should be given to appointing the Major Project Management Office, or an equivalent agency of the government to coordinate the regulatory approvals process and aboriginal consultation to ensure that timelines for major infrastructure projects are actively managed and that approval timelines are minimized, while ensuring that all social, economic, cultural and environmental impacts are minimized through effective mitigation and community engagement.	Ontario Premier's Office, MPMO	As per Planning Committee and project development timelines	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Municipal Infrastructure			
Housing			
The need for more rental housing units in the local market should be reflected in the municipality's on-going Official Plan update. In addition, the City should continue to monitor trends within what has become an extremely tight local rental housing market and respond as needed to facilitate the development of additional units.	City of Thunder Bay	Match timing of the OP Update; on-going monitoring	
Examine administrative mechanisms which encourage investment in new rental housing development. These might include offering a preferred municipal tax rate for new multi-residential developments. By establishing a "new multi-residential" property class, and setting the tax rate at or similar to that used for "residential", private sector interest in bringing new units into the local market may be increased	Fort William First Nation, AANDC, CN Rail, federal Dept of Transport, City of Thunder Bay	Q2 2013	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
It is recommended that the city strengthen and/or broaden its current provisions allowing for residential intensification where appropriate, as a way of encouraging additional housing unit development, and particularly rental housing, within the community.	City of Thunder Bay	2013-2014	Efforts in this regard were begun with the introduction of the new comprehensive zoning by-law in 2010 which increased the opportunities for rental unit development through infill and conversion within many areas of the City.
The City should investigate the establishment of a Development Permit System (DPS)as a tool for integrating zoning, site plan, and minor variance approvals into one application.	City of Thunder Bay	2013-2014	DPS is intended to help reduce review and approval timelines. DPS may not be much of a benefit to the City of Thunder Bay as there already exists the option to have multiple applications for a property processed together. However, the rules and regulations under the Development Permit System do provide for additional restrictions on the timing and eligiblity of third party appeals regarding development applications. These restrictions which may serve to facilitate quicker market responses to demand and may encourage the development of additional infill housing units.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Thunder Bay, in conjunction with private sector developers, are encouraged to work together on a "place to live" strategy for Thunder Bay that includes aggressive marketing of Thunder Bay's educational, health, recreational and commercial/business assets in addition to creating and maintaining an attractive and diversified local housing market.	City of Thunder Bay, representatives of the development community	2013 - on-going	It is expected that this type of marketing campaign, combined with an active campaign to provide a reasonable supply of new homes (for sale and rental) which will in turn attract the population growth resulting from mining sector growth. Although it is certain new employment will be created by growth in the mining sector, it is uncertain and unpredictable as to where these employees will choose to reside on a permanent basis, being a personal/family choice. This in turn makes housing supply forecasting uncertain. However, it is certain that the re-sale home and rental housing markets are currently short on supply, leading to higher prices. While there is currently a significant inventory of buildable lots, the location and availability of lots is not necessarily in keeping with market demands, nor is the supply and type of available housing.
The City should continue to closely monitor absorption rates, vacancy rates, housing prices and rental rates, as well as input from the development community and realtors.	City of Thunder Bay	2013- on-going	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The City should establish, in the Official Plan Review process, a "sunset" clause providing the City a mechanism to rescind approvals for draft plans of subdivision for undeveloped lots that are unlikely to come to market in the near term. These lots would then be removed from the building lot inventory used for planning purposes.	City of Thunder Bay	2013- on-going	
The City should investigate options to lower the cost of bringing lots to registered plan status ahead of anticipated demand. Any initiatives pursued must be measured against the potential impacts they may have on existing buildable lots, whether infill or under registered plans of subdivisions, as well as pressures that may be placed on the municipality to extend services prematurely.	City of Thunder Bay, representatives of the land development sector Ministry of Minicipal Affairs and Housing	2013	This mechanism would be expected to increase the development of lots on a speculative basis. However, potential impacts on the development of existing buildable lots must be considered, whether they be infill or registered plans of subdivision. Consderation must also be given to pressures that may be placed on the municipality to extend services prematurely on a speculative basis.
If the inventory of buildable lots declines over the near term (3 years) the City should, in conjunction with the development community, explore the opportunity of taking a more active role in land development.	City of Thunder Bay, Thunder Bay development community reps, Ministry of Municipal Affairs and Housing	At such time as the inventory of building lots declines and supply is under pressure	This could include the provision of specific or upgraded infrastructure assets financed through the application of area specific development charges.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The federal government should support the FWFN identify their community goals to improve housing. These include the following: Higher number of well-maintained units; Affordable, suitable and accessible housing options for all (singles, people with disabilities, special needs, single mothers/fathers, Elders); Quality, professionally built homes; Policies in place that are effective, fair, consistently followed and transparent; Increase housing administration to accommodate growing housing needs and demands; Enhanced measures of accountability and reporting requirements to membership; Flexible finance options; Fully operational housing program; Established committee with terms of reference; Long term sustainable housing plan for FWFN; Maintain an Arrears free housing program; A positive working relationship with membership; Elder's Emergency Home Repairs and Renovations Program; and, Options for off-reserve residents.	Aboriginal Affairs and Northern Development Canada; Fort William First Nation	2013-2015	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Industrial and Commercial Lands			
The City of Thunder Bay through the CEDC, and working closely with private property owners, should investigate and document remediation requirements for the many available lots that are designated for heavy industrial and large industrial use, to ensure their market availability for potential mining sector related development is as clear as possible.	CEDC, Thunder Bay, private landowners/developers	2013-2015	Increase the availability of industrial land.
Identify opportunities for partnering between the private sector and senior levels of government to remediate contaminated lands that could then be made available as application-ready industrial development sites to the industrial developer market.	CEDC, City of Thunder Bay, provincial government (Min of Municipal Affairs and Housing), federal government, private sector developers	as demand for industrial lands increases	Difficult to obtain funding/financing
The City should investigate the feasibility of extending sewer service to Mission Island to facilitate the development of available industrial lands.	CEDC, City of Thunder Bay, OPG, Ministry of Energy, gas pipeline company	2013	The feasibility of this development will likely be based on: 1) whether the Thunder Bay Generating Station is converted to natural gas, providing potential gas line connection to the Island; and 2) the rate of uptake of existing serviced industrial lots within other areas of the City and the Fort William First Nation.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Fort William First Nation and the City of Thunder Bay should collaborate to build on the comparative tax and location advantages enjoyed by FWFN through the creation of an economic plan, supporting policies and a regulatory environment conducive to development on First Nations industrial/commercial lands.	Fort Willilliam First Nation, City of Thunder Bay, CEDC	2013-on-going	
Fort William First Nation should be supported by Thunder Bay in their efforts to develop commercial development along Chippewa Road (City Road) east of James Street as well as the vacant 800 acres of CN lands in the area.	Fort William First Nation, City of Thunder Bay, CEDC	2013 - on-going	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The City, through the CEDC, together with Fort William First Nation, should explore the feasibility of developing a smelter(hydro metallurgical plant) on serviced industrial lands that are adequately connected to sources of high voltage power and heavy transportation systems, for the purposes of receiving copper and/or nickel(platinum, palladium) concentrate from the Marathon Copper deposit(Stillwater Mining),Thunder Bay North deposit (Panoramic Resources),and/or Eagles Nest deposit(Noront Resources) and all of the other potential mines in Northwestern Ontario, as well as neighbouring markets in the United States(including Northern Minnesota).	CEDC, City of Thunder Bay, Fort William First Nation, mining sector reps,	uncertain	The City of Thunder Bay and the Fort William First Nation are encouraged to work cooperatively to identify the best location for this facility on available, serviced industrial lands.
Infrastructure Demands			
It is recommended that the City continue to pursue the development of the Northwest Arterial road in order to facilitate the long term growth potential of the northwest section of the city and lessen current congestion at both John Street and the Thunder Bay Expressway (Highway 11/17) as well as Red River Road and the Thunder Bay Expressway.	City of Thunder Bay	2013-2014	This should be coordinated with the Province's recently announced design study and environmental assessment of possible improvements to the Thunder Bay Expressway (Highway 11/17) between Arthur Street and Balsam Street. That study is to look at possible widening of the highway and building new interchanges. The City should be in a position to influence the Provincial process to help ensure it reflects current local needs.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The City should continue to monitor growth patterns and demand for development within the northwestern section of the community and proceed with necessary planning, engineering and environmental assessment studies so that additional sewer capacity to this area can be delivered expediently prior to demand outstripping capacity.	City of Thunder Bay	2013-2014	
The federal and provincial governments, the CEDC and the City of Thunder Bay are encouraged to support the Fort William First Nation and the City of Thunder Bay in their joint review of a new fixed link bridge to replace the aging CN Rail-owned James Street Swing Bridge over the Kaministiquia River. The new bridge is to be located to the south side of the existing bridge to resolve safety issues while enhancing development opportunities on the First Nation's Commercial Lands.	Federal and provincial governments, Fort William First Nation, CEDC, City of Thunder Bay, CN Rail	2015	
Fort William First Nation Economic Development Initiatives			
The CEDC and the City of Thunder Bay are encouraged to facilitate the Fort William First Nation in their efforts to develop small businesses as identified in their Economic Development Strategy. These activities could be enhanced by collaboratively developing joint industrial clusters.	Fort William First Nation, CEDC, Thunder Bay	2013 - on-going	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The FWFN should be supported in their initiatives to position itself in acting upon unprecedented development opportunities and create social change by taking advantage of the regional mineral exploration and Northern Ontario's "Ring of Fire" developments (and other Northwestern Ontario mining activity). In support of these efforts, the federal government is encouraged to support the First Nation by approving their recently submitted application for funding to prepare a Comprehensive Community Development Strategic Plan.	Aboriginal Affairs and Northern Development Canada; Fort William First Nation	2013 - 2014	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The FWFN Project and Economic Opportunity and Evaluation Policy should be a key driver in selecting business activities with the FWFN.	Federal and provincial government, Fort William First Nation, CEDC, Thunder Bay, private sector partners, mining companies	2013 - on-going	Economic development initiatives include: Waterpower development: Fort William First Nation Loch Lomond Water Supply System, located on reserve lands;Xeneca Power Development/Lac des Mille Lacs First Nation waterpower projects located off-reserve. Impact Benefits Agreement with Lac des Iles and Panoramic: One operating mine and one exploration project within the First Nation's traditional lands -- present a variety of opportunities for new sources of revenue while supporting mineral development. Industrial Park Development on the former CN Lands: Both Cliffs Natural Resources and Noront Resources are reviewing the former CN Industrial Lands owned by FWFN as potential sites for mineral processing. Development of On-Reserve Residential Subdivision and Business Park: There is an opportunity for First Nations involved in the Ring of Fire to create urban business partnership between FWFN and industry creating on-reserve employment opportunities for Ring of Fire communities and FWFN and surrounding area. Mineral Exploration in the Thunder Bay Region: many new First Nation opportunities in future.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Aboriginal Affairs and Northern Development Canada is encouraged to provide financial support for development of a strategic plan to identify and quantify synergies between remote First Nations, FWFN, the mining sector and the City of Thunder Bay. The strategic plan should identify any remote First Nation mining opportunities that can be pursued within the urban environment of FWFN and Thunder Bay. Any proposed plan should strive identify the business and partnership opportunities that have potential to create stable sources of revenue and employment for the urban First Nation population in and around Thunder Bay.	Aboriginal and Affairs and Northern Development Canada, Fort William First Nation, Thunder Bay, CEDC	2013-2014	
Labour			
Through collaboration of the newly created mining sector industrial cluster and a newly created mining education community (see Education and Training), mining companies, education and training institutions and government agencies and associations responsible for employment should share data on labour requirements and timing to ensure accurate labour forecasts are prepared and shared among all parties on an on-going basis to ensure the proper flow of training and skills development, immigration, etc., is in place to supply the needed labour for the entire Northwestern Ontario mining sector.	CEDC, education and training institutions, education ministries, labour ministries, trades unions, chambers of commerce, mining sector companies	2013-on-going	This collaborative effort could be coordinated by CEDC

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Identify training opportunities to help the Aboriginal population maximize their ability to take advantage of the many employment opportunities that will be created from the growth in the regional economy.	Educational and training institutions, government agencies, First Nations Education Services and mining companies	2013-on-going	
Companies should increase their recruitment efforts to focus on the retention of female workers in mining-related jobs. One of the steps that can be taken to improve the number of female workers in mining sector employment opportunities is to tailor camp/living conditions to the families.	Mining sector and supply chain companies	2013-on-going	
Mining companies should work collaboratively with the Northwestern Ontario chapter of Women in Mining (WIM) to identify other steps that can be taken to promote mining sector employment opportunities for women and to increase the number of female employees.	Mining sector and supply chain companies, Women In Mining chapters in Northwestern Ontario	2013-on-going	
Encourage youth to stay in high school to attain their Grade 12, and aspire to obtain the post-secondary education and training needed to qualify for skilled mining and mining-related employment opportunities.	Educational and training institutions, government agencies, local school boards, First Nations Education Services, and mining companies	2013-on-going	
Support the immigration of skilled labour from countries with strong mining cultures such as South Africa, Peru, Chile, Australia, Mexico and certain Eastern European countries.	The federal and provincial government agencies	2013-on-going	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Ensure employment opportunities are advertised to skilled individuals, who are unemployed or employed in other sectors, to meet the labour demands.	Federal government, provincial government and local employment agencies, mining sector companies	2013-on-going	
The City of Thunder Bay and surrounding municipalities should aspire to be "places to live", providing world class social, educational,commercial and recreational amenities and a variety of residential options to attract workers and families to establish long-term residence in Northwestern Ontario.	CEDC, City of Thunder Bay, NW ON municipalities	2013-on-going	This focus should include a marketing campaign aimed at markets outside Northwestern Ontario where the future labour market may be sourced. Of particular importance is to target aboriginal youth living in communities within Northwestern Ontario who may choose the non-aboriginal communities to the south as places of long-term residence.
Education and Training			
Increase training capacity in Thunder Bay and Northwestern Ontario by increasing the number of students that can enroll in existing programs, and by implementing new training programs to address different types of skills training.	Education and training institutions	2013-on-going	Although current levels of training are exemplary, Northwestern Ontario is encouraged to continue its current endeavors to increase training capacity to have the local work force ready to take up the 13,725 construction jobs and 23,189 operation jobs projected between 2012 and 2021.
Education and training institutions are encouraged to establish new training programs to address gaps in training for skilled mining jobs, including: a) Underground production and development miners; b) Underground mine service and support workers; c) Drillers and blasters – surface mining, quarrying and construction; and d) Inspectors and testers, mineral and metal processing.	Education and training institutions	2013-on-going	

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Create a community of mining education and thought leadership. To attract the local workforce of Thunder Bay and Northwestern Ontario, a council of mining education should be created. This can be done through partnerships with industry leaders, training institutions (Confederation College, Lakehead University and aboriginal training institutions), all levels of government, and community leaders to promote education in the mining sector to the local workforce and develop research and development for the mining sector.	Education and training institutions	2013-on-going	This educational community can help the training institutions to align their training initiatives with industry's employment projects in order for the region to be prepared for mining employment. Research and development in the resource sector can also be done through this community of mining, creating a community of innovation through research and the development of innovative technology and services.
Create a community of mining education, to introduce and advance mining sector employment opportunities into high schools.	Education and training institutions, local school boards, teachers' federations and mining companies	2013-on-going	This will require that teachers are provided with the necessary education and knowledge of the mining sector and related supply chain economies to be well equipped to educate students on employment opportunities in the mining sector and its related supply sectors.
Encourage students to enroll in dual credits/programming in order to allow students to complete their high school diploma while transitioning to college and apprenticeship programs. This also exposes the students to jobs in the mining sector.	Local school boards and teachers federations, mining sector companies	2013-on-going	As students are being educated about the available jobs in the mining sector, high schools are encouraged to provide clear career paths in mining. It is important to make connections between employers and students in the mining sector.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Increase investment in a more comprehensive Integrated Service Delivery (ISD) model. Increased investment in ISD will provide tools and support to advance education-to-employment, lifelong learning and life long employment. Applicable directly to the Ring of Fire, the proposed ISD model uses a blended learning approach to reach potential learners within urban, rural and remote locations in Northwestern Ontario on an equitable, timely and cost effective basis.	The provincial government, through the various Ministries involved in funding post-secondary training and education	2013-on-going	The ISD system is linked with important employment related services, including readiness training, job profiles, job posting, individualized records of employment, related education and learning, and on-going career development. Also, this system involves individualized career planning and development, complete with electronic resumes, educational records, participant tracking, program monitoring and career goal attainment. Part of this investment would cover evidence-based research and evaluation to demonstrate streamlined government services, costs reductions or mitigation, critical successes factors, best practices and bench marking metrics.
Develop an international recruitment and retention strategy for Thunder Bay and the Northwestern Ontario region targeted at Economic Class immigrants, including skilled immigrants, to help fill skill shortages, help entrepreneurs to launch new enterprises, and encourage investors to fund new business development.	The City of Thunder Bay and the CEDC, in collaboration with regional and local Chambers of Commerce and the provincial and federal governments	2013-on-going	This strategy would include a focused approach to linking with Economic Class immigrants from Canada's top 5-6 source countries (India, China, Philippines, Europe, United Kingdom). Marketing efforts should be developed and implemented to target pre-arrival, arrival and resident Economic Class immigrants across Canada. Confederation College would play a supportive role in promoting immigrant recruitment, providing additional technical training and designing employment retention programs.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Develop specialized training programs tailored to the needs of the mining sector within the accelerated timelines required to respond to the growing demands of the mining and construction sectors over the coming years.	Federal and provincial governments, local school boards and mining sector companies	2013-on-going	These types of programs are not part of the regular inventory of training programs, nor are they readily available from third party sources. These programs must be developed in a comprehensive fashion to support in-class, online or blended delivery. The nature of work involves needs assessments, instructional design, content sourcing, curriculum development, media production and instructional delivery. It is recommended that funds be invested in a full-service training team that offers a consistent approach to quality programs.
All training programs should include, to some degree, curriculum that builds awareness and understanding of social issues and how to effectively deal with them. It is further recommended that funds be invested to conduct socioeconomic research in order to better understand the types of social issues that are likely to be encountered, leading to improved curriculum and program development.	Federal and provincial governments, local school boards and mining sector companies	2013-on-going	Creating and sustaining a steady and reliable labour force for Thunder Bay and Region means more than just skills training and development; it means a holistic approach to healthy and sustainable individuals, families and communities. Helping employees better deal with personal and social elements that may prevent them from going to work and being productive is critical to employment retention. Personal difficulties with such issues as family planning, substance abuse and mental health can negatively impact the labour force.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Identify the necessary resources to expand and refine existing employment and retention support services to meet a growing level of demand, diversity and complexity amongst the labour force.	Federal and provincial governments	2013-on-going	Developing a labour force of people within Northwestern Ontario, especially those from rural and remote communities, requires additional levels of support to ensure their active participation and retention in the labour market. These support systems are in various areas of personal advisement and counseling across a spectrum of areas, including personal, life skills, upgrading, job readiness, interview skills, resume development, employment postings, referrals, employer recruitment, job search, job maintenance and career planning.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
The System Integrator would have the responsibility or stewardship to oversee the "big picture" involving all stakeholders - government, education, employers, social and community. With a high-level perspective on the entire regional economy, the System Integrator would be expected to develop strategic thinking for today and into the future, plus develop skills solutions, gather data and disseminate information for today and into the future	Education and training institutions and other organizations	2013-on-going	Educational and training programs need to be designed to foster long-term sustainability of the economy. Running as a parallel track to mining-related skills training, programs must be developed to foster growth of a diversified economy. This will help to ensure future employment and sustainability for communities beyond specific mining-related business. This requires a broad range of alternative economic activity, including new business development, entrepreneurship, business incubators, export-oriented companies, strategic partnerships, import substitution, local supply-chain, youth enterprises, foreign investments, etc.. This level of enterprise development encompasses both for-profit business development and not-for-profit social entrepreneurship and innovation.
Establish a Regional education-to-employment 'Systems Integrator' position to be sponsored by one of the regional educational institutions such as Confederation College.	Provincial and federal governments	2013-on-going	The System Integrator would have the responsibility or stewardship to oversee the "big picture" involving all stakeholders - government, education, employers, social and community. With a high-level perspective on the entire regional economy, the System Integrator would be expected to develop strategic thinking for today and into the future, plus develop skills solutions, gather data and disseminate information for today and into the future

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Project Financing and Partnering			
The Provincial and Federal governments are encouraged to play a leadership role in the facilitation of partnering arrangements and providing security for project financing for projects such as transportation infrastructure and power system development.	Federal and provincial governments	2013-on-going	The financial returns that could be realized with the development of successful projects, through the future tax revenues(corporate, personal income tax and royalties) realized from mine operation, as well as return on investment in the infrastructure and power projects, should provide the incentive necessary to foster political support. The role of loan guarantees by both Federal and Provincial governments and their agencies should be promoted.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Foster effective partnering through public-private partnerships (P3s), especially for the development of infrastructure and energy projects.	Provincial and Federal governments	2013-on-going	P3s will help to dilute the risk to the ratepayer while encouraging the meaningful involvement of the First Nations in project development, ownership and operations. Ultimately, support for development of the mining sector in Northwestern Ontario requires government support. With this support in place the management of financial risk will become more manageable for private sector investors and First Nations. Success of the early stage mining projects, facilitated through the development of necessary infrastructure, will lead to further exploration, the identification of more mining projects and the success of mining projects for years to come. Ensuring that aboriginal and treaty rights are well respected and that First Nations are provided meaningful, sustainable and long-term involvement in all facets of mining sector development will help to secure long-term success.

Table 14.1: Summary of Recommendations, Responsibilities and Timelines

Recommendation	Responsible Authority	Suggested Timing	Comments
Explore methods of project financing and ownership that help First Nations and aboriginal organizations become equity holders in large-scale projects such as transportation infrastructure and power systems.	Provincial and federal governments, Aboriginal Associations, Aboriginal leaders	2013-on-going	Without the same ability as large private sector companies to secure initial equity financing, aboriginal entities and individuals are often frozen out of start-up opportunities to invest in large projects which could be located in their traditional territory and/or could affect the social, economic and environmental sustainability of their community(s). Providing more control over employment, procurement and the distribution of financial benefits from project ownership and operation could help to increase the level of support for projects. This approach is consistent with the Growth Plan for Northern Ontario.

Appendix A

Social and Community

- **Stakeholder Group List**
- **Questions for Focus Group Sessions**
- **Focus Group Session Notes**
  - **First Nation Organizations**
  - **Municipalities**
  - **Industry**
  - **Government**
  - **Educational Institutions**
  - **Suppliers**

A-1: Stakeholder List

Municipalities & Economic Development								
	Municipality/Organization	Title	Name	Mailing Address	Phone #	Ext.	Fax #	Email
1	Town of Marathon	Mayor	Rick Dumas	P.O. Bag "TM", 4 Hemlo Drive Marathon, ON P0T 2E0	(807)229-1340	2224	(807)229-1999	mayor@marathon.ca
		Economic Development Manager						edo@marathon.ca
2	Municipality of Greenstone	Mayor	Renald Y. Beaulieu	1800 Main Street, P.O. Box 70 Geraldton, ON P0T 1M0				
		EDO	Vicki Blanchard					vicki.blanchard@greenstone.ca
3	Municipality of Neebing	Mayor	Ziggy Polkowski	4766 Highway 61 Neebing, ON P7L 0B5	807-964-2083 (Muni. Office: 807 474 5331)		807-474-5332	neebing@neebing.org
		Clerk	Donna Wilson					donna@neebing.org
4	Municipality of Oliver Paipoonge	Mayor	Lucy Kloosterhuis	P.O. Box 10 4569 Oliver Road Murillo, ON P0T 2G0	(807) 473-5658 (Muni Office: (807) 935-2613)		(807) 935-2161	mayor.lucy@xplornet.com
		Clerk						jamie.cressman@oliverpaipoonge.on.ca
5	Municipality of Shuniah	Reeve	Maria Harding	2845 Eldorado Beach Rd. Shuniah, ON P7A 0H7	807-983-2276 (Muni office: 807-683-4545)			mharding@tbaytel.net
		CAO						ecollingwood@shuniah.org
6	Municipality of Wawa	Mayor	Linda Nowicki	40 Broadway Avenue P.O. Box 500 Wawa, ON Canada P0S 1K0	705-856-2085			lnowicki@wawa.ca
		CAO	Chris Wray					cwray@wawa.ca
7	Township of Conmee	Reeve	Kevin Holland	19 Holland Road West R.R. #1 Kakabeka Falls, ON P0T 1W0	807-475-5229		807-475-4793	
		CAO						conmee@tbaytel.net
8	Township of Dorion	Reeve	Dave Harris	170 Dorion Loop Road Dorion, ON P0T 1K0	Office Phone: (807) 857-2289 Home: (807) 857-1437 Mobile: (807) 889-0339		(807) 857 - 2203	dharris@doriontownship.ca
								helena@doriontownship.ca

A-1: Stakeholder List

	Municipality/Organization	Title	Name	Mailing Address	Phone #	Ext.	Fax #	Email
9	Township of Gillies	Reeve	Rick Kieri	R.R. #1 1092 Hwy 595 Kakabeka Falls, ON P0T 1W0	807-475-3185		807-473-0767	
								gillies@tbaytel.net
10	Township of Manitowadge	Mayor	John MacEachern	1 Mississauga Drive Manitouwadge, ON POT 2CO	(807) 826-3227 Home: (807) 826-2801 Cell: 807-228-2263	224	(807) 826-4592	mayor@manitouwadge.ca
		EDO						afriedrich@manitouwadge.ca
11	Township of Nipigon	Mayor	Richard Harvey	52 Front St Box 160 Nipigon, ON P0T 2J0	807-887-3135			richardharvey@nipigon.net
		EDO						edo@nipigon.net
12	Township of O'Connor	Mayor	Ron Nelson	RR#1 Kakabeka Falls, ON P0T 1W0	Cell: 807-621-8211 807-475-9213			
		Clerk						twpoconn@tbaytel.net
13	Township of Red Rock	Mayor	Gary Nelson	42 Salls Street PO Box 447 Red Rock, ON P0T 2P0	807-886-2503			cao@shawbiz.ca
		EDO						cdo@redrocktownship.ca
14	Township of Schreiber	Mayor	Don McArthur	204 Alberta Street P.O. Box 40 Schreiber, ON P0T 2S0	Office: (807) 824-2711 Mobile: (807) 621-9970 Business: (807) 824-2454	290 - -	807-824-3231	mayor@schreiber.ca
		Clerk						clerk@schreiber.ca
15	Township of Terrace Bay	Mayor	Mike King	1 Selkirk Ave. & Highway #17 Terrace Bay, ON P0T 2W0	807-825-3501			m.king@terracebay.ca
		CAO						cao@terracebay.ca
16	Township of White River	Mayor	Angelo Bazzoni	102 Durham St. P.O. Box 307 White River, ON P0M 3G0	807-822-2450			

A-1: Stakeholder List

		Municipality/Organization	Title	Name	Mailing Address	Phone #	Ext.	Fax #	Email
Municipalities	17	Township of Hornepayne	Mayor	Morley Forster	P.O. Box 370 68 Front Street Hornepayne, Ontario P0M 1Z0	807-868-2020		807-868-2787	forster1@bell.net
	18	City of Thunder Bay	Mayor	Keith Hobbs	500 Donald St. E. Thunder Bay, ON P7E 5V3	(807) 625-3600		(807) 623-1164	khobbs@thunderbay.ca
	19	Township of Alberton	Reeve	Michael Hammond	RR#1 - B2 Fort Frances, ON P9A 3M2	807-274-6053		807-274-8449	
			CAO						alberton@jam21.net
	20	Town of Atikokan	Mayor	Dennis Brown	120 Marks Street Box 1330 Atikokan, ON P0T 1C0	807-597-1234	235		denbrown@tbaytel.net
			CAO	Angela Sharbot					angela.sharbot@atikokan.ca
	21	Township of Chapple	Reeve	Peter Van Heyst	P.O. Box 4 Barwick, Ontario P0W 1A0	807-487-2354		807-487-2406	
			CAO						chapple@tbaytel.net
	22	Township of Dawson	Mayor	Eltjo Wiersema	PO Box 427 211 4th Street Rainy River, ON P0W 1L0	(807) 852-3529		(807) 852-3529	
	23	Township of Emo	Mayor	Vincent Sheppard	39 Roy Street PO Box 520, Emo, ON P0W 1E0	(807) 482-2378		(807) 482-2741	
	24	Town of Fort Frances	Mayor	Roy Avis	320 Portage Avenue Fort Frances, ON P9A 3P9	807-274-5323	234		ravis@fort-frances.com
			EDO						geoff@rrfdc.on.ca
	25	Township of Lake of the Woods	Mayor	Valerie Pizey	PO Box 427 Rainy River, ON, P0W 1L0	807-852-3529			
			Clerk / Treasurer						gilesp@tbaytel.net
	26	Township of LaVallee	Reeve	Ross Donaldson	Box 99 Devlin, Ontario P0W1C0	(807) 486-3452		(807) 486-3863	
			Clerk						lavalley@nwonet.net
	27	Township of Morley	Reeve	Moe Henry	P.O. Box 40 Stratton, ON P0W 1N0	(807) 483-5455		(807) 483-5882	
			Clerk / Treasurer						townshipofmorley@gmail.com

A-1: Stakeholder List

	Municipality/Organization	Title	Name	Mailing Address	Phone #	Ext.	Fax #	Email
28	Town of Rainy River	Mayor	Deborah Ewald	PO Box 488 Rainy River, ON P0W 1L0	807 852-3244		807 852-3553	
								rainyriver@tbaytel.net
29	City of Dryden	Mayor	Craig Nuttall	30 Van Horne Avenue Dryden, ON P8N 2A7	807-223-6119		807-223-3999	cnuttall@dryden.ca
		Planning Admin						vmckeever@dryden.ca
30	City of Kenora	Mayor	Dave Canfield	One Main Street South Kenora, ON P9N 3X2	Office: (807)-467-2018 Cell: 807468-1115		(807)-467-2009	dcanfield@kenora.ca
31	Municipality of Machin	Mayor	Gord Dingman	Box 249 75 Spruce Street Vermilion Bay, Ontario P0V 2V0	807-227-2633		807-227-5443	
		Clerk / Treasurer	Tammy Robb					clerktreasurer@visitmachin.com
32	Municipality of Red Lake	Mayor	Phil Vinet	2 Fifth Street Balmertown, ON P0V1C0	Office: 807-735-2096 Mobile: 807-727-0425	233 -	807-735-2286	
		EDO	Bill Greenway					bgreenway@redlake.ca
		CAO	Brian Anderson					municipality@redlake.ca
33	Municipality of Sioux Lookout	Mayor	Dennis Leney	25 Fifth Avenue, P.O. Box 158 Sioux Lookout, ON P8T 1A4	807-737-4670	2221		dleney@siouxlookout.ca
		EDO	Florence Bailey					edo@siouxlookout.ca
		CAO	Anne Mitchell					amitchell@siouxlookout.ca
34	Township of Ear Falls	Mayor	Kevin Kahoot	P.O. Box 309 2 Willow Crescent Ear Falls, ON P0V 1T0	Office: 807-222-3624 H: 807-222-3589 Cell: 807-727-0365	30 - -	807-222-2384	kkahoot@ear-falls.com
		Clerk / Treasurer	Kimberly					kballance@ear-falls.com
35	Township of Ignace	Mayor	Lee Kennard	34 Highway 17 W P. O. Box 248 Ignace, ON P0T 1T0	Phone: 807-934-2202 Cell: 807-221-7980		807-934-2864	elkennard@yahoo.com
								ecdev@tbaytel.net

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		Municipality/Organization	Title	Name	Mailing Address	Phone #	Ext.	Fax #	Email
	36	Township of Pickle Lake	Mayor	Roy Hoffman	2 Anne St Box 340 Pickle Lake, ON P0V 3A0	807-928-2034		807-928-2708	mayor@picklelake.org
									reception@picklelake.org
	37	Township of Sioux Narrows-Nestor Falls	Mayor	Bill Thompson	P.O. Box 417 Sioux Narrows, ON P0X 1N0	807-226-5241		807-226-5712	
EDOs, CFDCs, Etc	**38**	Nishnawbe Aski Development Fund	General Manager	Colleen Martin	106 Centennial Square, 2nd Floor Thunder Bay, ON P7E 1H3	(807) 623-5397	(807) 622-8271		cmartin@nadf.org
			Special Initiative Projects Advisor	Brian Davey					bdavey@nadf.org
	39	Thunder Bay Ventures	Manager	Royden Potvin	P.O. Box 10116 Thunder Bay, ON P7B 6T6	(807) 768-6650		royden@thunderbayventures.com	www.thunderbayventures.com
	40	Superior North Community Futures Development Corporation	General Manager	Anne-Marie Bourgeault	P.O. Box 716 7 Mill Road Terrace Bay, ON P0T 2W0	(807) 825-4505 Ext: 1	(807) 825-9664	info@sncfdc.org	www.sncfdc.org
	41	Atikokan Economic Development Corporation	Executive Director	Garry McKinnon	P.O. Box 218 214 Main St. W Atikokan, ON P0T 1C0	(807) 597-2757	(807) 597-2726	garry.mckinnon@atikokaninfo.com	www.atikokaninfo.com/aedc
	42	Greenstone Economic Development Corporation	Executive Director	Dina Quenneville	1409 Main Street PO Box 1018 Geraldton, ON P0T 1M0	(807) 854-2273 Ext: 22	(807) 854-2474	dina@gedc.ca	www.gedc.ca
	43	Municipality of Greenstone	Economic Development Officer	Vicki Blanchard	PO Box 70 Geraldton, ON P0T 1M0	807-854-1100 ext. 2033		Vicki.Blanchard@greenstone.ca	http://Greenstone.ca
	44	Marathon Economic Development Corporation (MEDC)	CAO	Brian Tocheri	4 Hemlo Drive Marathon ON P0T 2E0	(807) 229-1340 ext. 2228 Cell: 807-229-6145		cao@marathon.ca	http://choosemarathon.ca
	45	Economic Development Office Township of Manitouwadge	Economic Development Officer	Anthony Friedrich	1 Mississauga Drive Manitouwadge, ON P0T 2C0	(807) 826-3227 Ext. 234	(807) 825-4592	afriedrich@manitouwadge.ca	http://www.manitouwadge.ca
	47	Opportunity Thunder Bay		Jason L. Susin					

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Educational Institutions					
	Organization	**Title**	**Name**	**Phone #**	**Email**
1	Confederation College	Dean of Technology	Dr. Jag Mohan		jmohan@confederationc.on.ca
2	Confederation College	VP, Workforce Development	Don Bernosky		bernosky@confederationc.on.ca
3	Catholic School Board	Director of Education	Joan Powell	807-625-1567	jpowell@tdcdsb.on.ca
4	Catholic School Board	Superintendent of Education (7-12 schools)	Pino Tassone	807-625-1590	ptassone@tbcdsb.on.ca
5	Catholic School Board	Education Officer	David Bragnalo	807-625-1585	dbragnal@tbcdscb.on.ca
6	Lakehead Public Schools	Director of Education	Cathi Siemieniuk	807-625-5131	csiemieniuk@lakeheadschools.ca
7	Lakehead Public Schools	Superintendent of Education	Ian MacRae	807-625-5158	imacrae@lakeheadschools.ca
8	Lakehead University		Dr. Dadgostar, School of Business		bahram.dadgostar@lakeheadu.ca
9	Lakehead University		Jennifer Childs		jennifer.childs@lakeheadu.ca
10	Thunder Bay Construction Safety Association	Harold Lindstrom			harold.lindstrom@catb.on.ca
11	North Superior Workforce Development Board	Madge Richardson	Executive Director		mrichardson@nswpb.ca
12	Lakehead University	Peggy Smith			pasmith@lakeheadu.ca
13	Lakehead University	Peter Hollings			peter.hollings@lakeheadu.ca

Government Agencies										
Type		**Organization**	**Dep't**	**Title**	**Name**	**Mailing Address**	**Phone Number**	**Fax Number**	**Email**	**Website**
NWO ORGANIZATIONS	1	**NOMA** (Northwestern Ontario Municipal Association)	Staff	Executive Director	Charla Robinson	P.O. Box 10308 Thunder Bay, ON P7B 6T8	(807) 683-6662		admin@noma.on.ca	www.noma.ca
	2		Board of Directors	President	Mayor Ron Nelson				president@noma.on.ca	
	3	**NOACC** (Northwestern Ontario Associated Chambers of Commerce)	NOACC Executive	President	Andrew Scribilo *(Bell Aliant)*	Kenora, ON	807-548-5095		andrew.scribilo@bell.ca	www.noacc.ca
	4			COO	Harold Wilson *(President & CEO of Tbay Chamber of Commerce)*	200 Syndicate Avenue S., Suite 102 Thunder Bay, ON P7E 1C9	807-624-2626	807-622-7752	harold@tb-chamber.on.ca	
	5	**NODN** (Northwestern Ontario Development Network)		President	Anthony Friedrich *(Manitouwadge, Economic Development Officer)*					
	6			Executive Director/Manager	Dan Brenzavich	Suite 300, 96 High Street North Thunder Bay, ON P7A 5R3	807-621-3562	807-768-6683	dan@nodn.com	
	7			Executive Assistant	Kim MacMillan				kim@nodn.com	
PROVINCE	8	MNDM (Ministry of Northern Development and Mines)				159 Cedar Street Sudbury, ON P3E 6A5	1-705-670-5755 Toll Free - 1-888-415-9845	1-705-670-5818		http://www.mndm.gov.on.ca/
	9	MNR (Ministry of Natural Resources)	Northwest Regional Office -			435 S. James St., Suite 221, P7E 6S8	(807) 475-1261			http://www.mnr.gov.on.ca/en/index.html
	10	MOE (Ministry of the Envionrment)	Northern Region			Suite 331 435 James St. S. 3rd Floor Thunder Bay ON P7E 6S7	(807) 475-1205	807-475-1754		http://www.ene.gov.on.ca/environment
	11	MTO (Ministry of Transportation	Northwestern Region			615 James Street South Thunder Bay, ON P7E 6P6	(807) 473-2000			
	12	Ministry of Education				1st Flr 615 South James St Thunder Bay ON P7E 6P6	807-474-2980			http://www.edu.gov.on.ca/eng/
	13	Northern Ontario Heritage Fund Corporation				Roberta Bondar Place 70 Foster Drive, Suite 200 Sault Ste. Marie, ON P6A 6V8	705-945-6700 Toll Free - 1-800-461-8329	1-705-945-6701	nohfc.ndm@ontario.ca	http://nohfc.ca/en
	14	Ministry of Training, Colleges, and Universities				Public Inquiries Unit 2nd Floor, 880 Bay Street Toronto ON M7A 1N3	1-416-325-2929 Toll Free: 1-800-387-5514	1-416-325-6348	information.met@ontario.ca	http://www.tcu.gov.on.ca/eng/

Government Agencies										
Type		**Organization**	**Dep't**	**Title**	**Name**	**Mailing Address**	**Phone Number**	**Fax Number**	**Email**	**Website**
FEDERAL	**15**	FedNor				244 Lincoln Street Thunder Bay, Ontario P7B 5L2	1-877-333-6673	807-346-8474		http://fednor.gc.ca/eic/site/fednor-fednor.nsf/eng/home
	16	Industry Canada				C.D. Howe Building 235 Queen Street Ottawa, Ontario K1A 0H5	613-954-5031 Toll-free: 1-800-328-6189	613-954-2340		http://www.ic.gc.ca/ic_wp-pa.htm
OTHE	**17**	Thunder Bay Port Authority		CEO	Tim Heney	100 Main Street Thunder Bay, On P7B 6R9	807-345-6400	807-345-9058		http://www.portofthunderbay.com/
	18			Communications & Research Coordinator	Chris Heikkinen					
	19	CN (Canadian National Railway)	Investment Community	Vice-president, Investor Relations	Robert Noorigian	**Head Office** 935 de La Gauchetière Street West Montreal, Quebec H3B 2M9	514-399-0052			www.cn.ca
	20			Senior Vice-President, Southern Region	Jim Vena					
	21			Senior Vice-President, Eastern Region	Jeff Liepelt	Toronto, Ontario				
	22			Senior Vice-President, Western Region	Mike Cory	Edmonton, Alberta Walker Yard? 2585 167 Ave NW, Edmonton, AB T5B 4K3 ??				
	23			President and CEO	Claude Mongeau					
	24	Thunder Bay International Airports Authority Inc.	Administration	President and CEO	Scott McFadden	340-100 Princess Street Thunder Bay, ON P7E 6S2	807-473-2600			http://www.tbairport.on.ca/
	25		Economic Development/Business Opportunities	Manager of Business Development	Ed Schmidtke		807-473-2602			
	26	CPR (Canadian Pacific Railway Limited)	Investor Relations	Vice-president, Investor Relations	Janet Weiss	**Canadian head office & Investor Relations** Gulf Canada Square 401 9 Ave SW - Ste 500 Calgary, AB T2P 4Z4	**Investor Relations General Contact:** 1 (403) 319-3591	**Investor Relations General Contact:** 1 (403) 319-7568	investor@cpr.ca	http://www.cpr.ca/en/contact-CP/Pages/default.aspx
	27			Director, Investor Relations	Maeghan Albiston					
	28	TB Council MNO			Wendy Landry		807-346-9330		landry@tbaytel.net	

Government Agencies										
Type		Organization	Dep't	Title	Name	Mailing Address	Phone Number	Fax Number	Email	Website
R	29	PDAC			Glenn Nolan		416-576-6496		wildimages@sympatico.ca	
	30	OMA			Chris Hodgson		416-364-9301		chodgson@oma.on.ca	
	31	NWOPA			Dave Hunt		807-345-6285		d21hunt@shaw.ca	
	32	OPG			Glen Elliott		416-592-5361		g.d.elliott@opg.com	
	33	FedNor			Jamie Taylor		807-766-1828		jamie.taylor@ic.gc.ca	
	34	FedNor			David Frood				david.frood@ic.gc.ca	
	35	OPG			Chris Fralick		807-625-6457		chris.fralick@opg.com	
	36	OPA			Chuck Farmer				chuck.farmer@powerauthority.on.ca	
	37	MNR (Ministry of Natural Resources)			Honourable M. Gravelle				Michael.J.Gravelle@ontario.ca	
	38	MNR (Ministry of Natural Resources)			Al Wilcox				allan.willcocks@ontario.ca	
	39	MNDM (Ministry of Northern Development and Mines)			Honourable Rick Bartolucci				rick.bartolucci@ontario.ca	
	40	MNDM (Ministry of Northern Development and Mines)			Deputy George Ross				george.ross@ontario.ca	
	41	PA (Mines) MNDM			MPP Bill Mauro				bmauro.mpp.co@liberal.ola.org	
	42	MNDM (Ministry of Northern Development and Mines)			Mark Smyk				mark.smyk@ontario.ca	
	43	MNDM (Ministry of Northern Development and Mines)			Mike Grant				mike.grant@ontario.ca	
	44	MNDM (Ministry of Northern Development and Mines)			John Guerard				john.guerard@ontario.ca	
	45	Ministry of Energy			Honourable C. Bentley				cbentley.mpp.co@liberal.ola.org	
	46	Ministry of Transportation and Infrastructure			Honourable Bob Chiarelli				bob@bobchiarelli.com	
	47	Ministry of Economic Development and Innovation			Honourable Brad Duguid				bduguid.mpp.co@liberal.ola.org	
	52	MTCU			Jim Adams				jim.e.adams@ontario.ca	
	53	MAA			Kathleen Wynne				minister.maa@ontario.ca	
	55	MNR			Frank Miklas				frank.miklas@ontario.ca	

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First Nations Groups - Political Territory Organizations & Tribal Councils								
	Organization	**Title**	**Name**	**Mailing Address**	**Phone #**	**Fax #**	**Email**	**Website**
1	Nishnawbe-Aski Nation	Grand Chief	Harvey Yesno	100 Back St., Unit #200, Thunder Bay, ON P7C 4Z2	807 623-7730	807 623-5193	hyesno@nan.on.ca	http://www.anishinabek.ca
2		Executive Director	Dave Fletcher				dfletcher@nan.on.ca	
		Administrative Assistant (Executive)/Part-Time Travel Assistant	Charlene Yerxa				cyerxa@nan.on.ca	
3	Independent First Nations Alliance	CEO	Gerry McKay	105 N. May Street, Suite 218 Thunder Bay, ON P8T 1K6	(807) 626-7730 ext. #7733		gmckay@ifna.ca	http://www.ifna.ca/
4				PO Box 5010, 98 King Street Sioux Lookout, ON P8T 1K6	(807) 737-1902 ext. #225			
5	Keewaytinook Okimakanak (KO)	Executive Director,	Geordi Kakepetum	Keewaytinook Okimakanak P.O. Box 340, 8 Mine Road Balmertown, Ontario P0V 1C0	807-735-1383 Ext. 3305		geordikakepetum@knet.ca	http://www.knet.ca/
6		Director of Operations	Ross Mamakeesic				rossmamakeesic@knet.ca	
7	Matawa First Nations	CEO	David Paul Achneepineskum	233 S. Court St. Thunder Bay, ON P7B 2X9	807-344-4575	807-344-2977	davidpaul@matawa.on.ca	http://www.matawa.on.ca/
8	Nokiiwin Tribal Council	Executive Director/Governance	Audrey Gilbeau	1000 Chippewa Road Fort William First Nation, ON P7J 1B6	Tel (807) 474-4230 Cell (807) 621-7489	(807) 474-4238	director@nokiiwin.com	http://www.nokiiwin.com/
9	Grand Council Treaty #3	Grand Chief	Warren White		807-548-4214		grand.chief@treaty3.ca	
10	Anishnabek Nation (Union of Ontario Indians)						ansgc@anishinabek.ca	
11	Shibogama First Nations	Executive Director	Margaret Kenequanash				margaretk@shibogama.on.ca	
12	Windigo First Nations Council	Council Chair / CEO	Frank McKay				fmcmay@windigo.on.ca	
13	Bimose Tribal Council	Executive Director	Allan Lub				aluby@bimose.ca	
14	Pwi-Di-Goo-Zing-Ne-Yaa-Zhing Advisory Services	Director of Operations	Richard Bruyere				rbruyere@advisoryservices.ca	
15	Anishinaabeg of Kabapikotawangag Resource Council Inc.	Interim Director	Rhonda Nash		(807) 226-4445		rhonda.nash807@gmail.com	
16	Fort William First Nation		Ed Collins				edc@fwfn.com	
17	Metis Nation of Ontario			500 Old St. Patrick St, Unit D Ottawa, ON K1N 9G4			consultations@metisnation.org	
18	Anishnabek Employment & Training Services		Vernon Ogima				vernon.ogima@aets.org	
19	Lac Des Milles Lacs First		Quentin Snider Nations				quentinlaptop@tbaytel.net	
20	Wasaya Airlines		Tricia Woods				twoods@wasaya.com	
21	Wiskair Helicopters		Mark Wiskeman				info@wiskair.com	

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Industry					
	Organization	**Title**	**Name**	**Phone #**	**Email**
1	Metalcorp	P.Geo., Manager of Exploration	James Garber	807-346-2760	jim.garber@metalcorp.ca
2	PC Gold Inc.	Vice President, Exploration	Neil Pettigrew	807-345-5380	neil.pettigrew@pcgold.ca
3	North American Palladium Ltd.	Exploration Manager	John T. Corkery	807-623-8005	jcorkery@napalladium.com
4	Benton Resources Corp.	President & CEO	Stephen Stares	807-475-7474	sstares@bentonresources.ca
5	Rare Earth Metals Inc.	President & CEO	Michael Stares	807-475-7474	starcon@tbaytel.net
6	Zenyatta	P.Geo, President & CEO	Aubrey J. Eveleigh	807-346-1660	eveleigh@tbaytel.net
7	Wolfden Resources Corp.	President & CEO	Donald Hoy	807-683-7595	dhoy@alyrisgroup.com
8	Bending Lake Iron Group Ltd.	Vice President Operations	Dawn McKay	807-285-5364	dmckay@tbaytel.net
9	Goldcorp Musselwhite Mine	P.Geo, Chief Geologist	Rohan Millar	807-928-2200, Ext. 6264	rohan.millar@goldcorp.com
10	Jiminex Inc.	BScA., Geologist, President & CEO, Director	James R.B. Parres	807-977-1679	jiminex@xplornet.com
11	Magma Metals	M.Sc., P.Geo., Senior Exploration Geologist	Ryan Weston	807-345-6966	rweston@magmametals.ca
12	Mega Precious Metals Inc.	P.Geo, President & CEO	James A. Rogers	807-766-3380 (Direct 3385)	jrogers@megapmi.com
13	Metals Creek Resources	P.Geo, V.P. Exploration	Michael MacIsaac	807-345-4990	mmacisaac@metalscreek.com
14	Noront Resources Ltd.	Chief Geologist	Eric Mosley	807-285-4808, Ext. 103	eric.mosley@norontresources.com
15	Noront Resources Ltd.		Glenn Nolan		glenn.nolan@norontresources.com
16	Cliffs Natural Resources	Director, Development	Andrew Mitchell	807-768-3001	andrew.mitchell@cliffsnr.com
17	Cliffs Natural Resources		Jason Aagenes		jason.aagenes@cliffsnr.com
18	Rubicon Minerals Corp.	Regional Exploration Manager	Ian Russell	807-727-3334	ian@rubiconminerals.com
19	Rubicon Minerals Corp.	Director of Operations	Claude Bouchard		claude@rubiconminerals.com
20	Stillwater Canada Inc.	General Manager	Stan Emms	807-285-4272, Ext. 107	semms@stillwatercanadainc.com
21	Premier Gold Mines Ltd.	Chief Operating Officer	Paul Huet	807-346-1390	phuet@premiergoldmines.com
22	Magma Metals	Exploration Manager	Al MacTavish	807-345-6966	amctavish@magmametals.ca
23	Osisko Mining	Site Services Manager	Erik Johansson	807-597-4481, Ext. 235	ejohansson@osisko.com
24	Rainy River Resources	VP Operations	Garett MacDonald		gmacdonald@rainyriverresources.com
25	Rainy River Resources	Director Environment & Sustainability	Kyle Stanfield	807-621-6152	kstanfield@rainyriverresources.com
26	Rockex Mining Corp.	Chairman	Pierre Gagne	807-623-0661	pierre.gagne@rockexmining.com
27	Treasury Metals Inc.	VP	Norm Bush	807-938-6961	norm@treasurymetals.com
28	Northern Iron Gp	President	B. Botha		bbotha@northernironcorp.com
29	Goldcorp-Red Lake Gold Mines	Community Relations Superintendent	Mark Vermette	807-735-2077, Ext. 5257	mark.vermette@goldcorp.com
30	North American Palladium Ltd.	Community Relations Manager	Kevin Sherlock	807-622-8833, Ext. 3012	ksherlock@nap.com
31	Goldcorp Inc., - Musselwhite Mine	General Manager	Gil Lawson	807-928-2200	gil.lawson@goldcorp.com
32	Barrick Inc-Hemlo	HR Superintendent	Roger Souckey		rsouckey@barrick.com
33	Detour Gold	Manager of Aboriginal Affairs	Leonard Rickard		lrickard@detourgold.com

A-1: Stakeholder List

Suppliers							
	Organization	**Title**	**Name**	**Mailing Address**	**Phone #**	**Fax #**	**Email**
1	Accurassay Laboratories		Derek Demianiuk	1046 Gorham St. Thunder Bay,ON P7B 5X5	807-626-1630	807-622-7571	assay@accurassay.com
2	Activation Laboratories		Ryan Mackie	217 Round Boulevard Thunder Bay, ON P7E 6N2	807-622-6707	807-622-6571	RyanMackie@actlabs.com
3	ALS Chemex (ALS Laboratory Group)		Michael Kuemmel	1160 Commerce St. Thunder Bay, ON P7E 6E9	807-475-3329	807-475-9196	alsm.thunderbay@alsglobal.com
4	Outland			627 Squier Street Thunder Bay, ON	807-345-3534 ext 224	807-346-4212	dbradley@outland.ca
5	Clark Exploration Consulting		Garry Clark	1000 Alloy Dr. Thunder Bay, ON	807-622-3284	807-622-4156	gjclark@tbaytel.net
6	Fladgate Exploration Consulting			195 Park Avenue Thunder Bay, ON	807-345-5380	807-345-1875	info@fladgateexploration.com
7	Sharpstone Geoservices Ltd. (Consulting Geologist)		Dave Hunt	76 Crown Street Thunder Bay, ON P7B 3J9	807-345-6285	807-345-9546	d21hunt@shaw.ca
8	Northstar Drilling/Cobra Drilling Ltd.			1186 Russell St. Thunder Bay, ON P7B 5N2	807-577-5399	807-577-0558	northstardrilling@tbaytel.net
9	Sling Choker Manufacturing		Hugh Paxton	387 Mooney Ave. Thunder Bay, ON	807-344-9159		hugh@sc-tbay.com
10	MGM Electric	Operations Manager	Tom Chadwick	724 MacDonell St. Thunder Bay, ON	807-345-7767	807-345-7432	tchadwick@mgm-electric.com
11	Cook Engineering (A Division of Genivar)		Dave Knutson	740 Syndicate Ave. S. Thunder Bay, ON	807-625-6700	807-623-4491	dave.knutson.@genivar.com
12	DST Consulting Engineers Inc.		Dr. Myint win BO	605 Hewitson St. Thunder Bay, ON	807-626-1312	807-623-1792	mwinbo@dstgroup.com
13	Nordmin Engineering Ltd.		Chris Dougherty	1139 Alloy Dr. Suite 224 Thunder Bay, ON	807-683-1730	807-683-1744	nordmin@nordmin.com
14	TBT Engineering		Rob Frenette	1918 Yonge Street Thunder Bay, ON	807-624-5160	807-624-5161	info@tbte.ca
15			Jeff Halvorsen				jhalvorsen@tbte.ca
	Tetra Tech Global Mining Practice		Ian McCormack	725 Hewitson St. Thunder Bay, ON	807-345-5453	807-345-8708	info@tetratech.com
16	True Grit Consulting Ltd.		Eric Zakrewski	1127 Barton Street Thunder Bay, ON	807-626-5640	807-623-5690	ezakrewski@tgcl.ca
17	Benton Resources Corp.	President	Stephen Stares	R.R. #2 3250 W. Arthur St.	807-475-7474	807-475-7200	
18		V.P.	Clint Barr				
19	Cliffs Natural Resources Inc.		Jason Aagenes	Suite 200 1159 Alloy Dr. Thunder Bay, ON	807-346-0777	807-346-0778	
20	Magma Metals (Canada) Ltd.	Exploration Manager - Canada	Allan MacTavish	P.O. Box 10628 1004 Alloy Dr. Thunder Bay, ON	807-345-6966	807-345-8377	
21	Mega Precious Metals Inc.	President/CEO	Jim Rogers	401 – 1113 Jade Crt Thunder Bay, ON	807-766-3380	807-346-0100	
22	Metals Creek Resources Corp	VP Exploration	Mike MacIsaac	329–1100 Memorial Ave. Thunder Bay, ON	807-345-4990	807-345-5382	
23	Noront Resources Ltd.	Chief Geologist	Eric Mosley	886A Alloy Place Thunder Bay, ON	807-285-4808		

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24	Premier Gold Mines Ltd.	President/CEO	Ewan Downie	401 – 1113 Jade Crt Thunder Bay, ON	807-346-1668	807-645-0284	
25	Rockex Mining Corp		Pierre Gagne	580 New Vickers St Thunder Bay, ON	807-623-0661	807-523-4221	info@rockexmining.com
26	Stillwater Canada Inc.	General Manager	Stan Emms	1005 715 Hewitson St. Thunder Bay, ON Mailing Address 357 1100 Memorial Ave. Thunder Bay, ON	807-285-4272	807-285-4276	
27	Zenyatta Ventures Ltd.		Aubrey Eveleigh	1224 Amber Dr. Thunder Bay, ON	807-346-1660	807-345-4412	
28	Intercity Industrial Supply			669 Squier St. Thunder Bay, ON	807-345-2324	807-345-7741	
29	Coastal Steel Construction Ltd.		Don VanDyk	1227 Amber Dr. Thunder Bay, ON	807-346-4491	807-346-4468	dom@coastalsteel.ca
30	Lakehead Marine and Industrial		Rod Spicer	P.O. Box 10634 401 Shipyard Dr. Thunder Bay, ON	807-683-6261	807-683-3607	
31	Peterson Machine & Supply Inc.		Paul Peterson	1171 Russell St. Thunder Bay, ON	807-623-2412	807-623-5247	paul@petersonmachineinc.com
32	Venshore Mechanical Ltd.		John Jurcik	1019 Northern Ave. Thunder Bay, ON	807-623-6414	807-623-5357	venshore@tbaytel.net
33							office@venshore.com
	KBM Sales		Peter Higgelke	349 Mooney Ave. Thunder Bay, ON	807-344-0811		higgelke@kbm.on.ca
34	Chaltrek Geological Supplies Inc.			404 Balmoral St. Thunder Bay, ON	807-577-8848	807-476-0430	jw@chaltrek.com
35	Garden Lake Timber		Sandy Smith	Box 23, Site 11 Thunder Bay, ON	807-683-5352	807-683-3731	sandygardenlake@tbaytel.net
36	Intercity Industrial Supply Ltd.		Craig Urquhart	669 Squier St. Thunder Bay, ON	807-345-2324		craig.u@intercityindustrial.com
37	Moffat R C Supply Ltd.		Rick Ongaro	1135 Russell St. Thunder Bay, ON	807-626-0040	807-626-0014	rongaro@moffatsupply.com
38	Toromont Cat		Jeff McKnight	620 Beaverhall Pl. Thunder Bay, ON	807-475-7535	807-475-3717	
39	Clow Darling Ltd.			1201 Cameron St. Thunder Bay, ON	807-623-7485		
40	Wasaya Airways (fixed wing & helicopter)		James Ward	R.R. #4, Suite B 300 Anemki Place Thunder Bay,On	807-473-1228	807-475-7013	jward@wasaya.com
41	Wasaya Airways (fixed wing & helicopter)		John Beardy	R.R. #4, Suite B 300 Anemki Place Thunder Bay,On	807-473-1228	807-475-7013	jdbeardy@wasaya.com
42	Wiskair Helicopters (helicopter)		Mark Wiskemann	520 Orville Wieben Cr. Thunder Bay ON	807-475-4510	807-473-5485	info@wiskair.com
43	Arnone Transport Ltd.		Ken Merkley	300 South Water St. Thunder Bay, ON	807-345-1478	807-343-0466	kmerkley@arnonetransport.com
44	Manitoulin Group of Companies			161 Main St. Thunder Bay, ON	807-345-6501		

A-2: Questions for Focus Group Sessions

- Do you think mining is important for this region? In what way?
- What do you think of the present level of mining activity and investment in this region?
- What opportunities do you/your organization/institution/community/municipality etc. think will open up as a result of mining activity in this region?
- How do you/your organization intend to capture these opportunities?
- What challenges come with increasing mining activity for you/ your organization/institution/community/municipality etc.? What impact will these challenges have?
- How will you/ your organization/institution/community/municipality etc. address these challenges?
- What do you think is required in terms of institutional capacity/infrastructure/governance/municipality etc. generally if there is an increase in mining activity?
- What type of employment and training programs should be addressed in the Mining Readiness Strategy?
- How can the mining industry maximize business opportunities and use of regional companies?
- How can the mining industry maximize job opportunities?
- How can the mining industry develop local partnerships and business clusters within the region and Thunder Bay?

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Monday, October 29, 2012

Time: 9:00am – 11:00am

Location: Fort William First Nation Community Hall

List of Attendees:

Name / Title	Organization
Audrey Gilbeau (AG), Executive Director/Governance	Nokiiwin Tribal Council
Tara Ingram (TI), Economic Advisor	Nokiiwin Tribal Council
Kathy Brady (KB), Mining Advisor	Matawa First Nation
Jason Paul Rasevych (JR), Economic Advisor	Matawa First Nation
Robert Ostamas (RO), Logistics Officer	Matawa First Nation
Brian Ludwigsen (BL), Consultation Advisor	Fort William First Nation

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

Do you think mining is important for this region? In what way?	
RO	• Mining is a new concept for the community and we are just learning about it. • Research has been done as mining can have an impact on the community in terms of environment, culture, and way of life. • The community wants to be part of it to know what mining is about – for instance, if there are jobs so that they can have a better life. • Work needs to be done to prepare for mining – for instance, skills.
TI	• There are impacts after the mine closes, such as environmental impacts. • There are spin-offs as a result of mining with people traveling to the mines, etc.
AG	• Agree with both RO and TI • Read an article about experience with employment in mining sector where an Aboriginal was penalized due to their criminal record. It is important to train First Nations on life skills to be ready for employment, to help them obtain their GED, to help them deal with pardons.
KB	• Social issues need to be addressed and it is important to work with mining companies to help have these social issues addressed.
JR	• Lifestyles and one's history are penalizing First Nations.

	• There needs to be a strategy to support communities – for instance, a program to get employment after what they have been through. • Dealing with pardons is a lengthy process and takes up to 5 years. People are currently going through training processes and need to sort out their pardons.
What do you think of the present level of mining activity and investment in this region?	
TI	• There is a lot of business in the region, but not sure how much of it trickles down to the community.
AG	• There have been communities that have benefitted from jobs such as line cutting, but it is not long-term.
KB	• There are a lot of junior companies, air services, camps, etc that we could be benefiting more from, but people are being flown in and out of the communities for other jobs and we are not seeing the money. • What we are seeing is minimal. • There is a lot of investment with companies staking claims; however, the jobs are being hired out. • First Nations need to be informed on who is working in their area because we are not getting much investment.
JR	• The latest City report does not take into account First Nation lands. • First Nation communities need to be informed and involved as mining companies are not aware of burial sites, cultural areas, etc. Meanwhile, we are getting our people prepared but we are lacking the money.
What opportunities will open up as a result of mining?	
AG	• Need to look at the community because First Nation communities have land claims in their traditional areas. • There are opportunities with impact and benefit agreement (IBAs), however, the partners need to be informed.
KB	• There are lots of opportunities and it is up to us to make sure we benefit. • This is a golden opportunity to get our foot in the door to bring industry and government to get involved. • If we mold it right for the communities, it is up to us to get our voices heard. • Communities want to be part of discussions to do transmission, roads, etc as they want to be part of the decision making process.
JR	• There are enormous opportunities on regional and local scale. • Need to make sure governments have respect for aboriginal rights. • Decisions need to be brought at the community level – for example, we were asked to be brought into the EA state by Cliffs, where Cliffs submitted a 40 page project description and the elders couldn't understand. People need to understand the scope of project and how it will affect their culture and traditional way of life. • How will people be accommodated? • Need to make sure environment is safe-guarded. • There should be jobs and ownership of utilities, camp, tourism, etc.
RO	• Need cultural re-vitalization projects. • There is opportunity to be self-sustaining.
TI	• There are a lot of opportunities. • There are spin-offs from mining such as restaurants, gas, etc. • There are opportunities for jobs and learning.
How do you see your communities capturing opportunities?	
JR	• Communities need to be opportunity and investment ready.

	• We know what we have and we are coming for educational payment. • Economic leakage studies need to be done so we know where the dollars are going. • FedNor is holding back on funding. • Industry needs to know that First Nation communities have the right to be consulted with. • First Nations have the right to be accommodated and have the right to refusal.
RO	• We need to work with industry and government. • It is important to protect the environment.
TI	• IBAs have different benefits for the communities. • It is important to work with a lawyer to assist the communities.
AG	• One community asked Nokiiwin Tribal Council to look at an IBA. • It is important to know what the best practices are on IBAs. • Communities have values and want respect and companies want to do what is required. • When communities negotiate IBAs, it is hard to find best practices – they are confidential and can't be shared
KB	• Treaty rights need to be recognized and followed. • Agreements can always be amended. • We need to start preparing for 10 years from now and look at the long-term benefits and for social issues. • Our responsibility is to educate people and it goes two ways – industry needs to understand the social issues. • Long-term sustainability is important. • In terms of jobs, they say in the next 10 years there'll be 100, 000 jobs – this is key because First Nations will not be able to fill in all jobs.
What are the challenges and impacts with mining?	
RO	• There are a lot of challenges in Matawa, such as social problems with the pill abuse and there were two homicides in the last year. The pressures are hitting the community hard. • Another challenge is the loss of language and culture. • Worried what will happen in these communities. Need to protect culture, our lands, and way of life. • Mining is a new concept and we do not want to miss out. • If things are going to happen, it has to be real as there is fear of what happened in Attawapiskat.
TI	• Mining companies need to understand and be educated about the culture. • There is a loss of culture and language when mining comes.
BL	• One challenge is meaningful consultation and there are challenges with construction protocols.
AG	• There is a challenge of getting people in engagement and to get them to take the jobs. • There needs to be training in order to be ready to harness opportunities.
KB	• The community is starting to realize things are happening and the community never had a large scale opportunity. • When the road comes to the community, there will be more roads to open up to mining. • Social impacts are a challenge – people will need an understanding of finance, over spending, how to cope with a family member away at the mine.

	• Educating is important especially on money management and home management. • Preserving culture is important – can have language lessons at the cultural centre. • There is a long-term impact with mining because minerals are not a renewable resource. • Need to prepare for housing and water and economic development as well.
JR	• Challenge with getting community members engaged – this comes with time, literacy, and education because mining will affect future generations. • Challenge with governance – communities need to be investment ready. • Challenge with training and education attainment as people need sophisticated work skills. • Owning infrastructure such as roads and energy – there are opportunities for communities to generate power with East West Tie. • Need to have the capacity in the communities. • Need to gain trust of the community because communities don't get meaningful consultation – there won't be a lot of trust with sneaking EA processes, etc.
How will your community / organization address these challenges?	
TI	• Education can help address these challenges
BL	• Funding is important and people are not putting funding forward.
AG	• As a Tribal Council, we coordinate with communities. • Education is important and is how we can recognize there are challenges. There are challenges with education and need to come up with ways to educate – for instance, use of technology.
KB	• We gather and share information and communities do as they choose. • We address challenges by never stopping with communication and asking for funding. • Lack of resources is huge and we are constantly contacting ministries. • Need to educate industry and government and making them accountable and make sure communities get funding.
JR	• There are different departments working with Matawa Communities. • Learning centre to help community members obtain their GED. • Community is helping community members get into trades. • Need to ensure chiefs have all the information to bring back to the communities.
RO	• There is a lot of work being done to help First Nations. • There should be a business plan to help First Nation communities. • Education is important to get people ready.
What is required for institutional capacity, governance if there is an increase in mining activity?	
BL	• We need training facilities and the capacity to train our community. • We need funding, knowledge, education. • Everything needs to be open and transparent.
AG	• Need capacity – from a Tribal Council perspective, there is a need for staff with mining skills/expertise to review EA's for communities. • Need coordination of resources and a connection with communities – not all communities are affiliated with a union or a Tribal Council. • Nokiiwin Tribal Council is acting as a hub of information to communities. • Funding is also required – the m ore you educate, the more that is required.
KB	• First Nations need to have their own expertise and they need their own expertise to give their own perspectives. However, there is no funding for this.

	• Infrastructure – there needs to be opportunities where they don't have to put the money up front. • Governance – there are challenges with reporting and there needs to be an effective way of communicating with governments in a clear manner. • Commitments – need long-term commitments for education and jobs that are out there.
JR	• Require funding to do pre-feasibility studies. • Government is needed to implement treaty rights – there should be treaty information sessions that communities agreed to share resources with these treaties. • Land is at risk and communities need to understand what they are giving up.
RO	• Leadership is required to engage with communities. • Require support from government. • There is uncertainty and mistrust – our leaders need to involve the government to work out issues because there is a lot at stake and a lot to gain.
TI	• Need to ensure everyone is on the same page. • Need capacity in the communities to get ready for mining.
What type of training programs should be addressed in the Mining Readiness Strategy?	
AG	• Common assessment is key – aligning people's personalities with their skill sets. • Need readiness training – managing money, change in family • There is a lot of training taking place in "common core". • Need to think outside the box and long-term.
KB	• Need to look toward industry for educational trust funds. • Spoke with Tlicho about logistics for training and how women were included in employment – they had fly-in laundry from the camp to these women for hemming. • The off-reserve population wants to stay informed on what is happening in the communities – there is an opportunity for off-reserve population to return and work. • How do you attract people to come back to community?
JR	• Need a regional training facility and partnerships for resources. • Need tools to screen people and guide to career paths in order to have the right match for people. • Need recruitment and retainment.
TI	• Need training for trades – environmental scientists, camp cooks, etc.
BL	• Entrepreneurship should be addressed - not everyone wants to deal with heavy equipment, some may want to start up their own businesses.
How can mining industry maximize business opportunities?	
KB	• Mining industry needs to take into account where they are doing their work. • Need to utilize corporations that are out there, or if not available, need to build one. • Recognizing lack of resources – to help with down payments and loans. • Recognizing that there will be employment and training.
JR	• Through joint ventures and partnerships. • Investing in local companies and communities. • Need to show First Nations what the various jobs are – general management, construction, etc. • Need outreach on what is available and promote programs that are being offered. • Need a coping centre to help First Nations integrate into society.
RO	• Need to focus on youth entrepreneurship. • Need to utilize NADF to provide loans and grants. • Need to have internships.

	• Suggest creating an association for entrepreneurs to share experiences and best practices.
TI	• Need to work with communities and businesses.
BL	• Conferences are a starting point, but it has to be a learning curve. • Need to find ways to maximize opportunities and how to address challenges.
AG	• Need to make members true owners – for example, Casino Rama – Lottery Corporation worked with community and provided support with the water treatment and milk delivery.
How can the mining industry maximize job opportunities?	
RO	• Maximize job opportunities through hiring policies.
TI	• Working together with region and businesses.
BL	• Involvement with colleges and universities to utilize resources.
AG	• Better campaign to make the job opportunities real.
KB	• Career fairs to campaign for job opportunities. • Need solutions – to better the person, social rehabilitation, etc. • College / university partnerships. • Job visits at mining sites.
How can mining industry develop local partnership and business clusters be developed within the region?	
RO	• They need to come to the table to discuss aspirations and create a business model to give aboriginal businesses a chance.
TI	• Need to get all key players together for a discussion / focus group sessions.
BL	• Involve the First Nation Chamber of Commerce – this is a unique opportunity to bounce ideas off each other to help people grow.
AG	• Chamber of Commerce is an immediate opportunity. • Need to better prepare First Nation businesses on procurement and merx process.
KB	• Need a place for industry to see who is out there, what is available and where they can grow. • They need to be communicating and having focus group sessions. • Communities need to know who is working in their territories. • There are changes in the Mining Act where mining companies need to let communities know if they are within their traditional territories.
JR	• Through local networking opportunities – this is where foreign investors go. • It is difficult for communities to travel to conferences such as PDAC, CAMA, etc due to lack of funds – need to use the internet to allow communities to participate online.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Tuesday, October 30, 2012

Time: 9:00am – 11:00am

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Mayor Dennis Brown (DB)	Municipality of Atikokan
Gord Knowles (GK), Community Development Advisor	Atikokan Economic Development Corporation, the Town of Atikokan
Colleen Martin (CM), General Manager	Nishnawbe Aski Development Fund
Cal Southall (CS), Councilor	Municipality of Sioux Lookout
Florence Bailey (FB), Economic Development Officer	Municipality of Sioux Lookout

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

Do you think mining is important for this region? In what way?	
FB	• Mining is important for resource sharing.
CM	• There are negative impacts to being like Fort McMurray and having everyone working there but living somewhere else • The First Nations know they're behind general population in education and skills development so opportunity exists to focus on this area for Aboriginal youth. • Need to ensure that youth are encouraged to seek education complements the needs of mining. • There is a potential to draw the region together to capitalize on opportunities, or depending on the approach the development could potentially divide the communities; opportunity is in working together to meet everyone's needs • There is opportunity to review transportation modes and make changes to increase efficiencies.
DB	• Mining is a breath of fresh air in Atikokan. • We need the jobs and people because we have the amenities. • Northwestern Ontario need to make decisions right.
GK	• Mining is a small component. Need to bring in people, money, services.

	• It is important to build the social fabric. • We need a building block to re-establish the community.
What opportunities will open up as a result of mining?	
CS	• There is an opportunity to acquire the mine. • It depends what the workforce is going to be. • Studies show that there will be 1000 jobs available in Sioux Lookout – how do you prepare that? How do you sustain for that?
CM	• There is opportunity for income and wealth creation to allow for planning for the future. • Opportunity for independence for First Nations and to address the needs of their communities. • Wealth creation leads to investment. • Need to look at other opportunities – this will diversify and create a stable environment.
DB	• Atikokan has room in schools, recreational facilities, etc, but we just need the money. • Currently working on an Impact and Benefit Agreement (IBA) to see how we can make the community sustainable after the mine. • There is a shortage of entrepreneurs. Economic development offices need to steer entrepreneurs to mining.
GK	• Opportunities are dependent on the opportunities we can bring in. • Need to start working in creative ways to work with people and bring in services in the community. • We have infrastructure, schools, water, etc – it is about selling a quality of life to people. • People are talented, but they don't have the opportunity or the experience.
FB	• Education – whether it'll be opportunities at the regional and local levels so that everyone can participate. • Education for skill sets and common core programs.
CS	• Agree with FB
CM	• There are opportunities for synergies to be created to work in partnership with others from different communities.
How do you see your communities capturing opportunities?	
CM	• Capture these opportunities by working on educating members creating awareness where opportunities are and get them into related education • Need for financial literacy courses to learn to manage money. • Hope to attract private companies to establish an equity fund to assist First Nations in accessing business opportunities. • Need to start negotiating with government to find ways to use money effectively and to create partnerships with other organizations to be most effective. • Need curriculum to get people ready. • Need to learn how to use IBAs and what the benefits are. • Need to develop strategies to use expertise from various organizations to go to communities and educate/mentor community members on • It would be helpful to have conversations with partnerships. • Need to try to communicate and discuss to get the buy-in. • Inclusivity is important up front; this project is example, it would have been more inclusive with an upfront invitation to participate rather than an announcement of a

	regional strategy development by City and one First Nation located adjacent to the City.
DB	• There are studies on national community investment. We have information on gaps present in the community and labour market. • We need the expertise to coordinate. • Getting information is important, but implementing is the next step. • In Northwestern Ontario, schools need to encourage people to be entrepreneurs. • Need to educate students when they are young.
GK	• We have partnered with 6 other communities. • Loans need to be offered, including secondary loans for business to improve. • There are programs that are not being taken advantage of. • National community investment reports have identified gaps; however, it is just finding the gap between getting information and getting what people need. • We have the land, access to capital and we just need human capital. • There is an organization need to get programs that people are interested in.
FB	• Establishing relationships to take advantage of strategic relationships. • At a local level, they need to be doing things to advance mineral exploration studies. • Need for upgrading skills in First Nations and immigration – this leads into looking at housing for people. • Need an economic development strategic plan to align people to agree what will happen in the next 10-15 years.
CS	• Sioux Lookout is on an aggressive plan. • We are in a different situation where we have no workforce – for instance, a restaurant was recently closed because there are no workers. • We are in a crisis even without mining. • We are progressing aggressively without mining. • We are lacking in retail – it is hard to attract people. • Sioux Lookout has SLAAMB (Sioux Lookout Area Aboriginal Management Board) for upgrading to where people can get an entry in an entrepreneurship. • Looking into starting a drilling school.
CM	• There is a need to bring awareness to the history of First Nations – there are a lot of people are asking what is the matter with First Nations? Why do we have to keep paying for a mistake made 100s of years ago? • NADF has had a focus on awareness at partnership events. • There should be an understanding of the treaty and related rights – people need to be educated on this before beginning a relationship with First Nations
What are the challenges and impacts with mining?	
DB	• The workforce is a challenge. • We want people to live in Atikokan and not in the camps, but we need the lots. • Need the human resources.
GK	• Need people and housing. • Need to refresh our town because it is a shell of what it was when the mine was there – housing is a number one issue and people will just live here (Thunder Bay). • Need to provide a package of quality of life to tell the public that it is worth it, with great people, and great services. • We have an aging population and we need to replace them with the younger population with experience. • Unless we are building a social fabric, we might as well be a camp.

	• Need to build a community that entices them to move there.
FB	• Looking at growth and development on what we see. • There is a challenge with addressing the growth and development. • Need to look at strategic growth. • We are recognizing that Sioux Lookout's future relies on working on a solution or these challenges.
CS	• The challenge is to want to be ready for what is going to happen. • Red Lake did not get the population they were hoping for. • Challenge is being ready enough – need to be thinking of "if this happens, what are we going to do with infrastructure, etc" • We are fortunate in our spirit and culture within the community. • Our biggest challenge is retail.
CM	• Challenge with legal regulations - Far North Act, Mining Act • Challenge with land use planning. • Challenge with equity – there are huge business opportunities but they need the management experience and equity. • Challenge with workforce – immigration versus Aboriginal population – there is a lack of strategic planning for education specific to identified future needs • There is a lack of understanding and commitment from the non-Aboriginal population to build long-term relationships; it takes time to develop relationships. • There are social issues – drug abuse is present and potential for this to increase with increased disposable income and access due to all-season roads or other new infrastructure • Need to have a plan to sustain infrastructure beyond the mining sequence • There are environmental issues – young people are concerned about what is going to happen and how mining will affect communities downstream. • Need to start mobilizing communities to work together
What is required for institutional capacity, governance if there is an increase in mining activity?	
GK	• Need government playing a larger role than now and to work with lower level officials.
FB	• In terms of institutional capacity, need education and skill development for people to participate. • Need strategic planning. • Working with municipalities to further grow a winter road network. • Working with First Nations to engage them in the process. • In terms of governance, no need for new level of governance.
CS	• Agree with FB
CM	• Should be careful not to create new organizations/structures as there are existing organizations to deliver services/training etc For example, creation of Joint Task Force seemed a duplicate and there are excellent universities and colleges that are available.
DB	• Provincial government should be taking more of a lead. • The EA process is too expensive and too long – for example, Osisko is spending $7 million on an EA. • For institutional capacity – there should be more programs in schools to encourage young people and tell them what is available.
What type of training programs should be addressed in the Mining Readiness Strategy?	

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FB	• Need life skills development, high school training, entrepreneurship, common core training. • Need university programs such as mining and occupational therapy.
CS	• We have Pelican Falls with First Nations attending. • Starting a training school. • Schools are not big enough for students – this should be part of the solution process.
CM	• Need to take the time to get all education authorities and training organizations to share information to avoid duplication and most effective use of resources • Need to track First Nation statistics better – number of students, skill sets and education already available. Aboriginal statistics are not represented properly in census data. There is a loss of important information on youth and the remote populations that is not readily available. It is important to have an inventory of existing skills and education in order to strategically plan for future training, education, skill development.
GK	• Government should be talking to educational institutions to have a discussion on the needs and steer people to a career path like mining – the municipalities shouldn't be doing this.
How can mining industry maximize business opportunities?	
CS	• Mining industry can't – we have to import all the trades people. • There is a lack of housing. • Ontario Aboriginal Housing is currently putting new houses in the area.
CM	• Mining industry is focusing on profits. It is up to municipalities and FN communities to work together to create synergies and assert rights in the region • Region needs to mobilize a skilled workforce so companies can function or they will go somewhere else. • We have the capacity, but also they need to build capacity within their businesses. • Entrepreneurs are getting frustrated with lack of skilled labour and Succession planning has not happened within these businesses so they may end up shutting down Northern Policy Institute is an opportunity to affect change within government policy
DB	• Atikokan is dealing with Thunder Bay companies and trying to get the interested – it is a challenge with the workforce.
GK	• Through awareness of services offered. • Communities are in a bubble because we are focused on our community survival and working with people like John, we see things on a regional level. • Regional companies need to build relationships with these communities. • Need to start developing real relationships now. • We are investing too much time in the planning process.
FB	• Need municipalities to look at their own RFP process. • Need to bring in contractors locally.
How can the mining industry maximize job opportunities?	
CM	• Through procurement to hire locally or regionally. • Promotion on awareness and what the needs are. • By establishing relationships.
DB	• Through awareness, education and relationships – this is what Atikokan is doing. • Some companies are secretive. • Businesses are doing a good job with meeting with council and through open houses.

GK	• Companies being secretive mean we are planning in the dark. • We don't have somebody with necessary skills and background to assess what the community needs – Atikokan is currently looking for mining advisor as right now we are working on assumptions. • Need collaboration because we are wasting time and planning opportunity.
FB	• Establishing relationships and getting to know who the mining companies are. • Example – Pickle Lake and Musselwhite Mine – Pickle Lake were promised a lot of things.
CS	• Agree with FB
How can mining industry develop local partnership and business clusters be developed within the region?	
DB	• What is happening today is good and this is what needs to happen. • Provincial government should encourage this and Thunder Bay taking the lead on planning for the region. • Need sharing on a regional level – we hope that if Thunder Bay sees opportunity that they pass it on to surrounding municipalities. • Under ideal circumstances, shouldn't the government be doing this?
GK	• Communities are fighting for their own survival. • Need to work collaboratively as a region to establish practices and having them passed onto the next community. • Need to be open and transparent to work together and push information out there.
FB	• Province and industry should not take the lead – it should be up to First Nations and municipalities. • The province is not planning and the industry will plan based on dollars. • Governments are not thinking strategically.
CS	• Agree with FB.
CB	• Agree with FB. • First Nation is losing hope in province. • First Nations are going to assert their rights to land that belongs to them. • If we are assertive as a region and get maximum benefit from the mines then when mines are gone, we will be able to sustain ourselves.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Wednesday, October 31, 2012

Time: 9:00am – 11:00am

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Armand Giguere (AG), Councilor	Municipality of Greenstone
Dina Quenneville (DQ), Executive Director	Greenstone Economic Development Corporation
Aaron MacMillan (AM), Economic Development Officer	Township of Schreiber
Jonathan Hall (JH), Clerk/Deputy Treasure	Township of Schreiber
Royden Potvin (RP), Manager	Thunder Bay Ventures
Bob Hancherow (BH), General Manager	Marathon Economic Development Corporation
Lucy Kloosterhuis (LK), Mayor	Municipality of Oliver Paipoonge
Brian Davey (BD)	Nishnawbe Aski Development Fund

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

Do you think mining is important for this region? In what way?	
RP	• In the long-term past there have been significant mines in Northwestern Ontario. • Ignace, Pickle Lake, Schreiber – historically have had a lot of "stuff" dug into the ground. Now we have 5-6 open mines. • Recently it's been major exploration – good for economic development like in Greenstone. • Exploration is a big deal. • Concerned for political "hyperbole" – mines are being opened by 2015. • To get to east of Webequie and East River, fly in is only way of getting in there and there is difficulty building access and getting heavy equipment there. • There will be mines in Northwestern Ontario and I think they're farther off than lead to believe. • Aboriginal issues are not dealt with well – this needs to be played out before investments are made. • We have mines every decade – Musselwhite in the 90s, and Lac Des Iles in early

	2000s and Stillwater in Marathon is supposed to start this year. • Major issues as a developer is lack of control over anything or even to influence a decision.
AG	• Ring of Fire is a great thing when forestry went down. • Right now we have investors out there. • If government and First Nations don't get their act together, there'll be no investors – investors are waiting. • Are we going to get together? Are ores going to stay in the ground? Are First Nations going to cross the river? – We are not focusing on getting together. • It'll be 2020 before anything happens. Everything sounds and looks pretty, but it's not.
BH	• Mining is important. When Hemlo opened in the 80's, Marathon enjoyed two industries, but when it was closed, we lost 280 workers. • Investors can't sell property and nothing is moving. • Need to get government and everybody at the same table – Northwestern Ontario needs to get together or else it'll go down to Sudbury or South America.
JH	• It is about understanding process and how community needs to understand the process. • Schreiber has a history with Inmet. • We have companies doing exploratory drilling and companies think a mine will come. • Schreiber is learning and getting the community ready.
AM	• JH summed it up
BD	• Mining causes infrastructure to be built. • Rail improves standard of living and causes employment in First Nation communities. • A lot of upside as to why mining is important in Northwestern Ontario – it brings us together as a community.
LK	• Mining won't happen overnight. • I have a lot of connections with drilling companies – they don't have competent drillers and they have to train the drillers themselves. • There is a lot of preparation for mining, but we don't have trades people – people have gone out west. • Need to start working with education. • We have lost forestry, but with mining there are a lot of minerals – we need to make sure we are ready for it. If it happens tomorrow, we are not ready. • Need people in Northwestern Ontario to work on behalf of us instead of people from Toronto or Ottawa because they don't understand.
DQ	• Everything has been said. • Government has fallen down seriously with this particular issue. • Forcing First Nation communities and companies to deal with these issues is not right – there is frustration with shareholders, communities, etc. • If government doesn't get their act together, we will lose out.
What opportunities will open up as a result of mining?	
AG	• The opportunity is growth. • Need investment readiness. • I think we are doing ok – we know they are coming but fear is they are going to go away – we need to be ready.

	• Government is doing the right thing with studies. • Municipalities are not working together – we need to fix that and fix at home before you fix influx.
BH	• Marathon has been through this before. • We built infrastructure, roads, housing, new clinic, and an OPP office – but need to be careful when you prepare these mines to come. Marathon did not capitalize. • We look around and see the opportunities and increase population. • When Stillwater opens, contractors will come in and move onto the next job site – we might be able to retain people. • We have time to prepare – need to develop skill sets through a mine centre or training centre. Need curriculum and instructors but need the students – how many people want to be a diamond driller helper? Need to get into grades 9 and 10 and tell them about mining as there are over 100 careers in mining – environmental engineers, truck drivers, drillers, etc. • We need the bodies – those looking for jobs and those in high schools. Teachers went to site in Sudbury and didn't think of all the jobs in mining such as biologists, safety, etc.
JH	• There are two problems – housing and people. • Terrace Bay is out of housing. • Schreiber is land locked – hard to accommodate people. • Schreiber's skilled labour went to the oil sands, Musselwhite, Lac Des Iles, etc. • Council is proactive in becoming ready – people would commute if mining started tomorrow.
AM	• At this stage it is about pre-feasibility. • There could be significant programs from grassroots. • If stakeholders get their act together, we can come up with a strategy. • It is important to get positioned for this investment. • There is great potential to be ready.
BD	• There are a lot of opportunities with mining. • First Nations are preparing at council level – they are developing capacity for mining and how to capture opportunities. • Local communities are doing strategic plan first and ensuring there are opportunities through IBAs and mineral agreements – businesses are getting smart knowing there are clauses in these agreements making sure that First Nations get their piece of the land. • NADF wants to get involved as an investor.
LK	• There are a lot of opportunities – we are beside Thunder Bay and we are looking to be ready for the overflow. • Education is important – people get turned off with apprenticeships – Example of someone coming to my office saying that they had to work 5 years before they got their hours and had to go to Winnipeg to get his papers. Government needs to look at apprentice programs. • Government won't allow us to put lots for homes – government said no because there is not expansion in Northwestern Ontario. Government is not allowing for expansion in Northwestern Ontario. • Need to work together for people to come work in the mine and stay here – we are attractive but need to be attractive for the working person. • We need trained people.
DQ	• We are looking to invest in SME businesses.

	• We have seen the opportunities – Example of Actlabs that has expanded in full lab. • Need to attract satellite operations. • Glad Thunder Bay took this on – Thunder Bay is the centre and this is where we align ourselves. The region will benefit. • How do we attract people to come back because we are losing people to the west? • Need to encourage private development in communities. • In terms of procurement, local companies are not ready to bid on large deals – need a workshop with SMEs to teach them on how to bid on these bids.
RP	• Opportunity for Thunder Bay and region is in regional supply area. • The transportation modes are here. • There is opportunity to structure businesses to support this. • Thunder Bay's economy is not hurting because we have wage flow earned externally with Pickle Lake and Musselwhite. We've also had First Nations move in here and the institutions are there. • Thunder Bay is a non-recession economy – more government base economy. • Idea of Thunder Bay being a bedroom community. • Don't think Ontario will change their policies. • Concerned with investing in land and development because of the time lag factor. • Timing issue on infrastructure can be put in after investment is made. • Threat is mining industry from Northeast – Timmins is close to Maquina and Sudbury enjoys different status. Timmins is a potential competitor. • Training for mining and desirability for mining and people to come up to Thunder Bay. • Northwestern Ontario population is static right now and we need to face that reality. • We need to be more attractive in many ways. People in general don't want to live in Thunder Bay – this challenge is huge. • Future of mining is with foreign workers – for example, meat cutting industry is made up of foreign workers from South America and Africa. • The problem we face is we have no labour – how are we going to attract people?
What are the challenges and impacts with mining?	
DQ	• Workforce is a challenge. • Timing the investment is a challenge – timing is about shareholder price – Cliffs is doing a pre-feasibility before making the investment. • Challenges of external factors we have no control of. • Aligning investment with reality is a problem – what do companies do without putting themselves at risk? • At the Mining Summit got to see what Webequie is doing because its right in their backyard – we have to be careful as communities to not overstep bounds and know what is out there and in what communities.
LK	• Having skilled labour and enticing labour. • We do have bodies and industry, but people are not educated. • People can do these jobs if they come back if they come back if they go to school. • A lot of people work out of the province and come back to see their family and they spend money here. • We have to work together to market Northwestern Ontario for mining.
BD	• Government hasn't stepped up to the plate – is it our fault that we don't have one of us to represent us? • We are not on the radar – Ring of Fire secretariat is not with the province but with the MNDM.

	• Federal government is not stepping up either. • Need to do some educating about working in the north. • IBA/collaborative agreements resolve things at an advanced stage – things won't happen without agreements.
AM	• Labour force is a challenge and Schreiber is thrilled with mining prospects. • Problem in Ontario is people my age packing to go out west. We turn to immigration workforce. We need collaboration with government to open up a program in Ontario to be in competition with Alberta.
JH	• Problem is the province – a lot of policies are urban centric. • There is a policy that no town sites are to be built – what happens if we have Hemlo? • Rural southern Ontario is different from Northern Ontario, but the legislation is the same. • The province needs to rethink their role.
BH	• Labour is a challenge. • From a government perspective – the EA process is a challenge. How does someone in a small community read this to give feedback? • Companies need to be environmentally and fiscally responsible. • Glad Thunder Bay is taking this on – we don't have an economy of this scale to talk about mining readiness. • Mining companies tag 10 years and have business plans for 10 years. • How do we attract supply services to Marathon or Thunder Bay? We have 135 businesses doing 50% in mining. How can we have more Moffat Supplies (from Atikokan) to Thunder Bay? • If we can't get it for our communities, let's get it for the city because we don't have critical mass.
AG	• Workforce is a challenge and government should stop over regulating us. • Need to work cooperatively. • Glad Thunder Bay is taking this on.
RP	• Small businesses in Thunder Bay are the remnants of forestry. There is a reluctance to enter into expansion – the owners are male, my age who are comfortable where they are and scared to expand and enter in a new industry and making new investments. • We need businesses transferred to younger population. • Labour is a challenge. • Political challenge – need to listen to what our leadership at Queens Park are saying and 50% of seats at Queens Park are from GTA, not Thunder Bay, Windsor, etc. Changing the political stripe is not going to solve the reality. • The idea of working together has to be there – we are not even close to coming together. • Need to talk to communities, find out what is going on and come out with an understanding.
What is required for institutional capacity, governance if there is an increase in mining activity?	
LK	• Number one is working together with institutions – not working on individual basis and this doesn't have to be political. • Need to go together and work together as Northwestern Ontario and as one organization. • First Nations need to be included to demand to the government what we need – institutional capacity, transportation, etc.

BD	• We have built a culture of going to university and not so much trades. We need to tell people that it is ok to be an electrician. We need to change our outlook and start at high school. • Governance – prior to 1982, they wouldn't talk to First Nations and now they talk to us because of Section 35 of the Constitution – we need to leverage that with municipalities. • Need senior representation on these issues. • Government has to be a big player with investing in infrastructure.
AM	• Need to have people informed to make sure people are on the same page. • Regional ripple in reality – need communication between regional mines, institutions for a collective approach to move towards the same goal. • Need to work with different institutions and regions and together for this to ripple around all over Northwestern Ontario. We just need communication and cooperation.
JH	• It is ok to be in the trades. There was no pressure when I was in high school to go in trades. • How do we develop trades programs with municipalities? • Infrastructure is under utilized in Schreiber.
BH	• Agree with everyone. • Need to get NOMA, NOAC and northern policy to help us out.
AG	• We need to work together on one common goal. • First Nations are key. • The government blew it and need to fix it.
RP	• Education and training is required – where we've fallen down is not to provide alternatives. Trades are an alternative and are not initiated through educational institutions. If mining wants an electrician they train them themselves. • Institutional is what follows, not leads. • Problems with infrastructure – not enough power and can't move around. Musselwhite is out of power right now. Geraldton barely serviced by a line and not on the grid. • Northern communities are with no infrastructure – they fly in. • There are billions to be invested to go beyond scope of work unless we have a Canadian industrial policy. • Issue with infrastructure is the idea of sovereignty – exercise sovereignty by serving people by putting roads, power, and building infrastructure in the far north. • Governance – need work together if First Nations allow us to join with them and talk with them as one voice. First Nations have a bigger political voice than smaller municipalities, but First Nations need to have the desire to want us.
DQ	• Example – approached by a junior company to be a place holder to apply for P3 Canada - $497 million for a rail line. Went through a concessionary period for First Nation asset and Ottawa said it's good but interested in $96 million. Need companies to get agreement for a line and have all the First Nations and municipalities together first before getting the money. This shows that the interest isn't there. There is a lot of money for federal and provincial governments and we can't get together to get them interested. • It takes a crisis for province to listen.
LK	• It is frustrating not to have government on our side because they will invest and gain a lot from infrastructure
How can mining industry develop local partnership and business clusters be developed	

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within the region?	
BD	• To create business clusters, need to do an event to bring people together and network. The more we expose the win-wins, everything else comes to place.
AM	• Great potential for investment. • We have hurdles and we need to start promoting awareness to work together.
JH	• Partnerships – we don't have numbers or enough voice to get on their radar. • Partner with First Nations to take the lead. • Networking – this is how to build and progress.
BH	• Partnerships and networking – answers come from within. • Need NOMA and NOAC to address issues. • We need to stand up and be accountable and more forceful.
AG	• Need cooperation – we have lots of power with First Nations on board. First Nations carry a lot of power. • First Nations should be at the forefront – we are not doing it right now.
RP	• Agree with everyone.
DQ	• Remove "king of the hill" mentality and we all come together. • First Nations has a lot of power or maybe we need to sit and listen.
LK	• Agree with everyone. • Did a presentation and Minister thanked for presentation because we presented issues and presented a solution. • Government wants what the solutions are going to be.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Tuesday, October 30, 2012

Time: 1:00pm – 3:00pm

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Michael MacIsaac (MM), V.P. Exploration	Metals Creek Resources
Scott Jacob, Manager (SJ), Community Relations	Noront Resources Ltd.

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

Do you think mining is important for this region? In what way?	
MM	• Mining is important for the economy and for jobs. • In the 1980s mining was important for the region. • Over the years, money went abroad and now exploration is back. • Mining is also good for secondary jobs.
SJ	• Agree with MM. • Our company is trying to get the government to step up and address issues. We need government to realize that they have a lot to gain. • There is potential and need to invest in training programs. • The challenge is educating communities.
What opportunities will open up as a result of mining?	
MM	• There are opportunities for a skilled workforce – people will want to come up here.
How do you see your communities capturing opportunities?	
MM	• With a vibrant economy, synergies can happen. • Between Sioux Narrows, Rainy River and Coventry are building a synergy to use infrastructure – without them, we would miss our goal. • Need to think longer term because environmentally there'll be less impact if infrastructure is there to use.
What are the challenges and impacts with mining?	
MM	• There are two big challenges: 1) Ring of Fire area with educating communities and transportation. With transportation corridor a lot would happen – need federal and

	provincial government on board. 2) Communities – need communities to be on board. • It is important to have First Nations part of the company to have trust
SJ	• Communities hear in the past that this will eventually happen – this is a challenge for people to accept it is happening and to prepare and this is why we are hiring now. • Need to educate people in communities on the regulatory process and on terms of reference – educate people that this is the process and they should be encouraged to take part in the process. • Challenge of communicating with news releases from companies. • The need to get people to understand is a challenge itself.
How will your company address these challenges?	
MM	• By going back to the communities. • Hire a consultation company – suggest getting First Nations to start their own consultation company to get the trust of the communities. There is an invested interest. • Infrastructure is tough because companies have to show government that it will pay for itself in the long run – there is talk about having a toll road.
What is required for institutional capacity, governance if there is an increase in mining activity?	
MM	• Mining companies want to fund everything themselves. • Problem now is market and the market is bad right – it is difficult having companies fund things themselves. • Not sure of an answer – how can banks get on board to fund the project and government help fund? • Power is a big issue as well – a provincial issue. Northwestern Ontario produces cheap power and with no capacity – this is why Cliffs is going to Sudbury for this.
SJ	• Should have a study where government, industry and proponents come together to address for infrastructure, roads, etc. • Address challenge on how First Nations want to be a proponent on infrastructure. • In terms of power – spoke with Ed Collins about having power to go up to Ignace transmission corridor. • There is time to get First Nations involved and strategize on how we can get governments to invest.
How can the mining industry maximize job opportunities?	
MM	• Try and get drilling companies with apprentice programs. • Once mines are running, can get a lot of training – for example, Musselwhite Mine have a specific number of First Nations to be trained. • Another problem is education. • Need apprenticeship programs for communities – there is opportunity with drilling companies. • Training is important – need to train field technicians and geologists. • Need to get people interested in projects – go to communities and explain the process, how it works and people begin to get interested.
SJ	• Investing in training programs is key • Through training programs – Webequie First Nation has a diamond driller program for 7 weeks. • Need job training – the college and Noront are speaking with drilling companies of where to place people. • Noront has a comprehensive training proposal with KKETS – colleges throughout

	the country to train First Nation communities. • Challenge with Eagles Nest project is filling in the gaps – every project faces a labour shortage and need the manpower to get projects off the ground. • Need to invest in human resources in the area.
How can mining industry maximize business opportunities?	
MM	• Need to make a concentrated effort to use local companies – this is important to use local people and local infrastructure.
SJ	• The strategy is aboriginal inclusion – need to see what their needs are. • Need a procurement strategy – encourage companies to talk to First Nation businesses and communities. • Communities are interested but don't have capacity. • Companies are slowly understanding that these are the best opportunities – this is not just in Thunder Bay but in Northwestern Ontario. • Industry can be extraordinary with opportunities, but need the money.
How can mining industry develop local partnership and business clusters be developed within the region?	
SJ	• Need to partner with locals and people are interested from the communities. • People move out because there is lack of infrastructure – housing, health services, etc. • Need to partner with First Nations and Métis – these are newer ideas that are coming out.
MM	• A lot of that can start with research – technical research to get a mining centre of excellence. From this, will see spin-off in Northwestern Ontario. • Need research done at the university. • With research, you get training.
Other Comments	
MM	• Big thing is getting government on board and getting communities on board, especially with infrastructure. • It is equally important to get communities to come together as one. • People don't realize the long process to get projects running – there should be education for public on this. • First Nations need to be move involved.
MM SJ	• Mining companies are impatient – companies go in communities and expect things to happen. • Companies want to strike while the market is hot. • Companies are impatient because of shareholders – the challenge is balancing that with addressing the communities. • Communities want to see jobs and opportunities – suggest taking the time to spend with communities and explain to them the opportunities.
MM	• Another problem is that people involved are from Southern Ontario – need the Northwestern Ontario culture to get communities on board. • Need a long-term approach
MM	• What we are doing now is good – this is getting people more focused. • Need to create momentum to get people talking about it. To do this is to get government on board which is tough because government is in deficit. • Communication is key which is what you are doing.
SJ	• I've been interested in this since it was announced because the region will see a lot of benefits.

	• There is a lot to gain from these exercises. • Overall this is good – the challenges are there but there are people in place to adjust challenges.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Tuesday, October 31, 2012

Time: 1:00pm – 3:00pm

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Jim Garber (JG), Manager of Exploration	Metalcorp Limited
Kevin Sherlock (KS), Community Relations Manager	North American Palladium – Lac Des Iles Mine
Christine Sibley (CS), Regional Human Resources Manager	North American Palladium – Lac Des Iles Mine
Erik Johansson (EJ), Site Manager	Osisko

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

Do you think mining is important for this region? In what way?	
JG	• Mining is important – has significant economic development. • Economic benefits are tremendous in the years to come.
EJ	• Anyone who is familiar with Northwestern Ontario knows it was the forestry industry. • Now mining is the next best thing and forestry has filled in the gaps in the mining industry.
KS	• Would like to touch on First Nation and Métis involvement to development capacity – this is a challenge for them and for industry. • Lac Des Iles absorbed forestry people – skills are changing from open pit to underground mines. • Need skills for the Ring of Fire. • Mining is very important but there is a gap from forestry. • Mining is a cyclical business – need to look at transferable skills when talking about education so that people find work.
CS	• Mining assists communities that service mines. • There are successful business ventures. • Mining is important with its infrastructure – want workers to live in communities in which we are operating – more transient with housing, schools, etc. Thunder Bay

	can expand quite quickly. • Housing is difficult as it is.
What opportunities will open up as a result of mining?	
EJ	• There will be economic growth for Thunder Bay, Marathon, Atikokan – there are 13-14 projects in the pipeline. • Opportunity for businesses to shift from forestry to mining. • Opportunities for communities are huge.
KS	• Key for Thunder Bay is to develop a support / procurement. • Thunder Bay needs to position itself as a supply centre and as a training centre to identify gaps and training. • Think about long-term benefit to train local people. • Think of Thunder Bay as a bedroom community – people commuting on a regular basis for other services / mines.
CS	• Opportunity for sustainability to work with established organizations to service and move product – this can be done through Joint Ventures (JV) with First Nations in the area. • The region is getting used to camp life – the airport is getting busier. • There is potential growth for the city and surrounding communities.
JG	• Towns and communities can develop and grow as there are service and supply opportunities for drill rods, tires, etc. • There is an educational factor – need training. • We are short of geologists – got foresters and trained them. • Opportunities can spread to groceries, restaurants, etc. • Concerned about transportation – losing rails which is important to mining industry. Need to take advantage of it instead of removing them – this may be an opportunity lost.
What are the challenges and impacts with mining?	
KS	• Transportation is a challenge. • Power / energy is a challenge for mines – we are ramping up and we need to start looking at solutions. • There was an idea of the Cliffs smelter but under capacity of power was a problem and need to look to government. • JVs with First Nations are a possibility. • Energy / power needs to be spread to remote locations – many small communities are often diesel run. • Need to come up with reasonable price and accessible power – with less environmental impacts • Need the social fabric to want to maintain the viability of our small communities.
CS	• Challenge of the socio-economic impact of people with disposable income – find First Nations moving off reserve which has an impact on culture. We need to be mindful and making sure you balance work and culture. • Challenge of integrating outside people into local areas – different culture in the city with prices rising and need to be mindful because people will change.
JG	• Challenge with maintaining people. • Lakehead University has good staff and college is doing well assisting students. • Need to think about bringing people in from other countries. • We have lost a generation of people – geologists were contracted and go one once contract is done. When there are no jobs, people become carpenters and people are lost in the industry.

	• Junior companies are struggling due to upswing and economy. • Having difficulty fitting people in job slots; however, on the other side you have keen graduate with no experience. The new generation doesn't know what to do. • Challenge of keeping processing plants here – if we want to keep industry and processing plants, we need power.
EJ	• Challenge of speed of projects are going – 30 month construction window. • Process is long and we need to persevere. • Challenge of not enough people and lay-offs – schedule and workforce is going to be huge
What is required for institutional capacity, governance if there is an increase in mining activity?	
CS	• Infrastructure is going to be huge with a huge impact – volume of traffic, people, and product will grow exponentially. Infrastructure broke down during flooding. In terms of traffic, need a busing system to support changes. • Governance – what is important is that members of Chamber of Commerce be in tune with the communities – need to ensure there is communication with citizens of the area. • Institutional capacity – unfamiliar how doing that and not sure how we're structured.
JG	• Infrastructure problems – know that Nordmin looking for suitable office space for their staff.
EJ	• Institutional capacity – know that there are line ups at the hospital for a couple of hours waiting period. • Infrastructure – roads and rails are at a level that are acceptable now, but if ramping up of capacity there will be problems. Highway 622 in Atikokan is experiencing traffic volumes. • Governance – there is talk of closing down DFO in Thunder Bay which was our main contact and now can't ask them direct questions about the region.
KS	• Example of infrastructure — Alberta Construction Association don't drive on Highway 63 in Fort McMurray anymore because it is not suitable. • Institutional capacity – need to start to understand resource industry. Mining companies are resilient and need to allow for adjustment. • For training, need to start having universities put on industry programs and to time it well so that industry can have these students when they need them. • Need to start JVs with First Nations not just have them work as drill helpers, for example. First Nations are well positioned to train for mining. • Need to think about who do you train, how do you train, and for how long? • Infrastructure – rail, roads, ports – economics works with rails. Thunder Bay port is gearing up to carry heavier loads and that power is important for everyone. • Big mining companies look at Thunder Bay and will go somewhere else if they don't have what they want – need to be proactive. Also need to be positioned and consistent to give what industry wants. • Governance – First Nations is an on-going situation. Need to think about how government works with them and industry as well as how it will impact them – bad for industry if they don't know how to interact with First Nations. • Need provincial and federal input for infrastructure on Ring of Fire.
What type of training programs should be addressed in the Mining Readiness Strategy?	
JF	• At the very least at universities here, professors are already doing a lot and know what they're doing. • Colleges need to train as well – plumbing, human relations, trades, etc. They need

	to be ready for when they're needed because it will be now. • There needs to be continual though – economy is changing, forestry is gone and now we have medical programs. • Whoever is planning, they need to keep in mind what is happening here.
EJ	• University has good geology program – we have Lakehead University graduates working on our project. • Beyond geologists, not sure what discipline is required. • People need to be at school now for when projects are here. • Need trades from colleges – there are no skilled trades now. If they are not working here, they are out west. • College here is on right track – just need students to be out when projects are here.
KS	• There is good infrastructure for distance education at colleges and universities here. • Need training centres through agreements with First Nations groups, colleges, etc. • Mining industry has to trust training – this is a good thing. • Training centres create good buzz – if we train them ourselves we know they're good. • Any training we do has to be recognized – maybe these should be sponsored by industry. • Need JVs between First Nations and companies to access contracts, whether they are competitive or preference contracts – For example, First Nations set up 51%/49% businesses and provide access to bidding. Need transferable skills – create skill sets that are not tried to specific industries. • Stillwater is talking to ministry to gear up to hire people. We need to stand as an industry because we are all fighting over the same people.
CS	• Agree that mining needs to trust training – training has to be recognized by people by people doing the job. Know that the Haileybury School is well regarded. • There is a gap that is prominent – we have senior individuals and a green group and there is nobody in between. What we trained boomers is not what new millennia people need – they are different and work at a faster pace. These are challenges because we have a gap. We have highly educated young people with masters filling in senior positions but have no experience. • Need operations workers. • Population is decreasing and need to tap into females and First Nation communities. • The university is doing a good job with profession group right now. • Need to change image of mining – selling technology and what people are going to learn. • Need to start looking at apprentice programs.
What can the region do to develop supply/service sector?	
EJ	• There was a manufacturing consortium to bid on oil sands – this needs to be looked at in the mining sector. • There are no North American manufacturers – look to Europe for these services when these can be done locally.
KS	• To be successful is to be consistent – need to set up store front here. • Need to encourage local businesses and supply. • In the first 8 months of 2011, dealt with 283 businesses in Thunder Bay and know they can bring in local businesses to the mine. • Thunder Bay and the region should get in touch with industry. • The resource industry is key to Thunder Bay.
CS	• For services, I see hospitality sector to pick it up – there is not enough hotel space

	and it is taxing now because there is a lot of traffic.
JG	• From exploration perspective, do not see much opportunity now – there are no changes because we can get what we need within 24 hours. Drillers know what they need here or in North Bay. • Challenge with hospitality – no food services and hotels because they are busy. • Little opportunity for exploration.
How can mining industry maximize job opportunities?	
KS	• Opportunities for partnerships – cheaper to have local labour. Need to train people now to establish a career now. • Need to link what is being trained and what is needed. • Get local communities to supply what we need.
CS	• Challenge of transporting people – we are flying people back and forth to Toronto and this is a detriment. If we are servicing the North, need to look at what airlines service Thunder Bay. • Start partnering with universities – need apprenticeship programs. • Need succession planning. • Need to carefully plan rotations because people get tired of the camp life – it is a different life and can't expect people stay at the camp forever.
JG	• Get local employment and maximize on that. • We have people commuting from Toronto. • Need to start hiring from local communities – we want to better our communities. • Can't always get professionals – there is no better way to do it than hire locally.
EJ	• Example of camp life – we have driller contractors can't get drillers to come back because the internet connection wasn't good enough. Need to fix telecommunications.
How can mining industry develop local partnership and business clusters be developed within the region?	
CS	• Partnerships with education, First Nation groups, industry itself because the era of going it alone is gone – need to work together as an industry. • If Ring of Fire takes off, we are mining for 120 years – think about sustainability and we can't do it alone. • The millennia group is socially conscious – attract them in the industry by saying you do your job, make a difference and work in the community. That's why partnerships are important – this is the longer term vision.
JG	• Not sure if I understand partnerships – I have seen First Nation groups partner with driller companies and the relationships fail. • Gain trust with companies you've worked with and done a good job – not sure how partnerships work and not sure how to understand because we are competitive. • Partnerships – City of Thunder Bay is partnering with Fort William First Nation – First Nations have certain strengths and advantages to become powerful working together.
EJ	• Agree to a certain extent – right now we are locked in with a 49/51 partnership. The operator on the machine didn't have experience – this is the frustration with partnerships. • Need trust and know industry and what the industry needs. • There are a wide range of partnerships.
KS	• The industry works to strict timelines – we need goods and services in a timely fashion. • Need to take advantage of opportunities of any situation – through

	entrepreneurships. • Focus on corporate social responsibility – to attract investment and make sure you do it right and above and beyond. • Local partnering – create sustainable partnerships to continue when you're gone. Sustaining and building their group and diversifying. We have the ability to plant the seed at one project and let it grow and there is an opportunity to turn it into a sophisticated supplier able to help you on the next project. • The workforce grows when partnerships grow because companies talk to other First Nation communities – they grow and benefit from one partnership to the other partnership.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Thursday, November 1, 2012

Time: 9:00am – 11:00am

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Jamie Taylor (JT), Initiatives Officer	FedNor
Peter Hinz (PH) Team Lead, Exploration and Mineral Development	Ring of Fire Secretariat, Ministry of Northern Development and Mines
Paul MacInnis (PM), Northern Development Advisor, Regional Economic Development Branch	Ministry of Northern Development and Mines
John Guerard (JG), Thunder Bay Area Team Manager, Regional Economic Development Branch	Ministry of Northern Development and Mines
Harold Wilson (HW), President	Thunder Bay Chamber of Commerce / NAOCC

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

Do you think mining is important for this region? In what way?	
JG	• Mining is important in many ways.
JT	• Importance of mining is laid out in the objectives of this project.
What opportunities will open up as a result of mining?	
JG	• There is a focus on companies in Ontario, especially in the Sudbury/Timmins area. • With the size of mines and developments, there is potential for investment for larger firms. • Need infrastructure to create jobs. • Opportunities for existing firms to set up shop.
PH	• There are potential developments – open region to further exploration and development. • Need to start encouraging mineral wealth as we have significant needs – supplies, labour, etc. We will see an influx.

	• If municipalities have the budget, we can have the mines. • Communities need to promote themselves and be mining ready. • Never seen the level of activity as it is now and we need to position ourselves as a mining community – communities need to take advantage of it now.
PM	• There are service and supply opportunities – not just for Ring of Fire, but need to include all different locations. • There is a boom – similar boom with services and suppliers. This makes the community stronger and broadens community's perspective – switch to mining. • Exploration – get in million dollar projects. • There is an influx in Greenstone – revived community and gave opportunities to smaller communities. • Fort William First Nation has capital and need to figure out their options to help them grow.
JT	• Having big companies as the catalyst for infrastructure development. • Mining opens opportunities for development
HW	• It is about potential and seeing these things through. • Opportunity to seeing these things come to fruition – Stillwater, Osisko – these need to get going and this is where the opportunities are. • Junior companies should raise funds – are they able to get project to opportunities? • Would be wonderful to be world leaders in research – there is a new scale development and projects. • Need to do it right with First Nations through strategic partnerships, development and will have relations and success to build on. • Need to solve changes to get to the remote areas and to get supplies up there and to keep on going. • Thunder Bay is doing a good job of being the regional hub – what is good for the region is good for Thunder Bay. Thunder Bay has to help smaller communities to grow and support them.
What are the challenges and impacts with mining?	
PH	• Challenges are 1) Labour because of need for skilled labour – 90,000 skilled labour to service industry; and 2) Infrastructure – a mine in a remote area is significant for the Ring of Fire. We can have projects but don't have labour and can't supply infrastructure. • Ear Falls had a rail, but it got removed. • Thunder Bay should look at long-term infrastructure needs. • Transportation is huge – we have a port which could be a great advantage, granite blocks which are produced in the Kenora-Vermilion Bay area are not moved through the port of Thunder Bay nor by rail. This needs to be studied. • Need consideration for transportation costs and what can be done to use port and rail.
PM	• Infrastructure – roads, power, telecommunications. • Roads are an easy fit with lots of experience in it. • Need rail lines and services to come into Thunder Bay. • Look at where developments are going – Red Lake, Atikokan – they need promotion for assistance to build infrastructure. • Need alternatives and different infrastructure as well as alternative access to these mines – look at alternatives that can be focused on to build the region. • Need more cooperation within the communities – need push of "let's all work together."

	• Need JVs to make opportunity to work together – still a challenge because communities still back out.
JT	• Main challenge is collaboration piece between federal government, provincial government and First Nations – even within each group. • There is room to improve – long-term planning is not going happen because things are based on what's happening today. • Need a mindset change. Outline how to work together and the benefits of working together as a common goal. • Need to encourage collaboration to be successful.
HW	• Spoke to Premier to articulate vision of end state – infrastructure with roads, telecommunications, etc. • Need to know how it is balanced and what the goal is. • Need to find solutions to these problems – it's not there right now and needs to be articulated from the top. • Need to expedite approvals and work through how it's going to go. • Don't want to do 2 years of development and then have government involved – government needs to get involved at the beginning. • Infrastructure investment – need to articulate what it is. • Need environment and partnerships to encourage this business development. • Challenge is Noront vs Cliffs – it is best to have both to maximize alternatives otherwise you have dividing of support. • If infrastructure is properly done, there could be more exploration. • Thunder Bay will have a challenge if they don't have people on board with experience to plan for growth – need to know city challenges and can they handle it? • Need to change culture and hire what you need.
JG	• People are not focusing on what happens when mines close – you see this in the EA process. • Challenge on capitalizing on infrastructure and thinking long-term because these won't last forever – 15 years from now, we might be another Atikokan. • Need long-term thinking – people do not believe what's coming down the pipe. • It is hard for people to think long-term and maximize on investments.
What is required for institutional capacity, governance if there is an increase in mining activity?	
PM	• Institutional capacities – need lots of focus and talk for need of training programs. Do we have a sector in college for mining? Need to catch up from institutional side. There is a lot of sitting and waiting to promote. • Institutional capacity – there is not a push at a younger age for opportunities out there – NADF has package to bring mining into schools. Need to start young to get kids in the industry. Need to see what level of training is, what funding is required and what the return is. Training is available, but need commitment from company to hire them – companies can't access funding because they can't guarantee a job. There is also no availability of information on who is training which doesn't help. Lots of people are trained and not accounted for. • Governance – need the top-down method. Need support through all levels. We are better doing calls between branches and going together as a group, but we need to have workers and decision makers there at the table. • Need work going on with communities and moving forward. • Need to get all governments moving in the same direction and keeping each other informed.

A-3: Focus Group Session Notes

JT	• Institutional capacity – opportunity to have leadership role at how it'll be addressed as a region. Need to work together instead of competing. Coordination is key. • Need to be open to new models in terms of training – need to think outside the box.
HW	• Institutionally there needs to be coordinated relations. • Want to see deliberation discussions to work on strategy. • Glad Harvey Yesno is the Grand Chief and see this as an opportunity because he has worked with us before and has a vision. • Governance looking at expenditure control and investments – MNR needs to resource to give approvals which affects investments. Need to start seeing connections, but need to see articulations to represent Northwest Ontario and push opportunities. • Need succession planning in government – they go to businesses and elsewhere. How can we handle things?
JG	• Government can do a better job at keeping each other informed and updating people, especially the public. • Taking on these opportunities is more than everybody's day job – matter of available and a quick turnaround are a limiting factor.
PH	• Institutional capacity and infrastructure need a plan. • Need collaboration of three levels of education to come together and get kids to understand the opportunities. • Need a broader way of sharing information. • Same with infrastructure – province and Thunder Bay are thinking and short decisions are being hampered decisions. • Need vision as to what infrastructure is important for development. • Governance – JG's point is excellent – we are our own worst enemy – we need positive communication on what is happening, what the government does and how we do it. We are dumping more on fewer people because of deficit and budgets. • Need communication on what governments do to tax payers.
What type of training programs should be addressed in the Mining Readiness Strategy?	
JT	• Need to look at different models and not just traditional models. • Look to First Nations – they propose different ways to train. • If things are not working, look for what does work – look at results to see how to make it together. • How do we target youth and women in these programs?
HW	• Get private sector engaged. • Need to fill in the gap which is training – give incentive to see these things through. • Approximately 50% First Nations work on mine and not everyone wants to be on the mine - there are lots of opportunities in supply and services. • Need to be strategic to place students in co-op so they can work and see how they can be employees and eventually get hired. • Need JVs with communities. • Need to plan today to identify students so they can go into mining, ancillary, supply, etc. • Need to look where we want to be in 15 years. • Need to have work placements in universities / colleges.
JG	• We are not going to have the workforce in enough time – people retire and jobs are needed – construction is different than operation. • We are competing against oil sands and other major projects. • Need to think long-term. Opportunities are across the board – don't need to be a

	miner, can run a restaurant and people don't realize that. • With increase level of economic activity it will bring opportunities in housing, health, and infrastructure – will have to look at influx of immigration for labour.
PH	• Need to understand First Nation culture – there is an opportunity to work with the new Grand Chief of NAN. • Need to collaborate on how to address these types of programs – for example, losing people in program because of 2 weeks in, 2 weeks out because they are not used to leaving their families. • Think about how to deliver programs to work with that culture. • GED upgrading in communities – how do you address that if in remote areas where all they may have is Grade 8? Need to address this in a matter it'll work. • Need education on what mineral industry is and what the opportunities are – accountants, etc. • People need to understand that any education you get is transferable and take it to another job location. • Thunder Bay needs to look at how to attract people here as a place to live – promote what Thunder Bay has → bedroom community area.
PM	• Need to focus on youth overall – too focused on First Nation training programs. • There are youth camps and ranger camps with an Aboriginal focus. • Need promotion to industry to assist in promoting these programs and showcase opportunities in mineral industry. • Need to get understanding in the kids. There are different stages in programs to hit the targets – need two to three tiered programs to hit target of employable people. • Need immigrants in Thunder Bay and need to promote that now – they come because there is nobody here to fill that position. Need this spin from governments, community and industry to bring them in the community. We know the wave is coming and need to prepare and train on other cultures coming and how it will benefit their area. • Need First Nation cultural understanding – even to figure out why things are shut down at certain times of the year due hunting season, funerals, etc. • Need best practices to be aware and know the culture, as well as to know what has worked and what hasn't.
How can mining industry maximize business opportunities?	
HW	• Promote and provide opportunities but not oversell – there is a fatigue on overselling. • Need to know what is keeping thinks from happening? • Need to promote and use real life examples to have them ready for growth – work on capacity building. Need to aspire at a higher level to be ready for that. • Want to see Northwestern Ontario part of the tradeshows like Mine Expo. • Need to identify capacity – talk about innovation, what's going on so we can come in and elevate the game. • Need supply and services to identify where they want to grow and promote success.
JG	• There are opportunities for existing people and inward investment. • With the Ring of Fire, Cliffs used to use large mining supply – there are opportunities for these players. • Need balance of where they set up shop. • Every community wants these jobs. • Existing companies can subcontract other companies. These companies are generally in town and are busy doing what they're doing now. These people are

	about to retire and need succession planning. • Communities need to work together to locate firms.
PH	• Marketing – regional, Thunder Bay or individual communities – for example, at PDAC, Geraldton and Red Lake had a booth. • Need Thunder Bay to target investment in region and investigated on businesses not in the area. • Need to be proactive. • Need to make a connection so companies are there to talk to each other.
PM	• Talking to companies that are out there to know what benefits they've gained. • Need to make connections so that companies are not competing, and instead making JVs.
JT	• Need to get groups to share right information together and bid on contracts together. • Get them together and get opportunities to link them together to talk about the process, marketing, etc. • How do you engage the region? • Need to get government to facilitate this to happen.
How can mining industry develop local partnership and business clusters be developed within the region?	
JT	• Collaborate and talk to each other.
PM	• Go to the Red Lake's, the Greenstone's and learn about what is needed in the mines. • Thunder Bay needs to go to these communities – to pick on opportunities and help out other mines.
JG	• If Thunder Bay is serious, you need a champion and need more than one person – need to invest in this on municipal or regional level.
HW	• Look at municipalities and planners to assess the needs of municipalities and show what you need to do – need linkages between people and recognition that people are there. • Need to get players involved and be strategic – Thunder Bay needs to be mindful.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Friday, November 2, 2012

Time: 9:00am – 11:00am

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Madge Richardson (MR), Executive Director	North Superior Workforce Planning Board
Gerry Cornies (GC), Student Success Resource Teacher	Lakehead District Schoolboard
Peter Hollings (PH), Chair of Geology Department	Lakehead University
John Hatton (JH), Director, Training & Development	Confederation College
John DeGiacomo (JDG), Proposal & Partnership Development Officer	Anishinabek Employment and Training Services

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

What opportunities will open up as a result of mining?	
GC	• There are skilled trades opportunities – machinists, welders, etc. • Opportunities for dual credits with the college. • High school students need to be focused on their decision at a young age – they need to decide their field by Grade 10. • Students are aware of mining industry in tech class so that they can go to college. • Hope for the opportunity for kids to stay in the region. • Guidance counselors now encourage for tech and push pathways to students – Tech department showcased their classroom during a school visit. • Trades like instrumentation are tough to pass and are very technical. • Trades is good for the community
PH	• Opportunity for geologists before during and after the mining process. • We have 145 majors throughout the 4 years. • Hope for more funding in the future.
JDG	• Think funding for all levels is a problem.

	• Need to look at tools that are out there already. • Information at different stages needs to be accessible so people know the occupations that are out there. • People don't understand the professions and cycles. • There is a challenge of getting information out there to others – what technology can be used to bridge that gap? Need to think of online tools and curriculum to explore cycles and profession. • We need to cease this opportunity now to populate colleges and universities. • Look at stages of cycles – construction and operation.
JH	• 1) Need to raise visibility of trades and technology. • Now we see careers in trades and technology programs are under scribed. • Trades is transferable – from power generation, road construction, transmission construction are all transferable. • Increase in tech is a good thing. • 2) Need to bring dialogue of First Nations ahead – it is real with the road blocks and IBA's are not good enough – need something more. • There is big money at stake – First Nations deserve more and demand more. • Need cultural training. • Need hotels and hospitals training because they know there is an opportunity.
MR	• We have had discussions to plan to open training centres – we should not forget the tech rooms that are already existing and active in Lake Superior High, Greenstone, etc – these should be used so that high school kids are interested. • Opportunity of people part of employee network – have service providers together to figure the gaps – literacy and basic skills to be able to respond for individual needs. • Essential skills are missing – need these to move and be competitive. • Organizations need money from the province to move forward. • Opportunity for Ministry of Training, Colleges and Universities (MTCU) for funding. • Employment Plus program – with essential skills and training. Need to know what materials are missing in mining industry and how to fill the gaps. • Labour Market Plan – multi-year plan to identify 6 projects within the region. • We are looking at all studies on human resources and the figures are static – want to compare mine cycles and map them on time continuum to have overview of occupation requirements and when. • Need ways to encourage people – come up with virtual occupation involved with mining. • Musselwhite was at the tradeshow early this year and they are using Ministry of Northern Development and Mines (MNDM) as a tool to encourage people.
What are the challenges and impacts with mining?	
PH	• Challenge with increasing enrolment, faculty, lab access – these issues are on-going. • Problem is mining companies will be taking people where they can get them. • IBA's have clauses for First Nations to be included. Might have to say in the agreement for a certain percentage of them being from Ontario.
JDG	• Funding is not an easy solution. • Need to have employers part of the solution. • If industry is part of the solution, they should be in the classroom too. • Industry is fearful of creating expectations – how can employers be engaged without making false expectations? It is hard for them to commit to give date and number of required employees. How do you get trust with industry to get those numbers?

	• If there is no plan by 2017, people will be poached and First Nations will be displeased and immigrants will be coming in. • If we don't cease this opportunity we will lose out – how do we change challenge into opportunity. • The Seven Stage Inclusion is a model for organizations to follow. There are conferences that are focused on First Nation representation. • Sensitive topics need to be discussed such as discrimination and things that happen on site – there are best practices that we can learn from.
JH	• Fear and challenge that we are not going to live up to the hype. • To get jobs, need a link to companies to get funding. • Skeptical of numbers in reports but at the mines, its multi-national and mines want experienced miners. • People are calling to get common core because that is what they're hearing they need. Transferable skills is important for this reason. • They are having a tough time even with surface drilling and it is drying up. • There are layoffs in Atikokan and they want to train them but don't have money. • We have to be ready, but how ready?
MR	• We are encountering a lot of discussions on initiatives. • We are losing experience with people retiring. • Challenges are with starting mentoring programs for higher positions and the challenge is also having time to discuss and have budget. • Challenge with time to prepare – problem with having reps from employers to be part of the process. • We are good with working together, but it's time to get it done. • Planning board and studies took hits because numbers don't match, but study shows three scenarios. • Mines now show contractions in next few years. • Operations overall are forecasted and know they are contracting. • We have to be prepared and know reality from contraction numbers to expansion numbers.
GC	• Have learned that we don't need Thunder Bay people to work – people can come from all over because of the rotation of 7 days on, 7 days off. • Mining doesn't hire apprentices. • Thunder Bay hasn't seen skilled trade shortage yet.
What is required for institutional capacity, governance if there is an increase in mining activity?	
JDG	• If we had finances, we still need relations with employers and industry. • Need trust with industry and without it, we don't know how to react accordingly. • If we know labour pool requirements, we can react accordingly. • If we have a glimpse of what is expected in the future, we can start planning. • Need communication and information with industry to act accordingly. • If we have all organizations, need common denominators to come with solutions together – for instance, at an inclusion symposium. How can we help towards a common goal?
JH	• This is a difficult question. • There is a theme of predominance of industry and not present here. • Institutionally need to engage mining companies. • Foreigners will take jobs.

	• It is important to have the Corporate Social Responsibility (CSR) piece – for instance, Kevin Sherlock is engaging schools and communities. • Need to know how to engage private sector.
MR	• Challenge of private sector having time. • Instead of having a rep of each mine, they put pressure on Mining Industry Human Resources (MIHR) and Ontario Mining Association (OMA) to talk about these initiatives – they can be the voice for industry to get things moving. • Infrastructure – communities want training centres and they don't know how to maintain them – need to look regionally and not build too much. Infrastructure is daunting. • Governance – ministry and planning boards report regionally to Thunder Bay instead of Toronto and they are responsive and know what is happening – we want MTCU office to be cutting edge and filtered from bottom up. This provides opportunity to do community planning – look at projects to come out of these discussions to help plan and how to approach it.
GC	• Institutions – education is doing what we're doing and we are ready to ramp up. • How are you going to hire local people? – get involved in committees. • Don't know what government can do to get Thunder Bay to supply employees.
PH	• Will funding answer all these questions? • Different companies are engaged at different levels – companies will in general take the lowest cost option.
What type of training programs should be addressed in the Mining Readiness Strategy?	
MR	• Unclear of different stages and what pathways are so companies are on board and when they can step in. • If industry had standards, training programs can be created to fit their standards. • What are the basic requirements to access employment sector? • Employment counselors don't know where to send people for training for their jobs. • People need to know and understand what common core is.
JH	• Having standards is a good point – I've talked to drilling companies and talk about essential skills and they don't care about literacy – they want them to drill, prepare the pump, etc. Their goal is to get the core out of the ground and use machines – this is the difference between academics and the real world. • They hire experienced miners, family and youth at Musselwhite. • There is a want for Norcat facility in Atikokan – to train all common core in the area, but it's very hard. Going to Norcat in Sudbury is useless. • Our problem with any common core is we need an operating mine. • Companies are doing it because they have to. North American Palladium's intentions are good with nearby First Nations.
MR	• MTCU needs an employer to sign off common core before they enter that person into the database. • Need to look at their requirements.
PH	• They tell us who fits in a training program. • Problem is mines don't even talk to each other – for instance, with Goldcorp, Musselwhite mine don't talk to Red Lake mine.
JDG	• There are many liability issues with the sign-off. • MTCU is putting up barriers.
How can mining industry maximize business opportunities?	
JH	• There are success stories in the region – for instance, Moffat in Atikokan. • Businesses are great for looking at opportunities.

	• We are experiencing boom from consultancy perspective – for example, Coastal Steel. • There are all kinds of opportunities – with Act Labs, restaurants, hotels. • Need to focus on things that already have happened. • If mining boom doesn't come, businesses are still doing well.
MR	• There are already success stories and organizations to assist people. • Need to identify opportunities – if someone can identify, it might spark something.
PH	• Need to make connections and get a foot in the door to have local companies. For example, the road to the Ring of Fire is done by an American company.
JDG	• Need communication with industry to look for catering. • In 2014, Stillwater will be ready to recruit – who will cater? This could be an opportunity for the region and First Nations. • It all depends on what information they want to share.
How can mining industry develop local partnership and business clusters be developed within the region?	
MR	• I think we are doing good studies toward that. • They can always be approved and look at it differently. • Women in mining is an example – recruit and encourage women to go into non-traditional jobs. • Thunder Bay multicultural association – credentials from other countries need to be easier here. • Mining is international and need to recruit from First Nations, women and immigrants – these groups need to be more involved.
PH	• We need to stop talking and start doing. • If we don't move soon, we will miss the boat. If we do, the cost is not hiring locals.
JDG	• Need to turn talk into action. • We are doing it in small ways at AETS. • Immigration is an issue with First Nations – First Nations have the capacity to be trained and are concerned of immigrants coming in – all First Nations communities are concerned about this. • For example, we are 1 of 2 to be selected to put in a proposal for $10million – even with money coming from industry; it is still difficult for the employer to identify needs like Cliffs and Noront. • Need industry to partner and communicate.
JH	• Need to define partnerships and networking. • There is a lot of talk around partnerships and not a lot of action – need results and put something in. • For the First Nation Natural Resource program – need to get $500 from Cliffs which is hard to do. • Partnerships have to be real. • There are partnerships with AETS and the College. • Oshki is partnered with Cambrian College. • Both parties in the partnership need to put something in and there has to be a benefit. • Companies don't see the need for employers yet and they won't commit to partnerships

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Friday, November 2, 2012

Time: 1:00pm – 3:00pm

Location: Thunder Bay Community Economic Development Commission (CEDC) Boardroom

List of Attendees:

Name / Title	Organization
Ian McCormack (IMC), Director, Change Management and Business Operations Mining and Minerals	Tetra Tech
Larry George (LG), CEO	George Contracting Group
Tere McDonald (TMD), President	MGM Electric Limited
David Hunt (DS), Consulting Geologist	Sharpstone Geoservices Ltd.
Michael Thompson (MT), President	Fladgate Exploration Consulting Corporation
Caitlin Jeffs (CJ), Vice President	Fladgate Exploration Consulting Corporation
Barb Courte Elinesky (BCE), President	North Star Drilling Ltd.

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

What opportunities will open up as a result of mining?	
IMC	• Opportunities for corridor business in Thunder Bay. • Opportunities for heavy industrial mining. • Knowledge based industry – we have great and challenging work for professionals and technical staff. • If the work isn't here, we will go elsewhere. • Mining is fundamental.
LG	• I am new to Thunder Bay and looking to expand on the opportunities here – we acquired a welder company. • Thunder Bay is the hub of activity and gateway to mining.
TMD	• There are fantastic opportunities. • There is a better opportunity to understand problems supply can have and support industry in the area.
DH	• We rely more on exploration than in mining. • There is a lot of capacity for people to be in exploration.

A-3: Focus Group Session Notes

CJ	• Opportunities for the exploration industry. • Flexibility is the key word – need to be adaptable. • There is more than enough to do and it is a matter of getting the work. • The word needs to get out about exploration companies.
MT	• There is opportunity to expanding to a corporate plan
BCE	• We are the first to get phone calls to do drilling. • Juniors are the ones that explore. • People need to understand that there is more than the Ring of Fire. • If we don't support junior exploration companies, there won't be mines.
What are the challenges and impacts with mining?	
LG	• Biggest challenge is with labour. • We don't have people with the mindset and skill set of mining.
TMD	• The Ring of Fire is beyond my career. • Labour is an issue. • Need for consumer confidence – need industry to be confident in Thunder Bay for supply.
DH	• Labour will be a problem in the future. • There are not a lot of geologists coming – fewer people in universities because kids are taught that mining is evil. • People are avoiding mining and engineering is a problem.
CJ	• Labour is an issue – we have hired Chileans, Africans, etc. • The City needs to attract people who want to settle here. • We need people who know how to use computers and equipment. • Infrastructure goes a long way and helps First Nations and helps them get connected to the south and gives us access to the mine. • Getting ready is knowing the steps of mining.
MT	• Infrastructure is a challenge – Quebec has plan to open Plan Nord. • Ring of Fire would be developed if we had a plan for a road – Thunder Bay would have had a smelter if the rail wasn't ripped. • Need infrastructure. • Ontario government cutting power and raising prices will not attract mines. • Mines depend on infrastructure – roads and cheap power.
BCE	• There is a problem with First Nations and juniors – this is bad and hurting juniors. • There is no revenue for juniors. • Consultants are trying to exploit First Nations which hurts the business. • Hydro, labour and First Nations are hurdles.
IMC	• Don't worry about labour – they are mobile and people will follow the money. Though, I don't disagree that labour is an issue. • Key issues: 1) Government – government reality with First Nations – need to get on with business in context with treaty and establish government and First Nations relations for certainty in the industry. 2) Investment in infrastructure – need the political will for infrastructure. Need public investment in infrastructure. 3) Hydro – currently paying New York and Michigan to take it away. Power is important as an enabler. • The City needs to understand mining companies want to come to town – for example, Osisko weren't impressed by Thunder Bay because Thunder Bay is not seen as a mining friendly community. • It is about leadership to say we are doing it and figuring the how to do this.

	• From a Mining Readiness Strategy standpoint if we're serious, we have to be important from a political standpoint – this takes political will and vision.
BC	• The problem is with the Ring of Fire – don't want it to be in Thunder Bay. • Cliffs is coming in and they don't care – they don't care about the company and not Thunder Bay. • Need to change the perception of mining – people see it as dark. • We need to welcome Osisko and Rainy River.
What is required for institutional capacity, governance if there is an increase in mining activity?	
IMC	• Ian hit it on provincial government where infrastructure is lacking. • Is mining expecting the province to develop a road to the Ring of Fire? Cliffs is seeking federal and provincial partnership like the East West Tie. A road opens up the Ring of Fire and its surrounding communities. • Maybe we as a business owners should go to the municipality for the mining sector to voice opposition. Maybe we need to be lobbyists. • Institutional capacity – with the university and college, the capacity is there. Lakehead University is developing a mining program. • Infrastructure – need competitive telecommunications services – to be ready and competitive, we need capabilities with large data package when in remote areas, otherwise we can't move large design files to remote communities. If we can't compete world class capabilities, we are not ready. • Being ready is bigger than Northwestern Ontario – need data packages to compete and build.
TMD	• Don't think provincial government is treating us differently than as it has. • There are obvious things to think about – cost of building roads is different from Southern Ontario. We need long range foresight on the province's calendar to tell them there is growth in Northwestern Ontario. • People are building on necessity than on speculation. • The province needs to understand what is going on today. • Thunder Bay sees modest growth based on speculation. • We're not being attractive either.
BCE	• This area has a lot of opportunity – I come from Timmins and this area has a lot of potential here. • I need to diversify in Dominican because I do not trust what's happening here. • Want to live in province. • We are ready to hire but there is no funding for training programs. The college needs to put on the helper program again. • We need to move forward to put pressure that we are not just the Ring of Fire. • We need to educate leaders on mining.
DH	• There is a big mindset in town that seems that they don't want this to happen. • Need leadership in municipal government to stand up and cheer for this – might help change this around. • We should be welcoming the Osisko's and offering what you can do.
CJ	• Need flexibility from municipal government. • There is a struggle sometimes working with the City. • There is a lot of room to add things to the College – the helper program was stopped because there was no funding.
MT	• There is an attitude that permeates from above that we are not mining friendly.

A-3: Focus Group Session Notes

LG	• Need roads and training. • Government should inject money in projects to develop capacity and ability. • Need to get in the field. • Government should subsidize construction costs and training.
What type of training programs should be addressed in the Mining Readiness Strategy?	
CJ	• There is a need for geo-technicians that need computer skills and GIS skills. • There is a lot of room for training. • We have hired ex-forestry people, but they need their common core modules. • There are people on waiting list to get into courses. • First Nations have developed their own training module.
MT	• This goes back to the high school level – need to tell them to go to university to be engineers and scientists.
BCE	• I did a presentation to the school board to steer kids towards mining. They said they don't want to send kids to the mines. • Need to get the students educated. • Need skilled labour because this will be a problem in the next few years. • Need to set up a system now – we have common core system but there are different modules people can get. • Young people today now feel entitled – employers are seen as the bad guys.
IMC	• Need business driven education and training programs. • Colleges are driven by program dollars • Need investments in mining training to be driven by business needs and not college dollars.
LG	• Is a big supporter of training. • Need money from government for training to be ready for industry.
TMD	• Trades will suffer in coming years due to lack of qualifications. • There is a problem with the system. • For electrical, only certain number of apprentices are allowed. • In my industry, we don't have people with education which is difficult. People don't have the same work ethics.
DH	• Need training for geo-techs. • Need technical training. • Lakehead University has good program and is really close with the industry and students come out very well trained.
How can supply and services sector flourish?	
BCE	• Supply and services can flourish through competitive pricing. • Time is of the essence – don't want to wait for a part, want it right away. • For this place to flourish, we need hydro – for accessibility and prices. • We lose revenue because people go somewhere else. • Service is key – supply shuts down for weekend when we want someone to answer you.
IMC	• In Sudbury, there is a century old mining culture in the community. • We need city leadership and legislation. If we want to grow, we need to put things in place to grow it. • Need to start recognizing the value of this sector and the fact that it exists. • Telecommunication challenges are very real. • We need to be on the ball, have competitive prices, etc. • Need to look to partner more with our colleagues in the community. We need to get

	over barriers we've built in. • For us to compete with Sudbury and Saskatoon, we need to pull together ourselves and lead on a business standpoint. • Mining sector and services need to talk to each other.
LG	• Agree with partnering for marketing and sharing bids. • Need to cross market housing, electrical, etc.
TMD	• As an independent business person, business is based on relationships. • We need to build relationships now to gain business now. • Need to create and inventory to support services. • As activity ramps up, services catch up. • Need a nucleus of independent business and need opportunity to build relationships.
DH	• Exploration runs 24/7 – if we need something, we need it right away. • Need to go regionally to get supplies if we don't get it locally.
MT	• We need less road blocks. We are always against a fight.
How can mining industry develop local partnership and business clusters be developed within the region?	
BCE	• We need to know what is out there. There is a lot of networking and people need to know we have all these opportunities. • Need to partner with the universities and colleges and need to get the school board on to expand. • Need media to bring awareness and promote mining in a positive way. Nobody knows about the juniors. The Chronicle Journal should profile companies. • Need to stop promoting Ring of Fire. • The mining community here needs to stand together and promote ourselves. • Need to expose ourselves that we are not the Ring of Fire. • Juniors are vibrant and everything will fall into place with them. However, the junior sector is suffering and people don't realize it.
IMC	• Need to develop mine services association so we can learn who is out there and get connected. This could be driven by the CEDC to introduce us to each other. • Media days are a good thing to do – For example, "This Week on Mining" on news in Duluth. • Need learning key foundations – used to teach teachers about forestry – we can do this with mining like Mining Matters – perhaps do a Mining Matters event in the community. • Need a City Council night with services companies. • In 1964, we started servicing mining companies. It's our core business. • Municipal leadership needs to hear stories like this. Until they know you're here and put in the money, they won't know us. That is why we need the Mining Readiness Strategy.
MT	• Need more committees and associations to cross market and two our weight around for us to be taken seriously. • Juniors stimulate but to get venture capital, need mines to get in place – it is a cycle.
LG	• Need partnerships – we are building on this model. • Need to get in with the right people. • Need cross marketing and relationships to find the right people.
TMD	• Mining and juniors are on top of creating business, then we go to the geologists and engineers. • Need to create an environment encompassing everybody.

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	• Need to get in arena to give us access to people who will benefit us. • If someone moves forward, we all move forward.
DH	• We're not promoting ourselves as much as we could. • At the Mines and Minerals Symposium, we have invited teachers to come 2 years in a row and we had some resistance. We need to get teachers involved.
CJ	• Need to be self organized. • Media is consistent – Chronicle Journal is aware of us when we want to put in a news release. CBC on the other hand needs to be better and should highlight a junior a week.

Thunder Bay Mining Readiness Strategy – An Integrated Regional Economic Development Plan

Focus Group Session Notes

Date: Thursday, November 11, 2012

Time: 2:00pm – 3:00pm

Location: One-on-One Telephone Interview

List of Attendees:

Name / Title	Organization
Dave Bradley (DB), Regional Manager	Outland

Discussion:

Table below outlines the questions that were asked during the focus group session with a list of responses made by meeting attendees.

What opportunities will open up as a result of mining?	
DB	• Looking at joint ventures and business arrangements with First Nation partners either with economic development corporations, individuals or communities in areas of camps and catering. • Opportunities for exploration services and training – Outland covers basic skills area, First Aid, Forest Fire Training, GPS/GIS skills, data collection, cook training. • Outland does a Summer Youth program and entrepreneurship programs.
What are the challenges and impacts with mining?	
DB	• Short term nature of mines with a 10-15 year window. • Mines are establishing workforce and no long term outlook – mines shut down and the towns roll up. • We do work utilizing local workers and there are barriers to transport them to work – the producers can afford these barriers, but for suppliers it's difficult. It is hard to keep the Aboriginal workforce going. • In my experience, it's more than teaching them how to use a chainsaw. It is about preparing them to work as the changes are complicated – change of values, change in managing families, being self-sufficient, being organized, being prepared to be away from the family, different day routine – these are all foreign to people that are out there on the mine sites. • This comes to education and what the system provides – it needs to be modified and relevant in alternate ways and conducive to learning. Education needs support from government and industry to help educate students and to help them flourish.
What is required for institutional capacity, governance if there is an increase in mining activity?	

DB	• The answer is to keep kids closer to home and it would be ideal to have the education piece at home. • Families are sending kids to Thunder Bay to go to school and the kids are not ready to be apart from home and their families. • Education needs to be smarter at handling students coming to an urban setting – there should be programs in place to get kids ready for this. • There should be a voluntary system where kids and families go because they want to go – education needs to step it up to address these needs. • Kids need to get out of the communities – seen kids and heard stories about these communities – the role modeling is negative. • Need government support and industry can help. • There needs to be a paradigm shift – the federal and provincial system needs coordination to create a new system. Kids will remain dependent if things don't change. • There is no wealth generation on reserves and it is hard for those on reserve to earn a living.
What type of training programs should be addressed in the Mining Readiness Strategy?	
DB	• Need to build values in the child. Everything goes down to youth – youth need mentoring, opportunities to learn and engage to see things, and role modeling. • If there is no role modeling and with parents that have no jobs, nobody understands what is happening and with no inspiration. • It boils down to how kids are brought up in education and they need a relative format (talking about communities near mines). • Youth need experience, awareness and role modeling built in the system.
How can supply and services sector flourish?	
DB	• It depends on the degree of certainty – projects are big and nobody knows if they're coming and when. For example, there is an uncertainty with the Cliffs project. • There is an uncertainty about land claims and treaty rights – the government should settle with First Nations to foster more certainty among players. It is not easy to buy land – it is complicated when mines go on traditional land. • The Environmental Assessment process is too long and there is inconsistency between the federal and provincial processes. Provincial process is more onerous and it needs to be more streamlined and people need to understand the EA's. This helps magnify the uncertainty. • Government needs to create a better business environment. • Need in-step goals and aspirations of communities as well.
How can mining industry develop local partnership and business clusters be developed within the region?	
DB	• Through joint ventures and partnerships with First Nations – that is what we are doing. • Business clusters suggests coordinating geographically to suit different areas – Thunder Bay will be a huge focal point especially for instance, with the port. • Through partnering with various groups. • Coordinate information and get it out to interested businesses and being fed with good information on what is going on – the Mining Readiness Strategy is smart and helpful for us and knowing what is going on and getting reliable information. Partnerships form from there. • We are services for camps and catering – we want to know that our company's information is getting to the right people. For example, we are available, but the

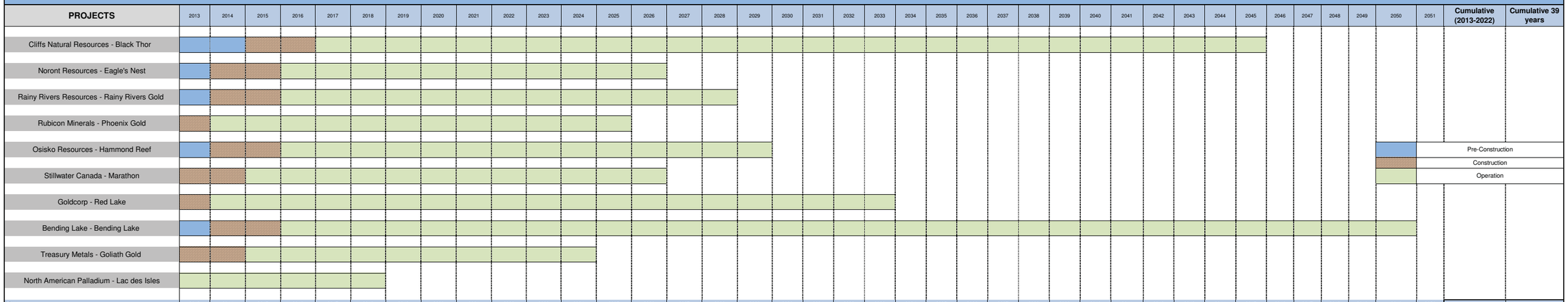
	contract goes to Alberta because nobody knows that we are here. • We need to know who is here – we need a mechanism with the city to have a list of local businesses.
Other comments	
DB	• Outland provides certain services – camps and catering, expediting, training, First Nation youth capacity. • Outland is a forestry company – help with mine site remediation. • Outland provides ice road building – road access to sites. • In terms of training, staff uses Red Cross – if there is a recognized standard, we train to that standard. • Forest Fire Training – SP100, SP101 • Brush Saw Training – 2 day course • GPS/GIS Training – provided as required – 1 to 2 day course • Cook Training – 10 day intro course to 6 week with hands on experience on site • We have been delivering a Youth Program for 13 years and have had approximately 300 youth over the 13 years. We are thinking of approaching other businesses to be part of the program so they have access to youth and can hire youth in order to get the ability and knowledge to work with youth. They become larger scale employers to work with First Nation youth. We are hopefully looking to get up to 2 camps. These programs should be all over the province.

Appendix B

Mining Project Overview

- B-1 Mining Projects Overview
- B-2 Projected Direct Mining Employment
- B-3 Projected Direct and Indirect Impacts on Employment and GDP (In Ontario)
- B-4 Median Scenario – Growth Rate Multiplier of 1.50
- B-5 Low Scenario – Growth Rate Multiplier of 1.25
- B-6 Employment Requirements Per Project
- B-7 Individual Project Information & Assumptions

APPENDIX B-1 MINING PROJECTS OVERVIEW



Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2049	2050	Cumulative (2013-2022)	Cumulative 39 years
Pre-Construction ($ in millions)																																									
Total Capex	$109	$36																																						$145	$267
Total Capex (in 2012 dollars)	$107	$35																																						$142	$263
Total pre -construction job positions																																									
Federal Tax Revenue (medium scenario)	$18	$6																																						$23	$43
Provincial Tax Revenue (medium scenario)	$14	$5																																						$19	$35
Municipal Tax Revenue (medium scenario)	$5	$1																																						$6	$11
Total Tax Revenue (medium scenario)	$36	$12																																						$48	$89
	Construction ($ in millions)																																								
Total Capex	$455	$1,278	$1,638	$544	$0																																			$3,914	$4,184
Total Capex (in 2012 dollars)	$446	$1,229	$1,543	$502	$0																																			$3,720	$3,990
Total construction job positions	**700**	**3725**	**3925**	**750**	**0**																																			9100	9250
Federal Tax Revenue (medium scenario)	$73	$202	$253	$83	$0																																			$611	$655
Provincial Tax Revenue (medium scenario)	$59	$163	$205	$67	$0																																			$494	$530
Municipal Tax Revenue (medium scenario)	$19	$53	$66	$21	$0																																			$159	$171
Total Tax Revenue (medium scenario)	$151	$417	$524	$171	$0																																			$1,264	$1,356
Operation ($ in millions)																																								
Gross Revenue	$138	$912	$1,277	$2,484	$3,936	$3,936	$3,798	$3,798	$3,798	$3,798	$3,798	$3,798	$3,656	$3,327	$2,782	$2,782	$2,730	$2,097	$2,097	$2,097	$2,097	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$1,652	$200	$200	$200	$200	$200	$200	$27,873	$80,288
Total operation job positions	**196**	**574**	**1,139**	**2,987**	**3,737**	**3,737**	**3,541**	**3,541**	**3,541**	**3,541**	**3,541**	**3,541**	**3,341**	**3,063**	**2,298**	**2,298**	**1,680**	**1,150**	**1,150**	**1,150**	**1,150**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**1,050**	**300**	**300**	**300**	**300**	**300**	**300**	26534	65492
Operation Costs (total)	$65	$213	$375	$1,147	$2,047	$2,047	$1,982	$1,982	$1,982	$1,982	$1,982	$1,982	$1,927	$1,869	$1,666	$1,666	$1,609	$1,079	$1,079	$1,079	$1,079	$988	$988	$988	$988	$988	$988	$988	$988	$988	$988	$988	$988	$88	$88	$88	$88	$88	$88	$13,822	$43,277
Operation Costs (total in 2012 dollars)	$63	$205	$353	$1,059	$1,854	$1,817	$1,726	$1,692	$1,659	$1,626	$1,594	$1,563	$1,490	$1,417	$1,238	$1,214	$1,149	$755	$740	$726	$712	$639	$626	$614	$602	$590	$579	$567	$556	$545	$534	$524	$514	$45	$44	$43	$42	$42	$41	$12,054	$31,862
Federal Tax Revenue (medium scenario)	$10	$34	$58	$174	$304	$299	$283	$278	$272	$267	$262	$257	$245	$233	$203	$199	$189	$124	$122	$119	$117	$105	$103	$101	$99	$97	$95	$93	$91	$90	$88	$86	$84	$7	$7	$7	$7	$7	$7	$1,980	$5,233
Provincial Tax Revenue (medium scenario)	$8	$27	$47	$141	$246	$241	$229	$225	$220	$216	$212	$207	$198	$188	$164	$161	$152	$100	$98	$96	$94	$85	$83	$82	$80	$78	$77	$75	$74	$72	$71	$70	$68	$6	$6	$6	$6	$6	$5	$1,600	$4,230
Municipal Tax Revenue (medium scenario)	$3	$9	$15	$45	$79	$78	$74	$72	$71	$70	$68	$67	$64	$61	$53	$52	$49	$32	$32	$31	$30	$27	$27	$26	$26	$25	$25	$24	$24	$23	$23	$22	$22	$2	$2	$2	$2	$2	$2	$515	$1,362
Total Tax Revenue (medium scenario)	$21	$70	$120	$360	$630	$617	$586	$575	$564	$552	$542	$531	$506	$481	$421	$412	$390	$257	$252	$247	$242	$217	$213	$209	$204	$200	$197	$193	$189	$185	$182	$178	$175	$15	$15	$15	$14	$14	$14	$4,095	$10,825

APPENDIX B-2 PROJECTED DIRECT MINING EMPLOYMENT

Trades and Undesignated Occupations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Labourers in mineral and metal processing	52	256	298	221	221	221	210	210	210	210	210	210	197	179	137	137	96	67	67	67	67	61	61	61	61	61	61	61	61	61	61	61	61	20	20	20	20	20	20	2,109	4,413
Construction millwrights and industrial mechanics (except textile)	49	242	282	209	209	209	198	198	198	198	198	198	186	169	129	129	91	64	64	64	64	57	57	57	57	57	57	57	57	57	57	57	57	19	19	19	19	19	19	1,993	4,168
Underground production and development miners	77	378	441	326	326	326	310	310	310	310	310	310	291	264	202	202	142	99	99	99	99	90	90	90	90	90	90	90	90	90	90	90	90	29	29	29	29	29	29	3,117	6,519
Heavy equipment operators (except crane)	35	170	198	147	147	147	140	140	140	140	140	140	131	119	91	91	64	45	45	45	45	40	40	40	40	40	40	40	40	40	40	40	40	13	13	13	13	13	13	1,402	2,931
Industrial electricians	28	139	162	120	120	120	114	114	114	114	114	114	107	97	74	74	52	36	36	36	36	33	33	33	33	33	33	33	33	33	33	33	33	11	11	11	11	11	11	1,146	2,396
Material handlers	21	98	116	86	86	86	81	81	81	81	81	81	77	71	52	52	39	27	27	27	27	24	24	24	24	24	24	24	24	24	24	24	24	6	6	6	6	6	6	816	1,715
Machine operators, mineral and metal processing	22	108	126	93	93	93	89	89	89	89	89	89	83	75	58	58	40	28	28	28	28	25	25	25	25	25	25	25	25	25	25	25	25	9	9	9	9	9	9	891	1,861
Heavy duty equipment mechanics	20	98	115	85	85	85	81	81	81	81	81	81	76	68	53	53	37	26	26	26	26	23	23	23	23	23	23	23	23	23	23	23	23	8	8	8	8	8	8	810	1,694
Central control and process operators, mineral and metal processing	19	97	112	83	83	83	80	80	80	80	80	80	74	66	52	52	35	25	25	25	25	22	22	22	22	22	22	22	22	22	22	22	22	8	8	8	8	8	8	797	1,661
Truck drivers	18	89	103	76	76	76	73	73	73	73	73	73	68	62	47	47	33	23	23	23	23	21	21	21	21	21	21	21	21	21	21	21	21	7	7	7	7	7	7	730	1,527
Welders and related machine operators	16	79	92	68	68	68	65	65	65	65	65	65	61	55	42	42	30	21	21	21	21	19	19	19	19	19	19	19	19	19	19	19	19	6	6	6	6	6	6	649	1,359
Underground mine service and support workers	13	65	75	56	56	56	53	53	53	53	53	53	50	45	35	35	24	17	17	17	17	15	15	15	15	15	15	15	15	15	15	15	15	5	5	5	5	5	5	533	1,114
Mine labourers	12	58	67	50	50	50	47	47	47	47	47	47	44	40	31	31	21	15	15	15	15	14	14	14	14	14	14	14	14	14	14	14	14	5	5	5	5	5	5	475	992
Construction trades helpers and labourers	8	38	45	33	33	33	31	31	31	31	31	31	29	27	20	20	15	10	10	10	10	9	9	9	9	9	9	9	9	9	9	9	9	3	3	3	3	3	3	314	657
Steamfitters, pipefitters and sprinkler system installers	6	31	36	27	27	27	25	25	25	25	25	25	24	22	17	17	12	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	2	2	2	2	2	2	255	535
Drillers and blasters - Surface mining, quarrying and construction	4	20	23	17	17	17	16	16	16	16	16	16	15	13	11	11	7	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	161	335
Crane operators	11	63	67	51	51	51	50	50	50	50	50	50	44	36	34	34	16	14	14	14	14	11	11	11	11	11	11	11	11	11	11	11	11	9	9	9	9	9	9	494	1,007
Carpenters	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
Plumbers	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Other trades helpers and labourers	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
																																					Category Total			16,823	35,160

Professional and Physical Science Occupations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051		
Geologists, geochemists and geophysicists	13	65	75	56	56	56	53	53	53	53	53	53	50	45	35	35	24	17	17	17	17	15	15	15	15	15	15	15	15	15	15	15	15	5	5	5	5	5	5	533	1,114
Mining Engineers	10	48	56	41	41	41	39	39	39	39	39	39	37	33	26	26	18	13	13	13	13	11	11	11	11	11	11	11	11	11	11	11	11	4	4	4	4	4	4	394	825
Industrial and manufacturing engineers	7	34	39	29	29	29	28	28	28	28	28	28	26	23	18	18	12	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	3	3	3	3	3	3	278	580
Metallurgical and materials engineers	5	24	28	21	21	21	20	20	20	20	20	20	18	17	13	13	9	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	2	2	197	412
Mechanical engineers	5	24	28	21	21	21	20	20	20	20	20	20	18	17	13	13	9	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	2	2	197	412
Other professional occupations in physical sciences	4	20	23	17	17	17	16	16	16	16	16	16	15	13	11	11	7	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	161	335
Chemists	2	10	11	8	8	8	8	8	8	8	8	8	7	7	5	5	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	80	167
Electrical and electronics engineers	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
Chemical engineers	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
Civil engineers	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
Geological engineers	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Other professional engineers, n.e.c.	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Biologists and related scientists	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
																																					Category Total			2,123	4,446

Human Resources and Financial Occupations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051		
Financial auditors and accountants	8	41	47	35	35	35	33	33	33	33	33	33	31	28	22	22	15	11	11	11	11	10	10	10	10	10	10	10	10	10	10	10	10	3	3	3	3	3	3	336	702
Human resources managers	4	20	23	17	17	17	16	16	16	16	16	16	15	13	11	11	7	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	161	335
Financial managers	4	20	23	17	17	17	16	16	16	16	16	16	15	13	11	11	7	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	161	335
Specialists in human resources	2	10	11	8	8	8	8	8	8	8	8	8	7	7	5	5	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	80	167
Financial and investment analysts	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
																																					Category Total			797	1,661

Support Workers	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051		
Inspectors and testers, mineral and metal processing	17	77	93	68	68	68	64	64	64	64	64	64	61	58	41	41	33	22	22	22	22	20	20	20	20	20	20	20	20	20	20	20	20	4	4	4	4	4	4	647	1,368
Dispatchers and radio operators	6	28	33	24	24	24	23	23	23	23	23	23	22	20	15	15	11	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	2	2	2	2	2	2	233	490
Secretaries (except legal and medical)	5	27	31	23	23	23	22	22	22	22	22	22	20	18	14	14	10	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	2	2	219	457
Transportation route and crew schedulers	3	12	16	12	12	12	11	11	11	11	11	11	11	11	7	7	7	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	108	233
Administrative clerks	3	14	17	12	12	12	12	12	12	12	12	12	11	10	7	7	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	117	245
Production clerks	3	19	20	15	15	15	15	15	15	15	15	15	13	11	10	10	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	147	302
Construction estimators	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Cooks	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Inspectors in public and environmental health and occupational health and safety	2	10	11	8	8	8	8	8	8	8	8	8	7	7	5	5	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	80	167
Engineering inspectors and regulatory officers	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
																																					Category Total			1,660	3,496

APPENDIX B-2 PROJECTED DIRECT MINING EMPLOYMENT

Technical Occupations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051		
Geological and mineral technologists and technicians	13	65	75	56	56	56	53	53	53	53	53	53	50	45	35	35	24	17	17	17	17	15	15	15	15	15	15	15	15	15	15	15	15	5	5	5	5	5	5	533	1,114
Chemical technologists and technicians	6	31	36	27	27	27	25	25	25	25	25	25	24	22	17	17	12	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	2	2	2	2	2	2	255	535
Industrial engineering and manufacturing technologists and technicians	5	27	31	23	23	23	22	22	22	22	22	22	20	18	14	14	10	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	2	2	219	457
Electrical and electronics engineering technologists and engineering	3	14	17	12	12	12	12	12	12	12	12	12	11	10	7	7	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	117	245
Mechanical engineering technologists and technicians	3	14	17	12	12	12	12	12	12	12	12	12	11	10	7	7	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	117	245
Land surveyors	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
Drafting technologist and technicians	1	7	8	6	6	6	6	6	6	6	6	6	5	5	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	122
Civil engineering technologists and technicians	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Mapping and related technologists and technicians	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Land surveying technologists and technicians	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Biological technologists and technicians	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
																																					Category Total		1,502	3,152

Supervisors, Coordinators and Foremen	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051		
Supervisors, mineral and metal processing	28	139	162	120	120	120	114	114	114	114	114	114	107	97	74	74	52	36	36	36	36	33	33	33	33	33	33	33	33	33	33	33	33	11	11	11	11	11	11	1,146	2,396
Supervisors, mining and quarrying	23	115	134	99	99	99	95	95	95	95	95	95	89	80	62	62	43	30	30	30	30	27	27	27	27	27	27	27	27	27	27	27	27	9	9	9	9	9	9	949	1,984
Primary production managers (except agriculture)	12	58	67	50	50	50	47	47	47	47	47	47	44	40	31	31	21	15	15	15	15	14	14	14	14	14	14	14	14	14	14	14	14	5	5	5	5	5	5	475	992
Contracts and supervisors, pipe fitting trades	4	18	22	16	16	16	15	15	15	15	15	15	14	14	10	10	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	1	1	1	153	323
Engineering managers	3	14	17	12	12	12	12	12	12	12	12	12	11	10	7	7	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	117	245
Construction managers	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
Contractors and supervisors, mechanic trades	1	4	5	4	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	36	78
																																						Category Total		2,912	6,095

All Other Occupations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051		
All Other Occupations	255	1,168	1,410	1,034	1,034	1,034	971	971	971	971	971	971	930	873	624	624	498	325	325	325	325	305	305	305	305	305	305	305	305	305	305	305	305	61	61	61	61	61	61	9,818	20,733
																																						Category Total		9,818	20,733

TOTALS	896	4,299	5,064	3,737	3,737	3,737	3,541	3,541	3,541	3,541	3,541	3,541	3,341	3,063	2,298	2,298	1,680	1,150	1,150	1,150	1,150	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	300	300	300	300	300	300	35,634	74,648

PROJECTED DIRECT AND INDIRECT IMPACTS ON EMPLOYMENT AND GDP (IN ONTARIO)

APPENDIX B-3 HIGH SCENARIO - GROWTH RATE MULTIPLIER OF 1.75

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Crop and Animal Production (Employment)	17	39	51	42	50	49	46	45	45	44	43	42	40	38	33	33	31	20	20	19	19	17	17	16	16	16	16	15	15	15	14	14	14	1	1	1	1	1	1	427	969
Crop and Animal Production (Impact in $ Thousands)	$758	$1,806	$2,333	$1,921	$2,280	$2,236	$2,123	$2,081	$2,040	$2,000	$1,961	$1,923	$1,832	$1,743	$1,523	$1,493	$1,413	$929	$911	$893	$875	$786	$770	$755	$740	$726	$712	$698	$684	$671	$657	$645	$632	$55	$54	$53	$52	$52	$51	$19,578	$44,424
Forestry and Logging (Employment)	2	4	5	4	5	4	4	4	4	4	4	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	39	88
Forestry and Logging (Impact in $ Thousands)	$127	$304	$392	$323	$384	$376	$357	$350	$343	$336	$330	$323	$308	$293	$256	$251	$238	$156	$153	$150	$147	$132	$130	$127	$125	$122	$120	$117	$115	$113	$111	$108	$106	$9	$9	$9	$9	$9	$9	$3,293	$7,472
Fishing, Hunting and Trapping (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing, Hunting and Trapping (Impact in $ Thousands)	$5	$11	$14	$12	$14	$14	$13	$13	$13	$12	$12	$12	$11	$11	$9	$9	$9	$6	$6	$5	$5	$5	$5	$5	$5	$4	$4	$4	$4	$4	$4	$4	$4	$0	$0	$0	$0	$0	$0	$120	$273
Support Activities for Agriculture and Forestry (Employment)	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	19	44
Support Activities for Agriculture and Forestry (Impact in $ Thousands)	$58	$139	$179	$148	$175	$172	$163	$160	$157	$154	$151	$148	$141	$134	$117	$115	$109	$71	$70	$69	$67	$60	$59	$58	$57	$56	$55	$54	$53	$52	$51	$50	$49	$4	$4	$4	$4	$4	$4	$1,506	$3,417
Oil and Gas Extraction (Employment)	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	19	44
Oil and Gas Extraction (Impact in $ Thousands)	$99	$237	$306	$252	$299	$293	$279	$273	$268	$263	$257	$252	$241	$229	$200	$196	$186	$122	$120	$117	$115	$103	$101	$99	$97	$95	$93	$92	$90	$88	$86	$85	$83	$7	$7	$7	$7	$7	$7	$2,570	$5,832
Support Activities for Oil and Gas Extraction (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Support Activities for Oil and Gas Extraction (Impact in $ Thousands)	$2	$4	$5	$4	$5	$5	$4	$4	$4	$4	$4	$4	$4	$4	$3	$3	$3	$2	$2	$2	$2	$2	$2	$2	$2	$1	$1	$1	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$40	$91
Mining (Employment)	1,819	4,337	5,601	4,613	5,476	5,368	5,097	4,997	4,899	4,803	4,709	4,617	4,400	4,185	3,656	3,585	3,393	2,230	2,187	2,144	2,102	1,887	1,850	1,813	1,778	1,743	1,709	1,675	1,642	1,610	1,579	1,548	1,517	132	129	127	124	124	122	47,011	106,673
Mining (Impact in $ Thousands)	$537,006	$1,280,287	$1,653,548	$1,361,835	$1,616,487	$1,584,791	$1,504,755	$1,475,250	$1,446,323	$1,417,964	$1,390,161	$1,362,903	$1,298,869	$1,235,403	$1,079,373	$1,058,209	$1,001,653	$658,440	$645,529	$632,872	$620,463	$556,971	$546,050	$535,343	$524,846	$514,555	$504,466	$494,574	$484,877	$475,369	$466,048	$456,910	$447,951	$38,914	$38,151	$37,403	$36,669	$36,669	$35,950	$13,878,246	$31,491,427
Support Activities for Mining (Employment)	104	249	322	265	314	308	293	287	281	276	270	265	253	240	210	206	195	128	126	123	121	108	106	104	102	100	98	96	94	92	91	89	87	8	7	7	7	7	7	2,699	6,125
Support Activities for Mining (Impact in $ Thousands)	$10,066	$24,000	$30,996	$25,528	$30,302	$29,708	$28,207	$27,654	$27,112	$26,580	$26,059	$25,548	$24,348	$23,158	$20,233	$19,837	$18,776	$12,343	$12,101	$11,863	$11,631	$10,441	$10,236	$10,035	$9,838	$9,646	$9,456	$9,271	$9,089	$8,911	$8,736	$8,565	$8,397	$729	$715	$701	$687	$687	$674	$260,154	$590,320
Electric Power Generation, Transmission and Distribution (Employment)	53	125	162	133	158	155	147	144	142	139	136	133	127	121	106	104	98	64	63	62	61	55	53	52	51	50	49	48	47	47	46	45	44	4	4	4	4	4	4	1,359	3,084
Electric Power Generation, Transmission and Distribution (Impact in $ Thousands)	$14,982	$35,718	$46,131	$37,993	$45,097	$44,213	$41,980	$41,157	$40,350	$39,559	$38,783	$38,023	$36,236	$34,466	$30,113	$29,522	$27,944	$18,369	$18,009	$17,656	$17,310	$15,538	$15,234	$14,935	$14,642	$14,355	$14,074	$13,798	$13,527	$13,262	$13,002	$12,747	$12,497	$1,086	$1,064	$1,043	$1,023	$1,023	$1,003	$387,178	$878,555
Natural Gas Distribution, Water, Sewage and Other Systems (Employment)	5	11	14	11	14	13	13	12	12	12	12	11	11	10	9	9	8	6	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	117	264
Natural Gas Distribution, Water, Sewage and Other Systems (Impact in $ Thousands)	$1,200	$2,860	$3,694	$3,042	$3,611	$3,540	$3,362	$3,296	$3,231	$3,168	$3,106	$3,045	$2,902	$2,760	$2,411	$2,364	$2,238	$1,471	$1,442	$1,414	$1,386	$1,244	$1,220	$1,196	$1,172	$1,149	$1,127	$1,105	$1,083	$1,062	$1,041	$1,021	$1,001	$87	$85	$84	$82	$82	$80	$31,003	$70,350
Construction (Employment)	128	306	396	326	387	379	360	353	346	339	333	326	311	296	258	253	240	158	154	151	148	133	131	128	126	123	121	118	116	114	112	109	107	9	9	9	9	9	9	3,320	7,534
Construction (Impact in $ Thousands)	$9,026	$21,519	$27,793	$22,890	$27,170	$26,637	$25,292	$24,796	$24,310	$23,833	$23,366	$22,908	$21,832	$20,765	$18,142	$17,786	$16,836	$11,067	$10,850	$10,637	$10,429	$9,362	$9,178	$8,998	$8,822	$8,649	$8,479	$8,313	$8,150	$7,990	$7,833	$7,680	$7,529	$654	$641	$629	$616	$616	$604	$233,267	$529,311
Food Manufacturing (Employment)	23	56	72	59	70	69	65	64	63	62	60	59	56	54	47	46	43	29	28	27	27	24	24	23	23	22	22	21	21	21	20	20	19	2	2	2	2	2	2	602	1,366
Food Manufacturing (Impact in $ Thousands)	$2,961	$7,059	$9,118	$7,509	$8,913	$8,738	$8,297	$8,134	$7,975	$7,819	$7,665	$7,515	$7,162	$6,812	$5,952	$5,835	$5,523	$3,631	$3,559	$3,490	$3,421	$3,071	$3,011	$2,952	$2,894	$2,837	$2,782	$2,727	$2,674	$2,621	$2,570	$2,519	$2,470	$215	$210	$206	$202	$202	$198	$76,524	$173,642
Beverage and Tobacco Product Manufacturing (Employment)	3	7	9	8	9	9	8	8	8	8	8	8	7	7	6	6	6	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	78	176
Beverage and Tobacco Product Manufacturing (Impact in $ Thousands)	$1,061	$2,530	$3,268	$2,692	$3,195	$3,132	$2,974	$2,916	$2,859	$2,802	$2,748	$2,694	$2,567	$2,442	$2,133	$2,091	$1,980	$1,301	$1,276	$1,251	$1,226	$1,101	$1,079	$1,058	$1,037	$1,017	$997	$977	$958	$940	$921	$903	$885	$77	$75	$74	$72	$72	$71	$27,429	$62,240
Textile and Textile Product Mills (Employment)	2	4	5	4	5	4	4	4	4	4	4	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	39	88
Textile and Textile Product Mills (Impact in $ Thousands)	$91	$217	$280	$231	$274	$268	$255	$250	$245	$240	$235	$231	$220	$209	$183	$179	$170	$111	$109	$107	$105	$94	$92	$91	$89	$87	$85	$84	$82	$80	$79	$77	$76	$7	$6	$6	$6	$6	$6	$2,349	$5,331
Clothing Manufacturing (Employment)	2	5	7	6	7	7	6	6	6	6	6	6	5	5	5	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	132
Clothing Manufacturing (Impact in $ Thousands)	$97	$232	$299	$246	$292	$287	$272	$267	$262	$256	$251	$246	$235	$223	$195	$191	$181	$119	$117	$114	$112	$101	$99	$97	$95	$93	$91	$89	$88	$86	$84	$83	$81	$7	$7	$7	$7	$7	$7	$2,510	$5,695
Leather and Allied Product Manufacturing (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leather and Allied Product Manufacturing (Impact in $ Thousands)	$7	$17	$22	$18	$21	$21	$20	$19	$19	$18	$18	$18	$17	$16	$14	$14	$13	$9	$8	$8	$8	$7	$7	$7	$7	$7	$7	$6	$6	$6	$6	$6	$6	$1	$0	$0	$0	$0	$0	$181	$410
Wood Product Manufacturing (Employment)	2	5	7	6	7	7	6	6	6	6	6	6	5	5	5	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	132
Wood Product Manufacturing (Impact in $ Thousands)	$159	$380	$490	$404	$479	$470	$446	$438	$429	$421	$412	$404	$385	$366	$320	$314	$297	$195	$191	$188	$184	$165	$162	$159	$156	$153	$150	$147	$144	$141	$138	$136	$133	$12	$11	$11	$11	$11	$11	$4,116	$9,341
Paper Manufacturing (Employment)	7	16	21	17	20	20	19	19	18	18	18	17	16	16	14	13	13	8	8	8	8	7	7	7	7	6	6	6	6	6	6	6	6	0	0	0	0	0	0	175	397
Paper Manufacturing (Impact in $ Thousands)	$783	$1,867	$2,412	$1,986	$2,358	$2,311	$2,195	$2,152	$2,109	$2,068	$2,027	$1,988	$1,894	$1,802	$1,574	$1,543	$1,461	$960	$941	$923	$905	$812	$796	$781	$765	$750	$736	$721	$707	$693	$680	$666	$653	$57	$56	$55	$53	$53	$52	$20,240	$45,928
Printing and Related Support Activities (Employment)	13	30	39	32	38	38	36	35	34	34	33	32	31	29	26	25	24	16	15	15	15	13	13	13	12	12	12	12	12	11	11	11	11	1	1	1	1	1	1	330	749
Printing and Related Support Activities (Impact in $ Thousands)	$1,195	$2,849	$3,680	$3,030	$3,597	$3,527	$3,348	$3,283	$3,218	$3,155	$3,093	$3,033	$2,890	$2,749	$2,402	$2,355	$2,229	$1,465	$1,436	$1,408	$1,381	$1,239	$1,215	$1,191	$1,168	$1,145	$1,123	$1,101	$1,079	$1,058	$1,037	$1,017	$997	$87	$85	$83	$82	$82	$80	$30,883	$70,077
Petroleum and Coal Products Manufacturing (Employment)	8	18	23	19	23	22	21	21	20	20	19	19	18	17	15	15	14	9	9	9	9	8	8	7	7	7	7	7	7	7	7	6	6	1	1	1	1	1	1	194	441
Petroleum and Coal Products Manufacturing (Impact in $ Thousands)	$681	$1,625	$2,098	$1,728	$2,051	$2,011	$1,909	$1,872	$1,835	$1,799	$1,764	$1,729	$1,648	$1,568	$1,370	$1,343	$1,271	$835	$819	$803	$787	$707	$693	$679	$666	$653	$640	$628	$615	$603	$591	$580	$568	$49	$48	$47	$47	$47	$46	$17,610	$39,959
Chemical Manufacturing (Employment)	12	29	37	30	36	35	34	33	32	32	31	31	29	28	24	24	22	15	14	14	14	12	12	12	12	12	11	11	11	11	10	10	10	1	1	1	1	1	1	311	705
Chemical Manufacturing (Impact in $ Thousands)	$1,482	$3,534	$4,565	$3,759	$4,462	$4,375	$4,154	$4,073	$3,993	$3,914	$3,838	$3,762	$3,586	$3,410	$2,980	$2,921	$2,765	$1,818	$1,782	$1,747	$1,713	$1,538	$1,507	$1,478	$1,449	$1,420	$1,393	$1,365	$1,339	$1,312	$1,287	$1,261	$1,237	$107	$105	$103	$101	$101	$99	$38,312	$86,935
Plastics and Rubber Products Manufacturing (Employment)	12	29	37	30	36	35	34	33	32	32	31	31	29	28	24	24	22	15	14	14	14	12	12	12	12	12	11	11	11	11	10	10	10	1	1	1	1	1	1	311	705
Plastics and Rubber Products Manufacturing (Impact in $ Thousands)	$1,092	$2,603	$3,361	$2,768	$3,286	$3,222	$3,059	$2,999	$2,940	$2,882	$2,826	$2,771	$2,640	$2,511	$2,194	$2,151	$2,036	$1,338	$1,312	$1,287	$1,261	$1,132	$1,110	$1,088	$1,067	$1,046	$1,025	$1,005	$986	$966	$947	$929	$911	$79	$78	$76	$75	$75	$73	$28,212	$64,017
Non-Metallic Mineral Product Manufacturing (Employment)	9	21	28	23	27	27	25	25	24	24	23	23	22	21	18	18	17	11	11	11	10	9	9	9	9	9	8	8	8	8	8	8	8	1	1	1	1	1	1	233	529
Non-Metallic Mineral Product Manufacturing (Impact in $ Thousands)	$1,124	$2,680	$3,462	$2,851	$3,384	$3,318	$3,150	$3,089	$3,028	$2,969	$2,910	$2,853	$2,719	$2,586	$2,260	$2,215	$2,097	$1,379	$1,351	$1,325	$1,299	$1,166	$1,143	$1,121	$1,099	$1,077	$1,056	$1,035	$1,015	$995	$976	$957	$938	$81	$80	$78	$77	$77	$75	$29,055	$65,930
Primary Metal Manufacturing (Employment)	6	14	19	15	18	18	17	17	16	16	16	15	15	14	12	12	11	7	7	7	7	6	6	6	6	6	6	6	5	5	5	5	5	0	0	0	0	0	0	155	352
Primary Metal Manufacturing (Impact in $ Thousands)	$859	$2,047	$2,644	$2,177	$2,584	$2,534	$2,406	$2,359	$2,312	$2,267	$2,223	$2,179	$2,077	$1,975	$1,726	$1,692	$1,601	$1,053	$1,032	$1,012	$992	$890	$873	$856	$839	$823	$807	$791	$775	$760	$745	$730	$716	$62	$61	$60	$59	$59	$57	$22,188	$50,348
Fabricated Metal Products Manufacturing (Employment)	25	59	76	63	75	73	69	68	67	65	64	63	60	57	50	49	46	30	30	29	29	26	25	25	24	24	23	23	22	22	22	21	21	2	2	2	2	2	2	641	1,454
Fabricated Metal Products Manufacturing (Impact in $ Thousands)	$1,811	$4,318	$5,577	$4,593	$5,452	$5,345	$5,075	$4,975	$4,878	$4,782	$4,688	$4,597	$4,381	$4,167	$3,640	$3,569	$3,378	$2,221	$2,177	$2,134	$2,093	$1,878	$1,842	$1,806	$1,770	$1,735	$1,701	$1,668	$1,635	$1,603	$1,572	$1,541	$1,511	$131	$129	$126	$124	$124	$121	$46,806	$106,208
Machinery Manufacturing (Employment)	27	64	83	69	81	80	76	74	73	71	70	69	65	62	54	53	50	33	33	32	31	28	28	27	26	26	25	25	24	24	23	23	23	2	2	2	2	2	2	699	1,586
Machinery Manufacturing (Impact in $ Thousands)	$3,665	$8,738	$11,285	$9,294	$11,032	$10,816	$10,270	$10,068	$9,871	$9,677	$9,488	$9,302	$8,865	$8,431	$7,367	$7,222	$6,836	$4,494	$4,406	$4,319	$4,235	$3,801	$3,727	$3,654	$3,582	$3,512	$3,443	$3,375	$3,309	$3,244	$3,181	$3,118	$3,057	$266	$260	$255	$250	$250	$245	$94,716	$214,923

APPENDIX B-3 HIGH SCENARIO - GROWTH RATE MULTIPLIER OF 1.75

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Computer and Electronic Product Manufacturing (Employment)	3	7	9	8	9	9	8	8	8	8	8	8	7	7	6	6	6	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	78	176
Computer and Electronic Product Manufacturing (Impact in $ Thousands)	$269	$641	$828	$682	$809	$793	$753	$739	$724	$710	$696	$682	$650	$618	$540	$530	$501	$330	$323	$317	$311	$279	$273	$268	$263	$258	$253	$248	$243	$238	$233	$229	$224	$19	$19	$19	$18	$18	$18	$6,948	$15,765
Electrical Equipment, Appliance and Component Manufacturing (Employment)	3	7	9	8	9	9	8	8	8	8	8	8	7	7	6	6	6	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	78	176
Electrical Equipment, Appliance and Component Manufacturing (Impact in $ Thousands)	$280	$669	$864	$711	$844	$828	$786	$771	$755	$741	$726	$712	$678	$645	$564	$553	$523	$344	$337	$331	$324	$291	$285	$280	$274	$269	$263	$258	$253	$248	$243	$239	$234	$20	$20	$20	$19	$19	$19	$7,249	$16,448
Transportation Equipment Manufacturing (Employment)	8	20	25	21	25	24	23	23	22	22	21	21	20	19	17	16	15	10	10	10	10	9	8	8	8	8	8	8	7	7	7	7	7	1	1	1	1	1	1	214	485
Transportation Equipment Manufacturing (Impact in $ Thousands)	$813	$1,938	$2,502	$2,061	$2,446	$2,398	$2,277	$2,233	$2,189	$2,146	$2,104	$2,063	$1,966	$1,870	$1,634	$1,602	$1,516	$996	$977	$958	$939	$843	$826	$810	$794	$779	$763	$748	$734	$719	$705	$691	$678	$59	$58	$57	$55	$55	$54	$21,003	$47,659
Furniture and Related Product Manufacturing (Employment)	2	5	7	6	7	7	6	6	6	6	6	6	5	5	5	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	58	132
Furniture and Related Product Manufacturing (Impact in $ Thousands)	$202	$482	$622	$512	$608	$596	$566	$555	$544	$533	$523	$513	$489	$465	$406	$398	$377	$248	$243	$238	$233	$210	$205	$201	$197	$194	$190	$186	$182	$179	$175	$172	$169	$15	$14	$14	$14	$14	$14	$5,221	$11,847
Miscellaneous Manufacturing (Employment)	5	11	14	11	14	13	13	12	12	12	12	11	11	10	9	9	8	6	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	117	264
Miscellaneous Manufacturing (Impact in $ Thousands)	$402	$958	$1,237	$1,019	$1,209	$1,185	$1,126	$1,104	$1,082	$1,061	$1,040	$1,019	$972	$924	$807	$792	$749	$493	$483	$473	$464	$417	$408	$400	$393	$385	$377	$370	$363	$356	$349	$342	$335	$29	$29	$28	$27	$27	$27	$10,381	$23,556
Wholesale Trade (Employment)	183	437	565	465	552	541	514	504	494	484	475	465	443	422	368	361	342	225	220	216	212	190	186	183	179	176	172	169	166	162	159	156	153	13	13	13	13	13	12	4,738	10,751
Wholesale Trade (Impact in $ Thousands)	$17,400	$41,484	$53,579	$44,127	$52,378	$51,351	$48,757	$47,801	$46,864	$45,945	$45,044	$44,161	$42,086	$40,030	$34,974	$34,288	$32,456	$21,335	$20,917	$20,506	$20,104	$18,047	$17,693	$17,346	$17,006	$16,673	$16,346	$16,025	$15,711	$15,403	$15,101	$14,805	$14,515	$1,261	$1,236	$1,212	$1,188	$1,188	$1,165	$449,687	$1,020,394
Retail Trade (Employment)	410	978	1,263	1,040	1,235	1,211	1,150	1,127	1,105	1,083	1,062	1,041	992	944	825	808	765	503	493	483	474	425	417	409	401	393	385	378	370	363	356	349	342	30	29	29	28	28	27	10,602	24,058
Retail Trade (Impact in $ Thousands)	$19,915	$47,479	$61,321	$50,503	$59,946	$58,771	$55,803	$54,709	$53,636	$52,584	$51,553	$50,542	$48,168	$45,814	$40,028	$39,243	$37,146	$24,418	$23,939	$23,470	$23,009	$20,655	$20,250	$19,853	$19,464	$19,082	$18,708	$18,341	$17,981	$17,629	$17,283	$16,944	$16,612	$1,443	$1,415	$1,387	$1,360	$1,360	$1,333	$514,665	$1,167,838
Truck Transportation (Employment)	34	81	104	86	102	100	95	93	91	89	88	86	82	78	68	67	63	41	41	40	39	35	34	34	33	32	32	31	31	30	29	29	28	2	2	2	2	2	2	874	1,983
Truck Transportation (Impact in $ Thousands)	$2,309	$5,505	$7,110	$5,856	$6,951	$6,815	$6,471	$6,344	$6,219	$6,097	$5,978	$5,861	$5,585	$5,312	$4,641	$4,550	$4,307	$2,831	$2,776	$2,721	$2,668	$2,395	$2,348	$2,302	$2,257	$2,213	$2,169	$2,127	$2,085	$2,044	$2,004	$1,965	$1,926	$167	$164	$161	$158	$158	$155	$59,677	$135,415
Transit and Ground Passenger Transportation (Employment)	26	63	81	67	79	78	74	72	71	69	68	67	64	60	53	52	49	32	32	31	30	27	27	26	26	25	25	24	24	23	23	22	22	2	2	2	2	2	2	680	1,542
Transit and Ground Passenger Transportation (Impact in $ Thousands)	$1,677	$3,999	$5,165	$4,254	$5,050	$4,951	$4,700	$4,608	$4,518	$4,429	$4,343	$4,257	$4,057	$3,859	$3,372	$3,306	$3,129	$2,057	$2,016	$1,977	$1,938	$1,740	$1,706	$1,672	$1,639	$1,607	$1,576	$1,545	$1,515	$1,485	$1,456	$1,427	$1,399	$122	$119	$117	$115	$115	$112	$43,352	$98,372
Pipeline Transportation (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipeline Transportation (Impact in $ Thousands)	$584	$1,391	$1,797	$1,480	$1,756	$1,722	$1,635	$1,603	$1,572	$1,541	$1,511	$1,481	$1,411	$1,342	$1,173	$1,150	$1,088	$715	$701	$688	$674	$605	$593	$582	$570	$559	$548	$537	$527	$517	$506	$496	$487	$42	$41	$41	$40	$40	$39	$15,080	$34,218
Other Transportation (Employment)	25	59	76	63	75	73	69	68	67	65	64	63	60	57	50	49	46	30	30	29	29	26	25	25	24	24	23	23	22	22	22	21	21	2	2	2	2	2	2	641	1,454
Other Transportation (Impact in $ Thousands)	$3,170	$7,558	$9,761	$8,039	$9,542	$9,355	$8,883	$8,709	$8,538	$8,370	$8,206	$8,045	$7,667	$7,293	$6,372	$6,247	$5,913	$3,887	$3,811	$3,736	$3,663	$3,288	$3,223	$3,160	$3,098	$3,038	$2,978	$2,920	$2,862	$2,806	$2,751	$2,697	$2,644	$230	$225	$221	$216	$216	$212	$81,926	$185,899
Postal Service and Couriers and Messengers (Employment)	32	77	99	82	97	95	91	89	87	85	84	82	78	74	65	64	60	40	39	38	37	34	33	32	32	31	30	30	29	29	28	27	27	2	2	2	2	2	2	835	1,895
Postal Service and Couriers and Messengers (Impact in $ Thousands)	$2,028	$4,835	$6,244	$5,143	$6,104	$5,985	$5,682	$5,571	$5,462	$5,355	$5,250	$5,147	$4,905	$4,665	$4,076	$3,996	$3,783	$2,486	$2,438	$2,390	$2,343	$2,103	$2,062	$2,022	$1,982	$1,943	$1,905	$1,868	$1,831	$1,795	$1,760	$1,725	$1,692	$147	$144	$141	$138	$138	$136	$52,408	$118,921
Warehousing and Storage (Employment)	7	16	21	17	20	20	19	19	18	18	18	17	16	16	14	13	13	8	8	8	8	7	7	7	7	6	6	6	6	6	6	6	6	0	0	0	0	0	0	175	397
Warehousing and Storage (Impact in $ Thousands)	$438	$1,045	$1,349	$1,111	$1,319	$1,293	$1,228	$1,204	$1,180	$1,157	$1,134	$1,112	$1,060	$1,008	$881	$864	$817	$537	$527	$516	$506	$455	$446	$437	$428	$420	$412	$404	$396	$388	$380	$373	$366	$32	$31	$31	$30	$30	$29	$11,325	$25,698
Motion Picture and Sound Recording Industries (Employment)	9	21	28	23	27	27	25	25	24	24	23	23	22	21	18	18	17	11	11	11	10	9	9	9	9	9	8	8	8	8	8	8	8	1	1	1	1	1	1	233	529
Motion Picture and Sound Recording Industries (Impact in $ Thousands)	$634	$1,512	$1,952	$1,608	$1,908	$1,871	$1,777	$1,742	$1,708	$1,674	$1,641	$1,609	$1,533	$1,459	$1,274	$1,249	$1,183	$777	$762	$747	$733	$658	$645	$632	$620	$608	$596	$584	$572	$561	$550	$539	$529	$46	$45	$44	$43	$43	$42	$16,385	$37,180
Publishing, Broadcasting, Telecom, and Other Information Services (Employment)	70	167	215	177	210	206	196	192	188	185	181	177	169	161	140	138	130	86	84	82	81	72	71	70	68	67	66	64	63	62	61	59	58	5	5	5	5	5	5	1,806	4,098
Publishing, Broadcasting, Telecom, and Other Information Services (Impact in $ Thousands)	$10,775	$25,689	$33,178	$27,325	$32,435	$31,799	$30,193	$29,601	$29,020	$28,451	$27,894	$27,347	$26,062	$24,788	$21,658	$21,233	$20,098	$13,212	$12,953	$12,699	$12,450	$11,176	$10,956	$10,742	$10,531	$10,325	$10,122	$9,924	$9,729	$9,538	$9,351	$9,168	$8,988	$781	$765	$750	$736	$736	$721	$278,467	$631,874
Finance, Insurance, Real Estate and Rental and Leasing (Employment)	370	883	1,141	939	1,115	1,093	1,038	1,018	998	978	959	940	896	852	745	730	691	454	445	437	428	384	377	369	362	355	348	341	334	328	321	315	309	27	26	26	25	25	25	9,573	21,722
Finance, Insurance, Real Estate and Rental and Leasing (Impact in $ Thousands)	$86,540	$206,321	$266,473	$219,462	$260,500	$255,392	$242,494	$237,739	$233,078	$228,508	$224,027	$219,634	$209,315	$199,088	$173,943	$170,532	$161,418	$106,109	$104,028	$101,989	$99,989	$89,757	$87,997	$86,272	$84,580	$82,922	$81,296	$79,702	$78,139	$76,607	$75,105	$73,632	$72,188	$6,271	$6,148	$6,027	$5,909	$5,909	$5,793	$2,236,507	$5,074,906
Professional, Scientific and Technical Services (Employment)	337	804	1,039	856	1,016	996	945	927	909	891	873	856	816	776	678	665	629	414	406	398	390	350	343	336	330	323	317	311	305	299	293	287	281	24	24	23	23	23	23	8,719	19,784
Professional, Scientific and Technical Services (Impact in $ Thousands)	$25,096	$59,832	$77,276	$63,643	$75,544	$74,063	$70,322	$68,943	$67,592	$66,266	$64,967	$63,693	$60,701	$57,735	$50,443	$49,454	$46,811	$30,771	$30,168	$29,576	$28,996	$26,029	$25,519	$25,018	$24,528	$24,047	$23,575	$23,113	$22,660	$22,216	$21,780	$21,353	$20,934	$1,819	$1,783	$1,748	$1,714	$1,714	$1,680	$648,577	$1,471,700
Administrative and Support Services (Employment)	223	532	687	566	672	659	625	613	601	589	578	566	540	513	449	440	416	274	268	263	258	231	227	222	218	214	210	206	201	198	194	190	186	16	16	16	15	15	15	5,767	13,086
Administrative and Support Services (Impact in $ Thousands)	$9,051	$21,578	$27,870	$22,953	$27,245	$26,711	$25,362	$24,864	$24,377	$23,899	$23,430	$22,971	$21,892	$20,822	$18,192	$17,835	$16,882	$11,098	$10,880	$10,667	$10,458	$9,387	$9,203	$9,023	$8,846	$8,673	$8,502	$8,336	$8,172	$8,012	$7,855	$7,701	$7,550	$656	$643	$630	$618	$618	$606	$233,909	$530,769
Waste Management and Remediation Services (Employment)	5	11	14	11	14	13	13	12	12	12	12	11	11	10	9	9	8	6	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	117	264
Waste Management and Remediation Services (Impact in $ Thousands)	$693	$1,652	$2,134	$1,758	$2,086	$2,045	$1,942	$1,904	$1,867	$1,830	$1,794	$1,759	$1,676	$1,594	$1,393	$1,366	$1,293	$850	$833	$817	$801	$719	$705	$691	$677	$664	$651	$638	$626	$614	$601	$590	$578	$50	$49	$48	$47	$47	$46	$17,911	$40,643
Educational Services (Employment)	14	34	44	36	43	42	40	39	38	38	37	36	35	33	29	28	27	18	17	17	16	15	15	14	14	14	13	13	13	12	12	12	12	1	1	1	1	1	1	369	837
Educational Services (Impact in $ Thousands)	$492	$1,173	$1,514	$1,247	$1,480	$1,451	$1,378	$1,351	$1,325	$1,299	$1,273	$1,248	$1,190	$1,131	$989	$969	$917	$603	$591	$580	$568	$510	$500	$490	$481	$471	$462	$453	$444	$435	$427	$418	$410	$36	$35	$34	$34	$34	$33	$12,711	$28,842
Health Care and Social Assistance (Employment)	83	197	254	210	249	244	232	227	223	218	214	210	200	190	166	163	154	101	99	97	95	86	84	82	81	79	78	76	75	73	72	70	69	6	6	6	6	6	6	2,136	4,847
Health Care and Social Assistance (Impact in $ Thousands)	$5,129	$12,228	$15,793	$13,006	$15,439	$15,136	$14,371	$14,090	$13,813	$13,543	$13,277	$13,017	$12,405	$11,799	$10,309	$10,107	$9,566	$6,289	$6,165	$6,044	$5,926	$5,319	$5,215	$5,113	$5,013	$4,914	$4,818	$4,724	$4,631	$4,540	$4,451	$4,364	$4,278	$372	$364	$357	$350	$350	$343	$132,547	$300,765
Arts, Entertainment and Recreation (Employment)	54	129	167	137	163	160	152	149	146	143	140	137	131	124	109	107	101	66	65	64	63	56	55	54	53	52	51	50	49	48	47	46	45	4	4	4	4	4	4	1,398	3,172
Arts, Entertainment and Recreation (Impact in $ Thousands)	$2,230	$5,316	$6,866	$5,655	$6,712	$6,581	$6,248	$6,126	$6,006	$5,888	$5,773	$5,659	$5,394	$5,130	$4,482	$4,394	$4,159	$2,734	$2,681	$2,628	$2,576	$2,313	$2,267	$2,223	$2,179	$2,137	$2,095	$2,054	$2,013	$1,974	$1,935	$1,897	$1,860	$162	$158	$155	$152	$152	$149	$57,629	$130,767
Accommodation and Food Services (Employment)	216	514	664	547	649	636	604	592	581	569	558	547	522	496	433	425	402	264	259	254	249	224	219	215	211	207	203	199	195	191	187	183	180	16	15	15	15	15	14	5,573	12,646
Accommodation and Food Services (Impact in $ Thousands)	$6,105	$14,556	$18,800	$15,483	$18,378	$18,018	$17,108	$16,773	$16,444	$16,121	$15,805	$15,495	$14,767	$14,046	$12,272	$12,031	$11,388	$7,486	$7,339	$7,195	$7,054	$6,332	$6,208	$6,087	$5,967	$5,850	$5,735	$5,623	$5,513	$5,405	$5,299	$5,195	$5,093	$442	$434	$425	$417	$417	$409	$157,787	$358,038
Repair and Maintenance (Employment)	56	133	171	141	167	164	156	153	150	147	144	141	134	128	112	110	104	68	67	66	64	58	57	55	54	53	52	51	50	49	48	47	46	4	4	4	4	4	4	1,437	3,261
Repair and Maintenance (Impact in $ Thousands)	$2,676	$6,380	$8,240	$6,786	$8,055	$7,897	$7,498	$7,351	$7,207	$7,066	$6,927	$6,791	$6,472	$6,156	$5,378	$5,273	$4,991	$3,281	$3,217	$3,154	$3,092	$2,775	$2,721	$2,668	$2,615	$2,564	$2,514	$2,464	$2,416	$2,369	$2,322	$2,277	$2,232	$194	$190	$186	$183	$183	$179	$69,155	$156,921
Grant Making, Civic, and other Professiojnal and Similar Orgs (Employment)	12	29	37	30	36	35	34	33	32	32	31	31	29	28	24	24	22	15	14	14	14	12	12	12	12	12	11	11	11	11	10	10	10	1	1	1	1	1	1	311	705
Grant Making, Civic, and other Professiojnal and Similar Orgs (Impact in $Thousands)	$865	$2,062	$2,663	$2,193	$2,603	$2,552	$2,423	$2,376	$2,329	$2,283	$2,239	$2,195	$2,092	$1,989	$1,738	$1,704	$1,613	$1,060	$1,040	$1,019	$999	$897	$879	$862	$845	$829	$812	$796	$781	$766	$750	$736	$721	$63	$61	$60	$59	$59	$58	$22,349	$50,712
Personal and Laundry Services and Private Households (Employment)	105	251	324	267	317	310	295	289	283	278	272	267	254	242	211	207	196	129	126	124	122	109	107	105	103	101	99	97	95	93	91	90	88	8	7	7	7	7	7	2,718	6,169
Personal and Laundry Services and Private Households (Impact in $ Thousands)	$3,218	$7,673	$9,909	$8,161	$9,687	$9,497	$9,018	$8,841	$8,668	$8,498	$8,331	$8,168	$7,784	$7,404	$6,469	$6,342	$6,003	$3,946	$3,869	$3,793	$3,718	$3,338	$3,272	$3,208	$3,145	$3,084	$3,023	$2,964	$2,906	$2,849	$2,793	$2,738	$2,685	$233	$229	$224	$220	$220	$215	$83,170	$188,724
Non-Profit Institutions Serving Households (Excl Education) (Employment)	106	253	326	269	319	313	297	291	285	280	274	269	256	244	213	209	198	130	127	125	122	110	108	106	104	102	100	98	96	94	92	90	88	8	8	7	7	7	7	2,738	6,213
Non-Profit Institutions Serving Households (Excl Education) (Impact in $ Thousands)	$5,687	$13,559	$17,513	$14,423	$17,120	$16,784	$15,937	$15,624	$15,318	$15,018	$14,723	$14,434	$13,756	$13,084	$11,432	$11,207	$10,608	$6,974	$6,837	$6,703	$6,571	$5,899	$5,783	$5,670	$5,559	$5,450	$5,343	$5,238	$5,135	$5,035	$4,936	$4,839	$4,744	$412	$404	$396	$388	$388	$381	$146,984	$333,525
Non-Profit Education Institutions (Employment)	8	20	25	21	25	24	23	23	22	22	21	21	20	19	17	16	15	10	10	10	10	9	8	8	8	8	8	8	7	7	7	7	7	1	1	1	1	1	1	214	485

APPENDIX B-3 HIGH SCENARIO - GROWTH RATE MULTIPLIER OF 1.75

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Non-Profit Education Institutions (Impact in $ Thousands)	$587	$1,399	$1,806	$1,488	$1,766	$1,731	$1,644	$1,612	$1,580	$1,549	$1,519	$1,489	$1,419	$1,350	$1,179	$1,156	$1,094	$719	$705	$691	$678	$608	$596	$585	$573	$562	$551	$540	$530	$519	$509	$499	$489	$43	$42	$41	$40	$40	$39	$15,160	$34,400
Hospitals and Residential Care Facilities (Employment)	13	30	39	32	38	38	36	35	34	34	33	32	31	29	26	25	24	16	15	15	15	13	13	13	12	12	12	12	12	11	11	11	11	1	1	1	1	1	1	330	749
Hospitals and Residential Care Facilities (Impact in $ Thousands)	$1,038	$2,475	$3,196	$2,632	$3,125	$3,063	$2,909	$2,852	$2,796	$2,741	$2,687	$2,634	$2,511	$2,388	$2,086	$2,046	$1,936	$1,273	$1,248	$1,223	$1,199	$1,077	$1,056	$1,035	$1,015	$995	$975	$956	$937	$919	$901	$883	$866	$75	$74	$72	$71	$71	$69	$26,827	$60,873
Universities and Government Education Services (Employment)	26	63	81	67	79	78	74	72	71	69	68	67	64	60	53	52	49	32	32	31	30	27	27	26	26	25	25	24	24	23	23	22	22	2	2	2	2	2	2	680	1,542
Universities and Government Education Services (Impact in $ Thousands)	$2,285	$5,448	$7,036	$5,795	$6,878	$6,744	$6,403	$6,277	$6,154	$6,034	$5,915	$5,799	$5,527	$5,257	$4,593	$4,503	$4,262	$2,802	$2,747	$2,693	$2,640	$2,370	$2,324	$2,278	$2,233	$2,190	$2,147	$2,105	$2,063	$2,023	$1,983	$1,944	$1,906	$166	$162	$159	$156	$156	$153	$59,055	$134,002
Other Municipal Government Services (Employment)	29	68	88	72	86	84	80	78	77	75	74	72	69	66	57	56	53	35	34	34	33	30	29	28	28	27	27	26	26	25	25	24	24	2	2	2	2	2	2	738	1,674
Other Municipal Government Services (Impact in $ Thousands)	$2,658	$6,337	$8,185	$6,741	$8,001	$7,844	$7,448	$7,302	$7,159	$7,018	$6,881	$6,746	$6,429	$6,115	$5,343	$5,238	$4,958	$3,259	$3,195	$3,133	$3,071	$2,757	$2,703	$2,650	$2,598	$2,547	$2,497	$2,448	$2,400	$2,353	$2,307	$2,262	$2,217	$193	$189	$185	$182	$182	$178	$68,693	$155,873
Other Provincial and Territorial Government Services (Employment)	9	21	28	23	27	27	25	25	24	24	23	23	22	21	18	18	17	11	11	11	10	9	9	9	9	9	8	8	8	8	8	8	8	1	1	1	1	1	1	233	529
Other Provincial and Territorial Government Services (Impact in $ Thousands)	$799	$1,904	$2,459	$2,026	$2,404	$2,357	$2,238	$2,194	$2,151	$2,109	$2,068	$2,027	$1,932	$1,837	$1,605	$1,574	$1,490	$979	$960	$941	$923	$828	$812	$796	$781	$765	$750	$736	$721	$707	$693	$680	$666	$58	$57	$56	$55	$55	$53	$20,642	$46,839
Other Federal Government Services (Employment)	17	39	51	42	50	49	46	45	45	44	43	42	40	38	33	33	31	20	20	19	19	17	17	16	16	16	16	15	15	15	14	14	14	1	1	1	1	1	1	427	969
Other Federal Government Services (Impact in $ Thousands)	$1,870	$4,459	$5,759	$4,743	$5,630	$5,519	$5,240	$5,138	$5,037	$4,938	$4,841	$4,746	$4,523	$4,302	$3,759	$3,685	$3,488	$2,293	$2,248	$2,204	$2,161	$1,940	$1,902	$1,864	$1,828	$1,792	$1,757	$1,722	$1,689	$1,656	$1,623	$1,591	$1,560	$136	$133	$130	$128	$128	$125	$48,332	$109,671
TOTAL (Employment)	4,779	11,393	14,714	12,118	14,385	14,102	13,390	13,128	12,870	12,618	12,371	12,128	11,558	10,993	9,605	9,417	8,913	5,859	5,744	5,632	5,521	4,956	4,859	4,764	4,670	4,579	4,489	4,401	4,315	4,230	4,147	4,066	3,986	346	339	333	326	326	320	123,497	280,230
TOTAL (Impact in $ Millions)	$808	$1,927	$2,489	$2,050	$2,433	$2,385	$2,265	$2,221	$2,177	$2,134	$2,092	$2,051	$1,955	$1,860	$1,625	$1,593	$1,508	$991	$972	$953	$934	$838	$822	$806	$790	$775	$759	$744	$730	$716	$702	$688	$674	$59	$57	$56	$55	$55	$54	$20,890	$47,402

APPENDIX B-4 MEDIAN SCENARIO - GROWTH RATE MULTIPLIER OF 1.50

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Crop and Animal Production (Employment)	14	34	44	36	43	42	40	39	38	37	37	36	34	33	28	28	26	17	17	17	16	15	14	14	14	14	13	13	13	13	12	12	12	1	1	1	1	1	1	366	831
Crop and Animal Production (Impact in $ Thousands)	$649	$1,548	$1,999	$1,647	$1,955	$1,916	$1,819	$1,784	$1,749	$1,715	$1,681	$1,648	$1,571	$1,494	$1,305	$1,280	$1,211	$796	$781	$765	$750	$673	$660	$647	$635	$622	$610	$598	$586	$575	$564	$552	$542	$47	$46	$45	$44	$44	$43	$16,781	$38,078
Forestry and Logging (Employment)	1	3	4	3	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	33	76
Forestry and Logging (Impact in $ Thousands)	$109	$260	$336	$277	$329	$322	$306	$300	$294	$288	$283	$277	$264	$251	$220	$215	$204	$134	$131	$129	$126	$113	$111	$109	$107	$105	$103	$101	$99	$97	$95	$93	$91	$8	$8	$8	$7	$7	$7	$2,823	$6,405
Fishing, Hunting and Trapping (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing, Hunting and Trapping (Impact in $ Thousands)	$4	$10	$12	$10	$12	$12	$11	$11	$11	$11	$10	$10	$10	$9	$8	$8	$7	$5	$5	$5	$5	$4	$4	$4	$4	$4	$4	$4	$4	$4	$3	$3	$3	$0	$0	$0	$0	$0	$0	$103	$234
Support Activities for Agriculture and Forestry (Employment)	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	17	38
Support Activities for Agriculture and Forestry (Impact in $ Thousands)	$50	$119	$154	$127	$150	$147	$140	$137	$135	$132	$129	$127	$121	$115	$100	$98	$93	$61	$60	$59	$58	$52	$51	$50	$49	$48	$47	$46	$45	$44	$43	$42	$42	$4	$4	$3	$3	$3	$3	$1,291	$2,929
Oil and Gas Extraction (Employment)	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	17	38
Oil and Gas Extraction (Impact in $ Thousands)	$85	$203	$262	$216	$257	$252	$239	$234	$230	$225	$221	$216	$206	$196	$171	$168	$159	$105	$102	$100	$98	$88	$87	$85	$83	$82	$80	$79	$77	$75	$74	$73	$71	$6	$6	$6	$6	$6	$6	$2,203	$4,999
Support Activities for Oil and Gas Extraction (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Support Activities for Oil and Gas Extraction (Impact in $ Thousands)	$1	$3	$4	$3	$4	$4	$4	$4	$4	$4	$3	$3	$3	$3	$3	$3	$2	$2	$2	$2	$2	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$34	$78
Mining (Employment)	1,559	3,717	4,801	3,954	4,693	4,601	4,369	4,283	4,199	4,117	4,036	3,957	3,771	3,587	3,134	3,072	2,908	1,912	1,874	1,838	1,801	1,617	1,585	1,554	1,524	1,494	1,465	1,436	1,408	1,380	1,353	1,327	1,301	113	111	109	106	106	104	40,295	91,434
Mining (Impact in $ Thousands)	$460,291	$1,097,389	$1,417,327	$1,167,288	$1,385,560	$1,358,392	$1,289,790	$1,264,500	$1,239,706	$1,215,398	$1,191,566	$1,168,202	$1,113,316	$1,058,917	$925,177	$907,036	$858,560	$564,377	$553,311	$542,462	$531,825	$477,403	$468,043	$458,865	$449,868	$441,047	$432,399	$423,921	$415,608	$407,459	$399,470	$391,637	$383,958	$33,355	$32,700	$32,059	$31,431	$31,431	$30,814	$11,895,639	$26,992,652
Support Activities for Mining (Employment)	90	213	276	227	269	264	251	246	241	236	232	227	217	206	180	176	167	110	108	105	103	93	91	89	87	86	84	82	81	79	78	76	75	6	6	6	6	6	6	2,313	5,250
Support Activities for Mining (Impact in $ Thousands)	$8,628	$20,571	$26,568	$21,881	$25,973	$25,464	$24,178	$23,704	$23,239	$22,783	$22,336	$21,898	$20,870	$19,850	$17,343	$17,003	$16,094	$10,579	$10,372	$10,169	$9,969	$8,949	$8,774	$8,602	$8,433	$8,268	$8,106	$7,947	$7,791	$7,638	$7,488	$7,341	$7,197	$625	$613	$601	$589	$589	$578	$222,989	$505,989
Electric Power Generation, Transmission and Distribution (Employment)	45	107	139	114	136	133	126	124	121	119	117	114	109	104	91	89	84	55	54	53	52	47	46	45	44	43	42	42	41	40	39	38	38	3	3	3	3	3	3	1,165	2,644
Electric Power Generation, Transmission and Distribution (Impact in $ Thousands)	$12,841	$30,615	$39,541	$32,565	$38,655	$37,897	$35,983	$35,277	$34,586	$33,907	$33,243	$32,591	$31,060	$29,542	$25,811	$25,305	$23,952	$15,745	$15,436	$15,134	$14,837	$13,319	$13,058	$12,802	$12,551	$12,304	$12,063	$11,827	$11,595	$11,367	$11,145	$10,926	$10,712	$931	$912	$894	$877	$877	$860	$331,867	$753,047
Natural Gas Distribution, Water, Sewage and Other Systems (Employment)	4	9	12	10	12	11	11	11	10	10	10	10	9	9	8	8	7	5	5	5	4	4	4	4	4	4	4	4	3	3	3	3	3	0	0	0	0	0	0	100	227
Natural Gas Distribution, Water, Sewage and Other Systems (Impact in $ Thousands)	$1,028	$2,452	$3,166	$2,608	$3,095	$3,035	$2,881	$2,825	$2,769	$2,715	$2,662	$2,610	$2,487	$2,366	$2,067	$2,026	$1,918	$1,261	$1,236	$1,212	$1,188	$1,066	$1,046	$1,025	$1,005	$985	$966	$947	$928	$910	$892	$875	$858	$75	$73	$72	$70	$70	$69	$26,574	$60,300
Construction (Employment)	110	263	339	279	332	325	309	303	297	291	285	279	266	253	221	217	205	135	132	130	127	114	112	110	108	106	103	101	99	97	96	94	92	8	8	8	8	8	7	2,846	6,458
Construction (Impact in $ Thousands)	$7,737	$18,445	$23,823	$19,620	$23,289	$22,832	$21,679	$21,254	$20,837	$20,429	$20,028	$19,635	$18,713	$17,798	$15,550	$15,246	$14,431	$9,486	$9,300	$9,118	$8,939	$8,024	$7,867	$7,713	$7,561	$7,413	$7,268	$7,125	$6,986	$6,849	$6,714	$6,583	$6,454	$561	$550	$539	$528	$528	$518	$199,943	$453,695
Food Manufacturing (Employment)	20	48	61	51	60	59	56	55	54	53	52	51	48	46	40	39	37	24	24	24	23	21	20	20	20	19	19	18	18	18	17	17	17	1	1	1	1	1	1	516	1,171
Food Manufacturing (Impact in $ Thousands)	$2,538	$6,051	$7,815	$6,436	$7,640	$7,490	$7,112	$6,972	$6,836	$6,702	$6,570	$6,441	$6,139	$5,839	$5,101	$5,001	$4,734	$3,112	$3,051	$2,991	$2,932	$2,632	$2,581	$2,530	$2,481	$2,432	$2,384	$2,337	$2,292	$2,247	$2,203	$2,159	$2,117	$184	$180	$177	$173	$173	$170	$65,592	$148,836
Beverage and Tobacco Product Manufacturing (Employment)	3	6	8	7	8	8	7	7	7	7	7	7	6	6	5	5	5	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	0	0	0	0	0	0	67	151
Beverage and Tobacco Product Manufacturing (Impact in $ Thousands)	$910	$2,169	$2,801	$2,307	$2,738	$2,685	$2,549	$2,499	$2,450	$2,402	$2,355	$2,309	$2,200	$2,093	$1,829	$1,793	$1,697	$1,115	$1,094	$1,072	$1,051	$944	$925	$907	$889	$872	$855	$838	$821	$805	$790	$774	$759	$66	$65	$63	$62	$62	$61	$23,511	$53,348
Textile and Textile Product Mills (Employment)	1	3	4	3	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	33	76
Textile and Textile Product Mills (Impact in $ Thousands)	$78	$186	$240	$198	$235	$230	$218	$214	$210	$206	$202	$198	$188	$179	$157	$154	$145	$96	$94	$92	$90	$81	$79	$78	$76	$75	$73	$72	$70	$69	$68	$66	$65	$6	$6	$5	$5	$5	$5	$2,014	$4,569
Clothing Manufacturing (Employment)	2	5	6	5	6	6	5	5	5	5	5	5	5	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	50	113
Clothing Manufacturing (Impact in $ Thousands)	$83	$198	$256	$211	$251	$246	$233	$229	$224	$220	$216	$211	$201	$192	$167	$164	$155	$102	$100	$98	$96	$86	$85	$83	$81	$80	$78	$77	$75	$74	$72	$71	$69	$6	$6	$6	$6	$6	$6	$2,151	$4,882
Leather and Allied Product Manufacturing (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leather and Allied Product Manufacturing (Impact in $ Thousands)	$6	$14	$18	$15	$18	$18	$17	$16	$16	$16	$16	$15	$14	$14	$12	$12	$11	$7	$7	$7	$7	$6	$6	$6	$6	$6	$6	$6	$5	$5	$5	$5	$5	$0	$0	$0	$0	$0	$0	$155	$351
Wood Product Manufacturing (Employment)	2	5	6	5	6	6	5	5	5	5	5	5	5	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	50	113
Wood Product Manufacturing (Impact in $ Thousands)	$137	$325	$420	$346	$411	$403	$383	$375	$368	$360	$353	$346	$330	$314	$274	$269	$255	$167	$164	$161	$158	$142	$139	$136	$133	$131	$128	$126	$123	$121	$118	$116	$114	$10	$10	$10	$9	$9	$9	$3,528	$8,006
Paper Manufacturing (Employment)	6	14	18	15	17	17	16	16	16	15	15	15	14	13	12	11	11	7	7	7	7	6	6	6	6	6	5	5	5	5	5	5	5	0	0	0	0	0	0	150	340
Paper Manufacturing (Impact in $ Thousands)	$671	$1,600	$2,067	$1,702	$2,021	$1,981	$1,881	$1,844	$1,808	$1,773	$1,738	$1,704	$1,624	$1,544	$1,349	$1,323	$1,252	$823	$807	$791	$776	$696	$683	$669	$656	$643	$631	$618	$606	$594	$583	$571	$560	$49	$48	$47	$46	$46	$45	$17,349	$39,367
Printing and Related Support Activities (Employment)	11	26	34	28	33	32	31	30	29	29	28	28	26	25	22	22	20	13	13	13	13	11	11	11	11	10	10	10	10	10	10	9	9	1	1	1	1	1	1	283	642
Printing and Related Support Activities (Impact in $ Thousands)	$1,024	$2,442	$3,154	$2,598	$3,083	$3,023	$2,870	$2,814	$2,759	$2,705	$2,652	$2,600	$2,477	$2,356	$2,059	$2,018	$1,911	$1,256	$1,231	$1,207	$1,183	$1,062	$1,042	$1,021	$1,001	$981	$962	$943	$925	$907	$889	$871	$854	$74	$73	$71	$70	$70	$69	$26,471	$60,066
Petroleum and Coal Products Manufacturing (Employment)	6	15	20	16	19	19	18	18	17	17	17	16	16	15	13	13	12	8	8	8	7	7	7	6	6	6	6	6	6	6	6	5	5	0	0	0	0	0	0	166	378
Petroleum and Coal Products Manufacturing (Impact in $ Thousands)	$584	$1,392	$1,798	$1,481	$1,758	$1,724	$1,637	$1,605	$1,573	$1,542	$1,512	$1,482	$1,413	$1,344	$1,174	$1,151	$1,089	$716	$702	$688	$675	$606	$594	$582	$571	$560	$549	$538	$527	$517	$507	$497	$487	$42	$41	$41	$40	$40	$39	$15,094	$34,251
Chemical Manufacturing (Employment)	10	25	32	26	31	30	29	28	28	27	27	26	25	24	21	20	19	13	12	12	12	11	10	10	10	10	10	9	9	9	9	9	9	1	1	1	1	1	1	266	604
Chemical Manufacturing (Impact in $ Thousands)	$1,271	$3,029	$3,913	$3,222	$3,825	$3,750	$3,561	$3,491	$3,422	$3,355	$3,289	$3,225	$3,073	$2,923	$2,554	$2,504	$2,370	$1,558	$1,527	$1,498	$1,468	$1,318	$1,292	$1,267	$1,242	$1,218	$1,194	$1,170	$1,147	$1,125	$1,103	$1,081	$1,060	$92	$90	$89	$87	$87	$85	$32,839	$74,516
Plastics and Rubber Products Manufacturing (Employment)	10	25	32	26	31	30	29	28	28	27	27	26	25	24	21	20	19	13	12	12	12	11	10	10	10	10	10	9	9	9	9	9	9	1	1	1	1	1	1	266	604
Plastics and Rubber Products Manufacturing (Impact in $ Thousands)	$936	$2,231	$2,881	$2,373	$2,817	$2,761	$2,622	$2,571	$2,520	$2,471	$2,422	$2,375	$2,263	$2,153	$1,881	$1,844	$1,745	$1,147	$1,125	$1,103	$1,081	$970	$951	$933	$915	$897	$879	$862	$845	$828	$812	$796	$781	$68	$66	$65	$64	$64	$63	$24,182	$54,871
Non-Metallic Mineral Product Manufacturing (Employment)	8	18	24	20	23	23	22	21	21	20	20	20	19	18	16	15	14	9	9	9	9	8	8	8	8	7	7	7	7	7	7	7	6	1	1	1	1	1	1	200	453
Non-Metallic Mineral Product Manufacturing (Impact in $ Thousands)	$964	$2,297	$2,967	$2,444	$2,901	$2,844	$2,700	$2,647	$2,595	$2,545	$2,495	$2,446	$2,331	$2,217	$1,937	$1,899	$1,797	$1,182	$1,158	$1,136	$1,113	$999	$980	$961	$942	$923	$905	$888	$870	$853	$836	$820	$804	$70	$68	$67	$66	$66	$65	$24,905	$56,512
Primary Metal Manufacturing (Employment)	5	12	16	13	16	15	14	14	14	14	13	13	12	12	10	10	10	6	6	6	6	5	5	5	5	5	5	5	5	5	4	4	4	0	0	0	0	0	0	133	302
Primary Metal Manufacturing (Impact in $ Thousands)	$736	$1,754	$2,266	$1,866	$2,215	$2,172	$2,062	$2,022	$1,982	$1,943	$1,905	$1,868	$1,780	$1,693	$1,479	$1,450	$1,373	$902	$885	$867	$850	$763	$748	$734	$719	$705	$691	$678	$664	$651	$639	$626	$614	$53	$52	$51	$50	$50	$49	$19,018	$43,155
Fabricated Metal Products Manufacturing (Employment)	21	51	65	54	64	63	60	58	57	56	55	54	51	49	43	42	40	26	26	25	25	22	22	21	21	20	20	20	19	19	18	18	18	2	2	1	1	1	1	549	1,246
Fabricated Metal Products Manufacturing (Impact in $ Thousands)	$1,552	$3,701	$4,780	$3,937	$4,673	$4,581	$4,350	$4,265	$4,181	$4,099	$4,019	$3,940	$3,755	$3,571	$3,120	$3,059	$2,896	$1,903	$1,866	$1,830	$1,794	$1,610	$1,579	$1,548	$1,517	$1,487	$1,458	$1,430	$1,402	$1,374	$1,347	$1,321	$1,295	$112	$110	$108	$106	$106	$104	$40,119	$91,036
Machinery Manufacturing (Employment)	23	55	71	59	70	68	65	64	62	61	60	59	56	53	47	46	43	28	28	27	27	24	24	23	23	22	22	21	21	21	20	20	19	2	2	2	2	2	2	599	1,360
Machinery Manufacturing (Impact in $ Thousands)	$3,141	$7,489	$9,673	$7,967	$9,456	$9,271	$8,803	$8,630	$8,461	$8,295	$8,132	$7,973	$7,598	$7,227	$6,314	$6,190	$5,860	$3,852	$3,776	$3,702	$3,630	$3,258	$3,194	$3,132	$3,070	$3,010	$2,951	$2,893	$2,836	$2,781	$2,726	$2,673	$2,620	$228	$223	$219	$215	$215	$210	$81,185	$184,220
Computer and Electronic Product Manufacturing (Employment)	3	6	8	7	8	8	7	7	7	7	7	7	6	6	5	5	5	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	0	0	0	0	0	0	67	151
Computer and Electronic Product Manufacturing (Impact in $ Thousands)	$230	$549	$710	$584	$694	$680	$646	$633	$621	$608	$597	$585	$557	$530	$463	$454	$430	$283	$277	$272	$266	$239	$234	$230	$225	$221	$216	$212	$208	$204	$200	$196	$192	$17	$16	$16	$16	$16	$15	$5,955	$13,513

APPENDIX B-4 MEDIAN SCENARIO - GROWTH RATE MULTIPLIER OF 1.50

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Electrical Equipment, Appliance and Component Manufacturing (Employment)	3	6	8	7	8	8	7	7	7	7	7	7	6	6	5	5	5	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	0	0	0	0	0	0	67	151
Electrical Equipment, Appliance and Component Manufacturing (Impact in $ Thousands)	$240	$573	$740	$610	$724	$710	$674	$660	$648	$635	$622	$610	$582	$553	$483	$474	$448	$295	$289	$283	$278	$249	$244	$240	$235	$230	$226	$221	$217	$213	$209	$205	$201	$17	$17	$17	$16	$16	$16	$6,213	$14,099
Transportation Equipment Manufacturing (Employment)	7	17	22	18	21	21	20	19	19	19	18	18	17	16	14	14	13	9	9	8	8	7	7	7	7	7	7	7	6	6	6	6	6	1	1	0	0	0	0	183	415
Transportation Equipment Manufacturing (Impact in $ Thousands)	$697	$1,661	$2,145	$1,767	$2,097	$2,056	$1,952	$1,914	$1,876	$1,839	$1,803	$1,768	$1,685	$1,603	$1,400	$1,373	$1,299	$854	$837	$821	$805	$723	$708	$694	$681	$667	$654	$642	$629	$617	$605	$593	$581	$50	$49	$49	$48	$48	$47	$18,003	$40,851
Furniture and Related Product Manufacturing (Employment)	2	5	6	5	6	6	5	5	5	5	5	5	5	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	50	113
Furniture and Related Product Manufacturing (Impact in $ Thousands)	$173	$413	$533	$439	$521	$511	$485	$476	$466	$457	$448	$439	$419	$398	$348	$341	$323	$212	$208	$204	$200	$180	$176	$173	$169	$166	$163	$159	$156	$153	$150	$147	$144	$13	$12	$12	$12	$12	$12	$4,475	$10,154
Miscellaneous Manufacturing (Employment)	4	9	12	10	12	11	11	11	10	10	10	10	9	9	8	8	7	5	5	5	4	4	4	4	4	4	4	4	3	3	3	3	3	0	0	0	0	0	0	100	227
Miscellaneous Manufacturing (Impact in $ Thousands)	$344	$821	$1,060	$873	$1,036	$1,016	$965	$946	$927	$909	$891	$874	$833	$792	$692	$678	$642	$422	$414	$406	$398	$357	$350	$343	$337	$330	$323	$317	$311	$305	$299	$293	$287	$25	$24	$24	$24	$24	$23	$8,898	$20,191
Wholesale Trade (Employment)	157	375	484	399	473	464	440	432	423	415	407	399	380	362	316	310	293	193	189	185	182	163	160	157	154	151	148	145	142	139	136	134	131	11	11	11	11	11	11	4,061	9,215
Wholesale Trade (Impact in $ Thousands)	$14,914	$35,558	$45,925	$37,823	$44,895	$44,015	$41,792	$40,973	$40,169	$39,382	$38,609	$37,852	$36,074	$34,311	$29,978	$29,390	$27,819	$18,287	$17,929	$17,577	$17,232	$15,469	$15,166	$14,868	$14,577	$14,291	$14,011	$13,736	$13,467	$13,203	$12,944	$12,690	$12,441	$1,081	$1,060	$1,039	$1,018	$1,018	$998	$385,446	$874,624
Retail Trade (Employment)	352	838	1,083	892	1,058	1,038	985	966	947	928	910	892	851	809	707	693	656	431	423	414	406	365	358	351	344	337	330	324	317	311	305	299	293	25	25	24	24	24	24	9,088	20,621
Retail Trade (Impact in $ Thousands)	$17,070	$40,696	$52,561	$43,288	$51,383	$50,375	$47,831	$46,893	$45,974	$45,072	$44,188	$43,322	$41,287	$39,269	$34,310	$33,637	$31,839	$20,930	$20,519	$20,117	$19,722	$17,704	$17,357	$17,017	$16,683	$16,356	$16,035	$15,721	$15,413	$15,110	$14,814	$14,524	$14,239	$1,237	$1,213	$1,189	$1,166	$1,166	$1,143	$441,141	$1,001,004
Truck Transportation (Employment)	29	69	89	73	87	86	81	80	78	77	75	74	70	67	58	57	54	36	35	34	33	30	29	29	28	28	27	27	26	26	25	25	24	2	2	2	2	2	2	749	1,700
Truck Transportation (Impact in $ Thousands)	$1,979	$4,719	$6,095	$5,019	$5,958	$5,841	$5,546	$5,437	$5,331	$5,226	$5,124	$5,023	$4,787	$4,553	$3,978	$3,900	$3,692	$2,427	$2,379	$2,333	$2,287	$2,053	$2,013	$1,973	$1,934	$1,897	$1,859	$1,823	$1,787	$1,752	$1,718	$1,684	$1,651	$143	$141	$138	$135	$135	$133	$51,152	$116,070
Transit and Ground Passenger Transportation (Employment)	23	54	69	57	68	67	63	62	61	60	58	57	55	52	45	44	42	28	27	27	26	23	23	22	22	22	21	21	20	20	20	19	19	2	2	2	2	2	2	583	1,322
Transit and Ground Passenger Transportation (Impact in $ Thousands)	$1,438	$3,428	$4,427	$3,646	$4,328	$4,243	$4,029	$3,950	$3,873	$3,797	$3,722	$3,649	$3,478	$3,308	$2,890	$2,833	$2,682	$1,763	$1,728	$1,695	$1,661	$1,491	$1,462	$1,433	$1,405	$1,378	$1,351	$1,324	$1,298	$1,273	$1,248	$1,223	$1,199	$104	$102	$100	$98	$98	$96	$37,159	$84,318
Pipeline Transportation (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipeline Transportation (Impact in $ Thousands)	$500	$1,192	$1,540	$1,268	$1,506	$1,476	$1,401	$1,374	$1,347	$1,321	$1,295	$1,269	$1,210	$1,151	$1,005	$986	$933	$613	$601	$589	$578	$519	$509	$499	$489	$479	$470	$461	$452	$443	$434	$426	$417	$36	$36	$35	$34	$34	$33	$12,926	$29,330
Other Transportation (Employment)	21	51	65	54	64	63	60	58	57	56	55	54	51	49	43	42	40	26	26	25	25	22	22	21	21	20	20	20	19	19	18	18	18	2	2	1	1	1	1	549	1,246
Other Transportation (Impact in $ Thousands)	$2,717	$6,478	$8,367	$6,891	$8,179	$8,019	$7,614	$7,465	$7,318	$7,175	$7,034	$6,896	$6,572	$6,251	$5,461	$5,354	$5,068	$3,332	$3,266	$3,202	$3,139	$2,818	$2,763	$2,709	$2,656	$2,604	$2,553	$2,502	$2,453	$2,405	$2,358	$2,312	$2,267	$197	$193	$189	$186	$186	$182	$70,222	$159,342
Postal Service and Couriers and Messengers (Employment)	28	66	85	70	83	82	78	76	75	73	72	70	67	64	56	55	52	34	33	33	32	29	28	28	27	27	26	26	25	25	24	24	23	2	2	2	2	2	2	716	1,624
Postal Service and Couriers and Messengers (Impact in $ Thousands)	$1,738	$4,144	$5,352	$4,408	$5,232	$5,130	$4,871	$4,775	$4,681	$4,590	$4,500	$4,411	$4,204	$3,999	$3,494	$3,425	$3,242	$2,131	$2,089	$2,048	$2,008	$1,803	$1,767	$1,733	$1,699	$1,666	$1,633	$1,601	$1,569	$1,539	$1,509	$1,479	$1,450	$126	$123	$121	$119	$119	$116	$44,921	$101,932
Warehousing and Storage (Employment)	6	14	18	15	17	17	16	16	16	15	15	15	14	13	12	11	11	7	7	7	7	6	6	6	6	6	5	5	5	5	5	5	5	0	0	0	0	0	0	150	340
Warehousing and Storage (Impact in $ Thousands)	$376	$895	$1,157	$953	$1,131	$1,108	$1,053	$1,032	$1,012	$992	$972	$953	$908	$864	$755	$740	$701	$461	$452	$443	$434	$390	$382	$374	$367	$360	$353	$346	$339	$332	$326	$320	$313	$27	$27	$26	$26	$26	$25	$9,707	$22,027
Motion Picture and Sound Recording Industries (Employment)	8	18	24	20	23	23	22	21	21	20	20	20	19	18	16	15	14	9	9	9	9	8	8	8	8	7	7	7	7	7	7	7	6	1	1	1	1	1	1	200	453
Motion Picture and Sound Recording Industries (Impact in $ Thousands)	$543	$1,296	$1,673	$1,378	$1,636	$1,604	$1,523	$1,493	$1,464	$1,435	$1,407	$1,379	$1,314	$1,250	$1,092	$1,071	$1,014	$666	$653	$640	$628	$564	$553	$542	$531	$521	$511	$500	$491	$481	$472	$462	$453	$39	$39	$38	$37	$37	$36	$14,044	$31,868
Publishing, Broadcasting, Telecom, and Other Information Services (Employment)	60	143	184	152	180	177	168	165	161	158	155	152	145	138	120	118	112	73	72	71	69	62	61	60	59	57	56	55	54	53	52	51	50	4	4	4	4	4	4	1,548	3,512
Publishing, Broadcasting, Telecom, and Other Information Services (Impact in $ Thousands)	$9,236	$22,019	$28,439	$23,422	$27,801	$27,256	$25,880	$25,372	$24,875	$24,387	$23,909	$23,440	$22,339	$21,247	$18,564	$18,200	$17,227	$11,324	$11,102	$10,884	$10,671	$9,579	$9,391	$9,207	$9,027	$8,850	$8,676	$8,506	$8,339	$8,176	$8,015	$7,858	$7,704	$669	$656	$643	$631	$631	$618	$238,686	$541,607
Finance, Insurance, Real Estate and Rental and Leasing (Employment)	318	757	978	805	956	937	890	872	855	838	822	806	768	730	638	626	592	389	382	374	367	329	323	317	310	304	298	292	287	281	276	270	265	23	23	22	22	22	21	8,205	18,619
Finance, Insurance, Real Estate and Rental and Leasing (Impact in $ Thousands)	$74,177	$176,846	$228,405	$188,111	$223,286	$218,908	$207,852	$203,777	$199,781	$195,864	$192,023	$188,258	$179,413	$170,647	$149,094	$146,171	$138,359	$90,950	$89,167	$87,419	$85,705	$76,935	$75,426	$73,947	$72,497	$71,076	$69,682	$68,316	$66,976	$65,663	$64,375	$63,113	$61,876	$5,375	$5,270	$5,166	$5,065	$5,065	$4,966	$1,917,006	$4,349,919
Professional, Scientific and Technical Services (Employment)	289	689	890	733	870	853	810	794	779	764	749	734	699	665	581	570	539	355	348	341	334	300	294	288	283	277	272	266	261	256	251	246	241	21	21	20	20	20	19	7,473	16,957
Professional, Scientific and Technical Services (Impact in $ Thousands)	$21,511	$51,285	$66,236	$54,551	$64,752	$63,482	$60,276	$59,094	$57,936	$56,800	$55,686	$54,594	$52,029	$49,487	$43,237	$42,389	$40,123	$26,375	$25,858	$25,351	$24,854	$22,311	$21,873	$21,444	$21,024	$20,612	$20,207	$19,811	$19,423	$19,042	$18,669	$18,303	$17,944	$1,559	$1,528	$1,498	$1,469	$1,469	$1,440	$555,923	$1,261,458
Administrative and Support Services (Employment)	191	456	589	485	576	564	536	525	515	505	495	485	463	440	384	377	357	235	230	225	221	198	194	191	187	183	180	176	173	169	166	163	160	14	14	13	13	13	13	4,943	11,217
Administrative and Support Services (Impact in $ Thousands)	$7,758	$18,496	$23,888	$19,674	$23,353	$22,895	$21,739	$21,312	$20,894	$20,485	$20,083	$19,689	$18,764	$17,847	$15,593	$15,288	$14,471	$9,512	$9,326	$9,143	$8,964	$8,046	$7,889	$7,734	$7,582	$7,434	$7,288	$7,145	$7,005	$6,867	$6,733	$6,601	$6,471	$562	$551	$540	$530	$530	$519	$200,494	$454,945
Waste Management and Remediation Services (Employment)	4	9	12	10	12	11	11	11	10	10	10	10	9	9	8	8	7	5	5	5	4	4	4	4	4	4	4	4	3	3	3	3	3	0	0	0	0	0	0	100	227
Waste Management and Remediation Services (Impact in $ Thousands)	$594	$1,416	$1,829	$1,506	$1,788	$1,753	$1,665	$1,632	$1,600	$1,569	$1,538	$1,508	$1,437	$1,367	$1,194	$1,171	$1,108	$728	$714	$700	$686	$616	$604	$592	$581	$569	$558	$547	$536	$526	$516	$505	$496	$43	$42	$41	$41	$41	$40	$15,352	$34,837
Educational Services (Employment)	12	29	38	31	37	36	34	34	33	32	32	31	30	28	25	24	23	15	15	14	14	13	12	12	12	12	11	11	11	11	11	10	10	1	1	1	1	1	1	316	718
Educational Services (Impact in $ Thousands)	$422	$1,005	$1,298	$1,069	$1,269	$1,244	$1,181	$1,158	$1,135	$1,113	$1,091	$1,070	$1,020	$970	$847	$831	$786	$517	$507	$497	$487	$437	$429	$420	$412	$404	$396	$388	$381	$373	$366	$359	$352	$31	$30	$29	$29	$29	$28	$10,895	$24,721
Health Care and Social Assistance (Employment)	71	169	218	180	213	209	199	195	191	187	183	180	171	163	142	140	132	87	85	83	82	73	72	71	69	68	67	65	64	63	61	60	59	5	5	5	5	5	5	1,831	4,154
Health Care and Social Assistance (Impact in $ Thousands)	$4,396	$10,481	$13,536	$11,148	$13,233	$12,974	$12,318	$12,077	$11,840	$11,608	$11,380	$11,157	$10,633	$10,113	$8,836	$8,663	$8,200	$5,390	$5,284	$5,181	$5,079	$4,560	$4,470	$4,382	$4,297	$4,212	$4,130	$4,049	$3,969	$3,892	$3,815	$3,740	$3,667	$319	$312	$306	$300	$300	$294	$113,611	$257,798
Arts, Entertainment and Recreation (Employment)	46	111	143	118	140	137	130	127	125	122	120	118	112	107	93	91	86	57	56	55	54	48	47	46	45	44	44	43	42	41	40	39	39	3	3	3	3	3	3	1,198	2,719
Arts, Entertainment and Recreation (Impact in $ Thousands)	$1,911	$4,557	$5,885	$4,847	$5,753	$5,641	$5,356	$5,251	$5,148	$5,047	$4,948	$4,851	$4,623	$4,397	$3,842	$3,766	$3,565	$2,344	$2,298	$2,253	$2,208	$1,982	$1,944	$1,905	$1,868	$1,831	$1,796	$1,760	$1,726	$1,692	$1,659	$1,626	$1,594	$139	$136	$133	$131	$131	$128	$49,396	$112,086
Accommodation and Food Services (Employment)	185	441	569	469	556	545	518	508	498	488	478	469	447	425	372	364	345	227	222	218	214	192	188	184	181	177	174	170	167	164	160	157	154	13	13	13	13	13	12	4,777	10,839
Accommodation and Food Services (Impact in $ Thousands)	$5,233	$12,477	$16,114	$13,271	$15,753	$15,444	$14,664	$14,377	$14,095	$13,818	$13,547	$13,282	$12,658	$12,039	$10,519	$10,312	$9,761	$6,417	$6,291	$6,167	$6,047	$5,428	$5,321	$5,217	$5,115	$5,014	$4,916	$4,820	$4,725	$4,633	$4,542	$4,453	$4,365	$379	$372	$364	$357	$357	$350	$135,246	$306,890
Repair and Maintenance (Employment)	48	114	147	121	143	141	134	131	128	126	123	121	115	110	96	94	89	58	57	56	55	49	48	48	47	46	45	44	43	42	41	41	40	3	3	3	3	3	3	1,232	2,795
Repair and Maintenance (Impact in $ Thousands)	$2,294	$5,468	$7,062	$5,817	$6,904	$6,769	$6,427	$6,301	$6,177	$6,056	$5,938	$5,821	$5,548	$5,277	$4,610	$4,520	$4,278	$2,812	$2,757	$2,703	$2,650	$2,379	$2,332	$2,287	$2,242	$2,198	$2,155	$2,112	$2,071	$2,030	$1,991	$1,952	$1,913	$166	$163	$160	$157	$157	$154	$59,276	$134,503
Grant Making, Civic, and other Professiojnal and Similar Orgs (Employment)	10	25	32	26	31	30	29	28	28	27	27	26	25	24	21	20	19	13	12	12	12	11	10	10	10	10	10	9	9	9	9	9	9	1	1	1	1	1	1	266	604
Grant Making, Civic, and other Professiojnal and Similar Orgs (Impact in $Thousands)	$741	$1,767	$2,282	$1,880	$2,231	$2,187	$2,077	$2,036	$1,996	$1,957	$1,919	$1,881	$1,793	$1,705	$1,490	$1,461	$1,383	$909	$891	$874	$856	$769	$754	$739	$724	$710	$696	$683	$669	$656	$643	$631	$618	$54	$53	$52	$51	$51	$50	$19,156	$43,468
Personal and Laundry Services and Private Households (Employment)	90	215	278	229	271	266	253	248	243	238	233	229	218	207	181	178	168	111	108	106	104	94	92	90	88	86	85	83	81	80	78	77	75	7	6	6	6	6	6	2,330	5,287
Personal and Laundry Services and Private Households (Impact in $ Thousands)	$2,758	$6,577	$8,494	$6,995	$8,303	$8,141	$7,730	$7,578	$7,429	$7,284	$7,141	$7,001	$6,672	$6,346	$5,544	$5,436	$5,145	$3,382	$3,316	$3,251	$3,187	$2,861	$2,805	$2,750	$2,696	$2,643	$2,591	$2,540	$2,491	$2,442	$2,394	$2,347	$2,301	$200	$196	$192	$188	$188	$185	$71,289	$161,763
Non-Profit Institutions Serving Households (Excl Education) (Employment)	91	216	280	230	273	268	254	249	245	240	235	230	220	209	183	179	169	111	109	107	105	94	92	91	89	87	85	84	82	80	79	77	76	7	6	6	6	6	6	2,347	5,325
Non-Profit Institutions Serving Households (Excl Education) (Impact in $ Thousands)	$4,875	$11,622	$15,011	$12,363	$14,674	$14,387	$13,660	$13,392	$13,130	$12,872	$12,620	$12,372	$11,791	$11,215	$9,799	$9,606	$9,093	$5,977	$5,860	$5,745	$5,633	$5,056	$4,957	$4,860	$4,765	$4,671	$4,580	$4,490	$4,402	$4,315	$4,231	$4,148	$4,066	$353	$346	$340	$333	$333	$326	$125,986	$285,878
Non-Profit Education Institutions (Employment)	7	17	22	18	21	21	20	19	19	19	18	18	17	16	14	14	13	9	9	8	8	7	7	7	7	7	7	7	6	6	6	6	6	1	1	0	0	0	0	183	415
Non-Profit Education Institutions (Impact in $ Thousands)	$503	$1,199	$1,548	$1,275	$1,514	$1,484	$1,409	$1,381	$1,354	$1,328	$1,302	$1,276	$1,216	$1,157	$1,011	$991	$938	$617	$604	$593	$581	$522	$511	$501	$491	$482	$472	$463	$454	$445	$436	$428	$419	$36	$36	$35	$34	$34	$34	$12,994	$29,486
Hospitals and Residential Care Facilities (Employment)	11	26	34	28	33	32	31	30	29	29	28	28	26	25	22	22	20	13	13	13	13	11	11	11	11	10	10	10	10	10	10	9	9	1	1	1	1	1	1	283	642

APPENDIX B-4 MEDIAN SCENARIO - GROWTH RATE MULTIPLIER OF 1.50

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Hospitals and Residential Care Facilities (Impact in $ Thousands)	$890	$2,121	$2,740	$2,256	$2,678	$2,626	$2,493	$2,444	$2,396	$2,349	$2,303	$2,258	$2,152	$2,047	$1,788	$1,753	$1,660	$1,091	$1,070	$1,049	$1,028	$923	$905	$887	$870	$853	$836	$819	$803	$788	$772	$757	$742	$64	$63	$62	$61	$61	$60	$22,994	$52,177
Universities and Government Education Services (Employment)	23	54	69	57	68	67	63	62	61	60	58	57	55	52	45	44	42	28	27	27	26	23	23	22	22	22	21	21	20	20	20	19	19	2	2	2	2	2	2	583	1,322
Universities and Government Education Services (Impact in $ Thousands)	$1,959	$4,670	$6,031	$4,967	$5,896	$5,780	$5,488	$5,381	$5,275	$5,172	$5,070	$4,971	$4,737	$4,506	$3,937	$3,860	$3,653	$2,402	$2,354	$2,308	$2,263	$2,031	$1,992	$1,953	$1,914	$1,877	$1,840	$1,804	$1,768	$1,734	$1,700	$1,666	$1,634	$142	$139	$136	$134	$134	$131	$50,618	$114,859
Other Municipal Government Services (Employment)	24	58	75	62	74	72	69	67	66	65	63	62	59	56	49	48	46	30	29	29	28	25	25	24	24	23	23	23	22	22	21	21	20	2	2	2	2	2	2	632	1,435
Other Municipal Government Services (Impact in $ Thousands)	$2,278	$5,432	$7,015	$5,778	$6,858	$6,724	$6,384	$6,259	$6,136	$6,016	$5,898	$5,782	$5,511	$5,241	$4,579	$4,490	$4,250	$2,793	$2,739	$2,685	$2,632	$2,363	$2,317	$2,271	$2,227	$2,183	$2,140	$2,098	$2,057	$2,017	$1,977	$1,938	$1,900	$165	$162	$159	$156	$156	$153	$58,880	$133,605
Other Provincial and Territorial Government Services (Employment)	8	18	24	20	23	23	22	21	21	20	20	20	19	18	16	15	14	9	9	9	9	8	8	8	8	7	7	7	7	7	7	7	6	1	1	1	1	1	1	200	453
Other Provincial and Territorial Government Services (Impact in $ Thousands)	$685	$1,632	$2,108	$1,736	$2,061	$2,020	$1,918	$1,881	$1,844	$1,808	$1,772	$1,738	$1,656	$1,575	$1,376	$1,349	$1,277	$839	$823	$807	$791	$710	$696	$683	$669	$656	$643	$631	$618	$606	$594	$583	$571	$50	$49	$48	$47	$47	$46	$17,693	$40,148
Other Federal Government Services (Employment)	14	34	44	36	43	42	40	39	38	37	37	36	34	33	28	28	26	17	17	17	16	15	14	14	14	14	13	13	13	13	12	12	12	1	1	1	1	1	1	366	831
Other Federal Government Services (Impact in $ Thousands)	$1,603	$3,822	$4,936	$4,065	$4,825	$4,731	$4,492	$4,404	$4,317	$4,233	$4,150	$4,068	$3,877	$3,688	$3,222	$3,159	$2,990	$1,965	$1,927	$1,889	$1,852	$1,663	$1,630	$1,598	$1,567	$1,536	$1,506	$1,476	$1,447	$1,419	$1,391	$1,364	$1,337	$116	$114	$112	$109	$109	$107	$41,427	$94,004
TOTAL (Employment)	4,096	9,765	12,612	10,387	12,330	12,088	11,477	11,252	11,032	10,815	10,603	10,395	9,907	9,423	8,233	8,071	7,640	5,022	4,924	4,827	4,733	4,248	4,165	4,083	4,003	3,925	3,848	3,772	3,698	3,626	3,555	3,485	3,417	297	291	285	280	280	274	105,855	240,197
TOTAL (Impact in $ Millions)	$693	$1,652	$2,133	$1,757	$2,086	$2,045	$1,941	$1,903	$1,866	$1,829	$1,794	$1,758	$1,676	$1,594	$1,393	$1,365	$1,292	$850	$833	$817	$801	$719	$705	$691	$677	$664	$651	$638	$626	$613	$601	$589	$578	$50	$49	$48	$47	$47	$46	$17,906	$40,630

APPENDIX B-5 LOW SCENARIO - GROWTH RATE MULTIPLIER OF 1.25

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Crop and Animal Production (Employment)	12	28	36	30	36	35	33	32	32	31	31	30	29	27	24	23	22	14	14	14	14	12	12	12	12	11	11	11	11	10	10	10	10	1	1	1	1	1	1	305	692
Crop and Animal Production (Impact in $ Thousands)	$541	$1,290	$1,666	$1,372	$1,629	$1,597	$1,516	$1,487	$1,457	$1,429	$1,401	$1,373	$1,309	$1,245	$1,088	$1,066	$1,009	$663	$650	$638	$625	$561	$550	$539	$529	$518	$508	$498	$489	$479	$470	$460	$451	$39	$38	$38	$37	$37	$36	$13,984	$31,732
Forestry and Logging (Employment)	1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	28	63
Forestry and Logging (Impact in $ Thousands)	$91	$217	$280	$231	$274	$269	$255	$250	$245	$240	$236	$231	$220	$209	$183	$179	$170	$112	$109	$107	$105	$94	$93	$91	$89	$87	$86	$84	$82	$81	$79	$77	$76	$7	$6	$6	$6	$6	$6	$2,352	$5,337
Fishing, Hunting and Trapping (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing, Hunting and Trapping (Impact in $ Thousands)	$3	$8	$10	$8	$10	$10	$9	$9	$9	$9	$9	$8	$8	$8	$7	$7	$6	$4	$4	$4	$4	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$0	$0	$0	$0	$0	$0	$86	$195
Support Activities for Agriculture and Forestry (Employment)	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	14	31
Support Activities for Agriculture and Forestry (Impact in $ Thousands)	$42	$99	$128	$106	$125	$123	$117	$114	$112	$110	$108	$106	$101	$96	$84	$82	$78	$51	$50	$49	$48	$43	$42	$41	$41	$40	$39	$38	$38	$37	$36	$35	$35	$3	$3	$3	$3	$3	$3	$1,076	$2,441
Oil and Gas Extraction (Employment)	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	14	31
Oil and Gas Extraction (Impact in $ Thousands)	$71	$169	$219	$180	$214	$210	$199	$195	$191	$188	$184	$180	$172	$163	$143	$140	$133	$87	$85	$84	$82	$74	$72	$71	$69	$68	$67	$65	$64	$63	$62	$60	$59	$5	$5	$5	$5	$5	$5	$1,836	$4,166
Support Activities for Oil and Gas Extraction (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Support Activities for Oil and Gas Extraction (Impact in $ Thousands)	$1	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$2	$2	$2	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$0	$0	$0	$0	$0	$0	$29	$65
Mining (Employment)	1,299	3,098	4,001	3,295	3,911	3,834	3,641	3,569	3,499	3,431	3,364	3,298	3,143	2,989	2,612	2,560	2,424	1,593	1,562	1,531	1,501	1,348	1,321	1,295	1,270	1,245	1,221	1,197	1,173	1,150	1,128	1,106	1,084	94	92	90	89	89	87	33,579	76,195
Mining (Impact in $ Thousands)	$383,576	$914,491	$1,181,106	$972,740	$1,154,633	$1,131,994	$1,074,825	$1,053,750	$1,033,088	$1,012,831	$992,972	$973,502	$927,764	$882,431	$770,981	$755,863	$715,466	$470,314	$461,092	$452,051	$443,188	$397,836	$390,036	$382,388	$374,890	$367,539	$360,333	$353,267	$346,340	$339,549	$332,892	$326,364	$319,965	$27,795	$27,250	$26,716	$26,192	$26,192	$25,679	$9,913,033	$22,493,877
Support Activities for Mining (Employment)	75	178	230	189	225	220	209	205	201	197	193	189	180	172	150	147	139	91	90	88	86	77	76	74	73	71	70	69	67	66	65	63	62	5	5	5	5	5	5	1,928	4,375
Support Activities for Mining (Impact in $ Thousands)	$7,190	$17,143	$22,140	$18,234	$21,644	$21,220	$20,148	$19,753	$19,366	$18,986	$18,614	$18,249	$17,391	$16,542	$14,452	$14,169	$13,412	$8,816	$8,643	$8,474	$8,308	$7,458	$7,311	$7,168	$7,027	$6,890	$6,755	$6,622	$6,492	$6,365	$6,240	$6,118	$5,998	$521	$511	$501	$491	$491	$481	$185,824	$421,657
Electric Power Generation, Transmission and Distribution (Employment)	38	90	116	95	113	111	105	103	101	99	97	95	91	86	76	74	70	46	45	44	43	39	38	37	37	36	35	35	34	33	33	32	31	3	3	3	3	3	3	971	2,203
Electric Power Generation, Transmission and Distribution (Impact in $ Thousands)	$10,701	$25,513	$32,951	$27,138	$32,212	$31,581	$29,986	$29,398	$28,821	$28,256	$27,702	$27,159	$25,883	$24,618	$21,509	$21,087	$19,960	$13,121	$12,864	$12,611	$12,364	$11,099	$10,881	$10,668	$10,459	$10,254	$10,053	$9,856	$9,662	$9,473	$9,287	$9,105	$8,926	$775	$760	$745	$731	$731	$716	$276,556	$627,539
Natural Gas Distribution, Water, Sewage and Other Systems (Employment)	3	8	10	8	10	10	9	9	9	9	8	8	8	7	6	6	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	83	189
Natural Gas Distribution, Water, Sewage and Other Systems (Impact in $ Thousands)	$857	$2,043	$2,639	$2,173	$2,579	$2,529	$2,401	$2,354	$2,308	$2,263	$2,218	$2,175	$2,073	$1,971	$1,722	$1,689	$1,598	$1,051	$1,030	$1,010	$990	$889	$871	$854	$837	$821	$805	$789	$774	$759	$744	$729	$715	$62	$61	$60	$59	$59	$57	$22,145	$50,250
Construction (Employment)	92	219	283	233	276	271	257	252	247	242	238	233	222	211	184	181	171	113	110	108	106	95	93	91	90	88	86	85	83	81	80	78	77	7	7	6	6	6	6	2,372	5,382
Construction (Impact in $ Thousands)	$6,447	$15,371	$19,852	$16,350	$19,407	$19,027	$18,066	$17,712	$17,364	$17,024	$16,690	$16,363	$15,594	$14,832	$12,959	$12,705	$12,026	$7,905	$7,750	$7,598	$7,449	$6,687	$6,556	$6,427	$6,301	$6,178	$6,057	$5,938	$5,821	$5,707	$5,595	$5,486	$5,378	$467	$458	$449	$440	$440	$432	$166,619	$378,079
Food Manufacturing (Employment)	17	40	51	42	50	49	47	46	45	44	43	42	40	38	33	33	31	20	20	20	19	17	17	17	16	16	16	15	15	15	14	14	14	1	1	1	1	1	1	430	976
Food Manufacturing (Impact in $ Thousands)	$2,115	$5,042	$6,513	$5,364	$6,367	$6,242	$5,927	$5,810	$5,696	$5,585	$5,475	$5,368	$5,116	$4,866	$4,251	$4,168	$3,945	$2,593	$2,542	$2,493	$2,444	$2,194	$2,151	$2,108	$2,067	$2,027	$1,987	$1,948	$1,910	$1,872	$1,836	$1,800	$1,764	$153	$150	$147	$144	$144	$142	$54,660	$124,030
Beverage and Tobacco Product Manufacturing (Employment)	2	5	7	5	6	6	6	6	6	6	6	5	5	5	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	55	126
Beverage and Tobacco Product Manufacturing (Impact in $ Thousands)	$758	$1,807	$2,334	$1,923	$2,282	$2,237	$2,124	$2,083	$2,042	$2,002	$1,963	$1,924	$1,834	$1,744	$1,524	$1,494	$1,414	$930	$911	$893	$876	$786	$771	$756	$741	$726	$712	$698	$685	$671	$658	$645	$632	$55	$54	$53	$52	$52	$51	$19,592	$44,457
Textile and Textile Product Mills (Employment)	1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	28	63
Textile and Textile Product Mills (Impact in $ Thousands)	$65	$155	$200	$165	$195	$192	$182	$178	$175	$171	$168	$165	$157	$149	$131	$128	$121	$80	$78	$77	$75	$67	$66	$65	$63	$62	$61	$60	$59	$57	$56	$55	$54	$5	$5	$5	$4	$4	$4	$1,678	$3,808
Clothing Manufacturing (Employment)	2	4	5	4	5	5	5	4	4	4	4	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	42	94
Clothing Manufacturing (Impact in $ Thousands)	$69	$165	$214	$176	$209	$205	$194	$191	$187	$183	$180	$176	$168	$160	$139	$137	$129	$85	$83	$82	$80	$72	$71	$69	$68	$66	$65	$64	$63	$61	$60	$59	$58	$5	$5	$5	$5	$5	$5	$1,793	$4,068
Leather and Allied Product Manufacturing (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leather and Allied Product Manufacturing (Impact in $ Thousands)	$5	$12	$15	$13	$15	$15	$14	$14	$13	$13	$13	$13	$12	$11	$10	$10	$9	$6	$6	$6	$6	$5	$5	$5	$5	$5	$5	$5	$5	$4	$4	$4	$4	$0	$0	$0	$0	$0	$0	$129	$293
Wood Product Manufacturing (Employment)	2	4	5	4	5	5	5	4	4	4	4	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	42	94
Wood Product Manufacturing (Impact in $ Thousands)	$114	$271	$350	$289	$342	$336	$319	$313	$306	$300	$295	$289	$275	$262	$229	$224	$212	$139	$137	$134	$131	$118	$116	$113	$111	$109	$107	$105	$103	$101	$99	$97	$95	$8	$8	$8	$8	$8	$8	$2,940	$6,672
Paper Manufacturing (Employment)	5	12	15	12	15	14	14	13	13	13	13	12	12	11	10	10	9	6	6	6	6	5	5	5	5	5	5	4	4	4	4	4	4	0	0	0	0	0	0	125	283
Paper Manufacturing (Impact in $ Thousands)	$559	$1,334	$1,723	$1,419	$1,684	$1,651	$1,568	$1,537	$1,507	$1,477	$1,448	$1,420	$1,353	$1,287	$1,124	$1,102	$1,043	$686	$672	$659	$646	$580	$569	$558	$547	$536	$526	$515	$505	$495	$485	$476	$467	$41	$40	$39	$38	$38	$37	$14,457	$32,806
Printing and Related Support Activities (Employment)	9	22	28	23	27	27	26	25	25	24	24	23	22	21	18	18	17	11	11	11	11	9	9	9	9	9	9	8	8	8	8	8	8	1	1	1	1	1	1	236	535
Printing and Related Support Activities (Impact in $ Thousands)	$854	$2,035	$2,628	$2,165	$2,569	$2,519	$2,392	$2,345	$2,299	$2,254	$2,210	$2,166	$2,065	$1,964	$1,716	$1,682	$1,592	$1,047	$1,026	$1,006	$986	$885	$868	$851	$834	$818	$802	$786	$771	$756	$741	$726	$712	$62	$61	$59	$58	$58	$57	$22,059	$50,055
Petroleum and Coal Products Manufacturing (Employment)	5	13	17	14	16	16	15	15	14	14	14	14	13	12	11	11	10	7	6	6	6	6	5	5	5	5	5	5	5	5	5	5	4	0	0	0	0	0	0	139	315
Petroleum and Coal Products Manufacturing (Impact in $ Thousands)	$487	$1,160	$1,499	$1,234	$1,465	$1,436	$1,364	$1,337	$1,311	$1,285	$1,260	$1,235	$1,177	$1,120	$978	$959	$908	$597	$585	$574	$562	$505	$495	$485	$476	$466	$457	$448	$439	$431	$422	$414	$406	$35	$35	$34	$33	$33	$33	$12,579	$28,542
Chemical Manufacturing (Employment)	9	20	26	22	26	25	24	24	23	23	22	22	21	20	17	17	16	11	10	10	10	9	9	9	8	8	8	8	8	8	7	7	7	1	1	1	1	1	1	222	504
Chemical Manufacturing (Impact in $ Thousands)	$1,059	$2,525	$3,261	$2,685	$3,187	$3,125	$2,967	$2,909	$2,852	$2,796	$2,741	$2,687	$2,561	$2,436	$2,128	$2,087	$1,975	$1,298	$1,273	$1,248	$1,223	$1,098	$1,077	$1,056	$1,035	$1,015	$995	$975	$956	$937	$919	$901	$883	$77	$75	$74	$72	$72	$71	$27,366	$62,097
Plastics and Rubber Products Manufacturing (Employment)	9	20	26	22	26	25	24	24	23	23	22	22	21	20	17	17	16	11	10	10	10	9	9	9	8	8	8	8	8	8	7	7	7	1	1	1	1	1	1	222	504
Plastics and Rubber Products Manufacturing (Impact in $ Thousands)	$780	$1,859	$2,401	$1,977	$2,347	$2,301	$2,185	$2,142	$2,100	$2,059	$2,019	$1,979	$1,886	$1,794	$1,567	$1,537	$1,454	$956	$937	$919	$901	$809	$793	$777	$762	$747	$732	$718	$704	$690	$677	$663	$650	$57	$55	$54	$53	$53	$52	$20,152	$45,726
Non-Metallic Mineral Product Manufacturing (Employment)	6	15	20	16	19	19	18	18	17	17	17	16	16	15	13	13	12	8	8	8	7	7	7	6	6	6	6	6	6	6	6	5	5	0	0	0	0	0	0	166	378
Non-Metallic Mineral Product Manufacturing (Impact in $ Thousands)	$803	$1,915	$2,473	$2,037	$2,417	$2,370	$2,250	$2,206	$2,163	$2,120	$2,079	$2,038	$1,942	$1,847	$1,614	$1,582	$1,498	$985	$965	$946	$928	$833	$817	$801	$785	$769	$754	$740	$725	$711	$697	$683	$670	$58	$57	$56	$55	$55	$54	$20,754	$47,093
Primary Metal Manufacturing (Employment)	4	10	13	11	13	13	12	12	12	11	11	11	10	10	9	8	8	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	111	252
Primary Metal Manufacturing (Impact in $ Thousands)	$613	$1,462	$1,888	$1,555	$1,846	$1,810	$1,718	$1,685	$1,652	$1,619	$1,588	$1,556	$1,483	$1,411	$1,233	$1,208	$1,144	$752	$737	$723	$709	$636	$624	$611	$599	$588	$576	$565	$554	$543	$532	$522	$512	$44	$44	$43	$42	$42	$41	$15,849	$35,963
Fabricated Metal Products Manufacturing (Employment)	18	42	55	45	53	52	50	49	48	47	46	45	43	41	36	35	33	22	21	21	20	18	18	18	17	17	17	16	16	16	15	15	15	1	1	1	1	1	1	458	1,039
Fabricated Metal Products Manufacturing (Impact in $ Thousands)	$1,294	$3,084	$3,983	$3,281	$3,894	$3,818	$3,625	$3,554	$3,484	$3,416	$3,349	$3,283	$3,129	$2,976	$2,600	$2,549	$2,413	$1,586	$1,555	$1,525	$1,495	$1,342	$1,315	$1,290	$1,264	$1,240	$1,215	$1,191	$1,168	$1,145	$1,123	$1,101	$1,079	$94	$92	$90	$88	$88	$87	$33,433	$75,863
Machinery Manufacturing (Employment)	19	46	59	49	58	57	54	53	52	51	50	49	47	44	39	38	36	24	23	23	22	20	20	19	19	19	18	18	17	17	17	16	16	1	1	1	1	1	1	499	1,133
Machinery Manufacturing (Impact in $ Thousands)	$2,618	$6,241	$8,061	$6,639	$7,880	$7,726	$7,335	$7,192	$7,051	$6,912	$6,777	$6,644	$6,332	$6,022	$5,262	$5,159	$4,883	$3,210	$3,147	$3,085	$3,025	$2,715	$2,662	$2,610	$2,559	$2,508	$2,459	$2,411	$2,364	$2,317	$2,272	$2,227	$2,184	$190	$186	$182	$179	$179	$175	$67,655	$153,516
Computer and Electronic Product Manufacturing (Employment)	2	5	7	5	6	6	6	6	6	6	6	5	5	5	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	55	126
Computer and Electronic Product Manufacturing (Impact in $ Thousands)	$192	$458	$591	$487	$578	$567	$538	$528	$517	$507	$497	$487	$464	$442	$386	$378	$358	$235	$231	$226	$222	$199	$195	$191	$188	$184	$180	$177	$173	$170	$167	$163	$160	$14	$14	$13	$13	$13	$13	$4,963	$11,261

APPENDIX B-5 LOW SCENARIO - GROWTH RATE MULTIPLIER OF 1.25

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Electrical Equipment, Appliance and Component Manufacturing (Employment)	2	5	7	5	6	6	6	6	6	6	6	5	5	5	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	55	126
Electrical Equipment, Appliance and Component Manufacturing (Impact in $ Thousands)	$200	$478	$617	$508	$603	$591	$561	$550	$540	$529	$519	$508	$485	$461	$403	$395	$374	$246	$241	$236	$231	$208	$204	$200	$196	$192	$188	$185	$181	$177	$174	$170	$167	$15	$14	$14	$14	$14	$13	$5,178	$11,749
Transportation Equipment Manufacturing (Employment)	6	14	18	15	18	17	17	16	16	16	15	15	14	14	12	12	11	7	7	7	7	6	6	6	6	6	6	5	5	5	5	5	5	0	0	0	0	0	0	153	346
Transportation Equipment Manufacturing (Impact in $ Thousands)	$581	$1,384	$1,787	$1,472	$1,747	$1,713	$1,627	$1,595	$1,563	$1,533	$1,503	$1,473	$1,404	$1,335	$1,167	$1,144	$1,083	$712	$698	$684	$671	$602	$590	$579	$567	$556	$545	$535	$524	$514	$504	$494	$484	$42	$41	$40	$40	$40	$39	$15,002	$34,042
Furniture and Related Product Manufacturing (Employment)	2	4	5	4	5	5	5	4	4	4	4	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	42	94
Furniture and Related Product Manufacturing (Impact in $ Thousands)	$144	$344	$444	$366	$434	$426	$404	$396	$389	$381	$374	$366	$349	$332	$290	$284	$269	$177	$173	$170	$167	$150	$147	$144	$141	$138	$136	$133	$130	$128	$125	$123	$120	$10	$10	$10	$10	$10	$10	$3,729	$8,462
Miscellaneous Manufacturing (Employment)	3	8	10	8	10	10	9	9	9	9	8	8	8	7	6	6	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	83	189
Miscellaneous Manufacturing (Impact in $ Thousands)	$287	$684	$883	$728	$864	$847	$804	$788	$773	$758	$743	$728	$694	$660	$577	$565	$535	$352	$345	$338	$332	$298	$292	$286	$280	$275	$270	$264	$259	$254	$249	$244	$239	$21	$20	$20	$20	$20	$19	$7,415	$16,826
Wholesale Trade (Employment)	131	312	403	332	394	386	367	360	353	346	339	332	317	301	263	258	244	161	157	154	151	136	133	131	128	125	123	121	118	116	114	111	109	9	9	9	9	9	9	3,384	7,679
Wholesale Trade (Impact in $ Thousands)	$12,429	$29,632	$38,271	$31,519	$37,413	$36,679	$34,827	$34,144	$33,474	$32,818	$32,175	$31,544	$30,062	$28,593	$24,982	$24,492	$23,183	$15,239	$14,940	$14,647	$14,360	$12,891	$12,638	$12,390	$12,147	$11,909	$11,676	$11,447	$11,222	$11,002	$10,786	$10,575	$10,368	$901	$883	$866	$849	$849	$832	$321,205	$728,853
Retail Trade (Employment)	293	699	902	743	882	865	821	805	789	774	759	744	709	674	589	577	547	359	352	345	339	304	298	292	286	281	275	270	265	259	254	249	244	21	21	20	20	20	20	7,573	17,184
Retail Trade (Impact in $ Thousands)	$14,225	$33,913	$43,800	$36,073	$42,819	$41,979	$39,859	$39,078	$38,311	$37,560	$36,824	$36,102	$34,405	$32,724	$28,591	$28,031	$26,533	$17,441	$17,099	$16,764	$16,435	$14,753	$14,464	$14,181	$13,903	$13,630	$13,363	$13,101	$12,844	$12,592	$12,345	$12,103	$11,866	$1,031	$1,011	$991	$971	$971	$952	$367,618	$834,170
Truck Transportation (Employment)	24	58	74	61	73	71	68	66	65	64	63	61	58	56	49	48	45	30	29	28	28	25	25	24	24	23	23	22	22	21	21	21	20	2	2	2	2	2	2	624	1,416
Truck Transportation (Impact in $ Thousands)	$1,649	$3,932	$5,079	$4,183	$4,965	$4,868	$4,622	$4,531	$4,442	$4,355	$4,270	$4,186	$3,989	$3,794	$3,315	$3,250	$3,077	$2,022	$1,983	$1,944	$1,906	$1,711	$1,677	$1,644	$1,612	$1,580	$1,549	$1,519	$1,489	$1,460	$1,431	$1,403	$1,376	$120	$117	$115	$113	$113	$110	$42,627	$96,725
Transit and Ground Passenger Transportation (Employment)	19	45	58	48	57	55	53	52	51	50	49	48	45	43	38	37	35	23	23	22	22	19	19	19	18	18	18	17	17	17	16	16	16	1	1	1	1	1	1	485	1,102
Transit and Ground Passenger Transportation (Impact in $ Thousands)	$1,198	$2,857	$3,689	$3,039	$3,607	$3,536	$3,357	$3,292	$3,227	$3,164	$3,102	$3,041	$2,898	$2,756	$2,408	$2,361	$2,235	$1,469	$1,440	$1,412	$1,384	$1,243	$1,218	$1,194	$1,171	$1,148	$1,126	$1,104	$1,082	$1,061	$1,040	$1,019	$999	$87	$85	$83	$82	$82	$80	$30,966	$70,265
Pipeline Transportation (Employment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pipeline Transportation (Impact in $ Thousands)	$417	$994	$1,283	$1,057	$1,255	$1,230	$1,168	$1,145	$1,123	$1,101	$1,079	$1,058	$1,008	$959	$838	$821	$777	$511	$501	$491	$482	$432	$424	$415	$407	$399	$392	$384	$376	$369	$362	$355	$348	$30	$30	$29	$28	$28	$28	$10,771	$24,442
Other Transportation (Employment)	18	42	55	45	53	52	50	49	48	47	46	45	43	41	36	35	33	22	21	21	20	18	18	18	17	17	17	16	16	16	15	15	15	1	1	1	1	1	1	458	1,039
Other Transportation (Impact in $ Thousands)	$2,264	$5,398	$6,972	$5,742	$6,816	$6,682	$6,345	$6,220	$6,098	$5,979	$5,862	$5,747	$5,477	$5,209	$4,551	$4,462	$4,224	$2,776	$2,722	$2,669	$2,616	$2,348	$2,302	$2,257	$2,213	$2,170	$2,127	$2,085	$2,045	$2,004	$1,965	$1,927	$1,889	$164	$161	$158	$155	$155	$152	$58,518	$132,785
Postal Service and Couriers and Messengers (Employment)	23	55	71	59	69	68	65	63	62	61	60	59	56	53	46	45	43	28	28	27	27	24	23	23	23	22	22	21	21	20	20	20	19	2	2	2	2	2	2	596	1,353
Postal Service and Couriers and Messengers (Impact in $ Thousands)	$1,448	$3,453	$4,460	$3,673	$4,360	$4,275	$4,059	$3,979	$3,901	$3,825	$3,750	$3,676	$3,504	$3,332	$2,911	$2,854	$2,702	$1,776	$1,741	$1,707	$1,674	$1,502	$1,473	$1,444	$1,416	$1,388	$1,361	$1,334	$1,308	$1,282	$1,257	$1,232	$1,208	$105	$103	$101	$99	$99	$97	$37,434	$84,943
Warehousing and Storage (Employment)	5	12	15	12	15	14	14	13	13	13	13	12	12	11	10	10	9	6	6	6	6	5	5	5	5	5	5	4	4	4	4	4	4	0	0	0	0	0	0	125	283
Warehousing and Storage (Impact in $ Thousands)	$313	$746	$964	$794	$942	$924	$877	$860	$843	$826	$810	$794	$757	$720	$629	$617	$584	$384	$376	$369	$362	$325	$318	$312	$306	$300	$294	$288	$283	$277	$272	$266	$261	$23	$22	$22	$21	$21	$21	$8,089	$18,356
Motion Picture and Sound Recording Industries (Employment)	6	15	20	16	19	19	18	18	17	17	17	16	16	15	13	13	12	8	8	8	7	7	7	6	6	6	6	6	6	6	6	5	5	0	0	0	0	0	0	166	378
Motion Picture and Sound Recording Industries (Impact in $ Thousands)	$453	$1,080	$1,394	$1,148	$1,363	$1,336	$1,269	$1,244	$1,220	$1,196	$1,172	$1,149	$1,095	$1,042	$910	$892	$845	$555	$544	$534	$523	$470	$460	$451	$443	$434	$425	$417	$409	$401	$393	$385	$378	$33	$32	$32	$31	$31	$30	$11,704	$26,557
Publishing, Broadcasting, Telecom, and Other Information Services (Employment)	50	119	154	127	150	147	140	137	134	132	129	127	121	115	100	98	93	61	60	59	58	52	51	50	49	48	47	46	45	44	43	42	42	4	4	3	3	3	3	1,290	2,927
Publishing, Broadcasting, Telecom, and Other Information Services (Impact in $ Thousands)	$7,696	$18,349	$23,699	$19,518	$23,168	$22,713	$21,566	$21,143	$20,729	$20,322	$19,924	$19,533	$18,616	$17,706	$15,470	$15,166	$14,356	$9,437	$9,252	$9,070	$8,893	$7,983	$7,826	$7,673	$7,522	$7,375	$7,230	$7,088	$6,949	$6,813	$6,679	$6,548	$6,420	$558	$547	$536	$526	$526	$515	$198,905	$451,339
Finance, Insurance, Real Estate and Rental and Leasing (Employment)	265	631	815	671	796	781	741	727	713	699	685	672	640	609	532	521	494	324	318	312	306	274	269	264	259	254	249	244	239	234	230	225	221	19	19	18	18	18	18	6,838	15,516
Finance, Insurance, Real Estate and Rental and Leasing (Impact in $ Thousands)	$61,814	$147,372	$190,338	$156,759	$186,071	$182,423	$173,210	$169,814	$166,484	$163,220	$160,019	$156,882	$149,511	$142,205	$124,245	$121,809	$115,299	$75,792	$74,306	$72,849	$71,421	$64,112	$62,855	$61,623	$60,414	$59,230	$58,068	$56,930	$55,813	$54,719	$53,646	$52,594	$51,563	$4,479	$4,391	$4,305	$4,221	$4,221	$4,138	$1,597,505	$3,624,933
Professional, Scientific and Technical Services (Employment)	241	575	742	611	725	711	675	662	649	636	624	612	583	554	484	475	449	295	290	284	278	250	245	240	236	231	226	222	218	213	209	205	201	17	17	17	16	16	16	6,228	14,131
Professional, Scientific and Technical Services (Impact in $ Thousands)	$17,926	$42,737	$55,197	$45,459	$53,960	$52,902	$50,230	$49,245	$48,280	$47,333	$46,405	$45,495	$43,358	$41,239	$36,031	$35,324	$33,436	$21,979	$21,548	$21,126	$20,712	$18,592	$18,228	$17,870	$17,520	$17,176	$16,840	$16,509	$16,186	$15,868	$15,557	$15,252	$14,953	$1,299	$1,274	$1,249	$1,224	$1,224	$1,200	$463,269	$1,051,215
Administrative and Support Services (Employment)	159	380	491	404	480	470	447	438	429	421	413	405	386	367	320	314	297	195	192	188	184	165	162	159	156	153	150	147	144	141	138	136	133	12	11	11	11	11	11	4,119	9,347
Administrative and Support Services (Impact in $ Thousands)	$6,465	$15,413	$19,907	$16,395	$19,461	$19,079	$18,116	$17,760	$17,412	$17,071	$16,736	$16,408	$15,637	$14,873	$12,994	$12,740	$12,059	$7,927	$7,771	$7,619	$7,470	$6,705	$6,574	$6,445	$6,319	$6,195	$6,073	$5,954	$5,837	$5,723	$5,611	$5,501	$5,393	$468	$459	$450	$441	$441	$433	$167,078	$379,121
Waste Management and Remediation Services (Employment)	3	8	10	8	10	10	9	9	9	9	8	8	8	7	6	6	6	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	83	189
Waste Management and Remediation Services (Impact in $ Thousands)	$495	$1,180	$1,524	$1,255	$1,490	$1,461	$1,387	$1,360	$1,333	$1,307	$1,282	$1,256	$1,197	$1,139	$995	$976	$923	$607	$595	$583	$572	$513	$503	$494	$484	$474	$465	$456	$447	$438	$430	$421	$413	$36	$35	$34	$34	$34	$33	$12,794	$29,030
Educational Services (Employment)	10	24	31	26	31	30	29	28	27	27	26	26	25	23	20	20	19	13	12	12	12	11	10	10	10	10	10	9	9	9	9	9	9	1	1	1	1	1	1	264	598
Educational Services (Impact in $ Thousands)	$351	$838	$1,082	$891	$1,057	$1,037	$984	$965	$946	$928	$909	$892	$850	$808	$706	$692	$655	$431	$422	$414	$406	$364	$357	$350	$343	$337	$330	$324	$317	$311	$305	$299	$293	$25	$25	$24	$24	$24	$24	$9,079	$20,601
Health Care and Social Assistance (Employment)	59	141	182	150	178	174	165	162	159	156	153	150	143	136	119	116	110	72	71	70	68	61	60	59	58	57	55	54	53	52	51	50	49	4	4	4	4	4	4	1,526	3,462
Health Care and Social Assistance (Impact in $ Thousands)	$3,663	$8,734	$11,280	$9,290	$11,028	$10,811	$10,265	$10,064	$9,867	$9,673	$9,484	$9,298	$8,861	$8,428	$7,363	$7,219	$6,833	$4,492	$4,404	$4,317	$4,233	$3,800	$3,725	$3,652	$3,580	$3,510	$3,441	$3,374	$3,308	$3,243	$3,179	$3,117	$3,056	$265	$260	$255	$250	$250	$245	$94,676	$214,832
Arts, Entertainment and Recreation (Employment)	39	92	119	98	116	114	108	106	104	102	100	98	93	89	78	76	72	47	46	46	45	40	39	39	38	37	36	36	35	34	34	33	32	3	3	3	3	3	3	999	2,266
Arts, Entertainment and Recreation (Impact in $ Thousands)	$1,593	$3,797	$4,905	$4,039	$4,795	$4,701	$4,463	$4,376	$4,290	$4,206	$4,123	$4,042	$3,853	$3,664	$3,201	$3,139	$2,971	$1,953	$1,915	$1,877	$1,840	$1,652	$1,620	$1,588	$1,557	$1,526	$1,496	$1,467	$1,438	$1,410	$1,382	$1,355	$1,329	$115	$113	$111	$109	$109	$107	$41,164	$93,405
Accommodation and Food Services (Employment)	154	367	474	391	464	455	432	423	415	407	399	391	373	354	310	304	287	189	185	182	178	160	157	154	151	148	145	142	139	136	134	131	128	11	11	11	11	11	10	3,981	9,033
Accommodation and Food Services (Impact in $ Thousands)	$4,361	$10,397	$13,428	$11,059	$13,127	$12,870	$12,220	$11,980	$11,746	$11,515	$11,289	$11,068	$10,548	$10,033	$8,766	$8,594	$8,134	$5,347	$5,242	$5,140	$5,039	$4,523	$4,434	$4,348	$4,262	$4,179	$4,097	$4,016	$3,938	$3,860	$3,785	$3,711	$3,638	$316	$310	$304	$298	$298	$292	$112,705	$255,741
Repair and Maintenance (Employment)	40	95	122	101	120	117	111	109	107	105	103	101	96	91	80	78	74	49	48	47	46	41	40	40	39	38	37	37	36	35	34	34	33	3	3	3	3	3	3	1,026	2,329
Repair and Maintenance (Impact in $ Thousands)	$1,911	$4,557	$5,885	$4,847	$5,753	$5,641	$5,356	$5,251	$5,148	$5,047	$4,948	$4,851	$4,623	$4,397	$3,842	$3,766	$3,565	$2,344	$2,298	$2,253	$2,208	$1,982	$1,944	$1,905	$1,868	$1,831	$1,796	$1,760	$1,726	$1,692	$1,659	$1,626	$1,594	$139	$136	$133	$131	$131	$128	$49,396	$112,086
Grant Making, Civic, and other Professiojnal and Similar Orgs (Employment)	9	20	26	22	26	25	24	24	23	23	22	22	21	20	17	17	16	11	10	10	10	9	9	9	8	8	8	8	8	8	7	7	7	1	1	1	1	1	1	222	504
Grant Making, Civic, and other Professiojnal and Similar Orgs (Impact in $Thousands)	$618	$1,473	$1,902	$1,566	$1,859	$1,823	$1,731	$1,697	$1,664	$1,631	$1,599	$1,568	$1,494	$1,421	$1,242	$1,217	$1,152	$757	$743	$728	$714	$641	$628	$616	$604	$592	$580	$569	$558	$547	$536	$526	$515	$45	$44	$43	$42	$42	$41	$15,963	$36,223
Personal and Laundry Services and Private Households (Employment)	75	179	231	191	226	222	211	206	202	198	195	191	182	173	151	148	140	92	90	89	87	78	76	75	73	72	71	69	68	67	65	64	63	5	5	5	5	5	5	1,942	4,406
Personal and Laundry Services and Private Households (Impact in $ Thousands)	$2,299	$5,480	$7,078	$5,829	$6,920	$6,784	$6,441	$6,315	$6,191	$6,070	$5,951	$5,834	$5,560	$5,288	$4,620	$4,530	$4,288	$2,819	$2,763	$2,709	$2,656	$2,384	$2,337	$2,292	$2,247	$2,203	$2,159	$2,117	$2,076	$2,035	$1,995	$1,956	$1,918	$167	$163	$160	$157	$157	$154	$59,407	$134,803
Non-Profit Institutions Serving Households (Excl Education) (Employment)	76	180	233	192	228	223	212	208	204	200	196	192	183	174	152	149	141	93	91	89	87	78	77	75	74	73	71	70	68	67	66	64	63	5	5	5	5	5	5	1,956	4,438
Non-Profit Institutions Serving Households (Excl Education) (Impact in $ Thousands)	$4,062	$9,685	$12,509	$10,302	$12,229	$11,989	$11,383	$11,160	$10,941	$10,727	$10,517	$10,310	$9,826	$9,346	$8,165	$8,005	$7,577	$4,981	$4,883	$4,788	$4,694	$4,213	$4,131	$4,050	$3,970	$3,893	$3,816	$3,741	$3,668	$3,596	$3,526	$3,457	$3,389	$294	$289	$283	$277	$277	$272	$104,989	$238,232
Non-Profit Education Institutions (Employment)	6	14	18	15	18	17	17	16	16	16	15	15	14	14	12	12	11	7	7	7	7	6	6	6	6	6	6	5	5	5	5	5	5	0	0	0	0	0	0	153	346
Non-Profit Education Institutions (Impact in $ Thousands)	$419	$999	$1,290	$1,063	$1,261	$1,237	$1,174	$1,151	$1,129	$1,106	$1,085	$1,063	$1,013	$964	$842	$826	$782	$514	$504	$494	$484	$435	$426	$418	$410	$401	$394	$386	$378	$371	$364	$357	$350	$30	$30	$29	$29	$29	$28	$10,829	$24,572
Hospitals and Residential Care Facilities (Employment)	9	22	28	23	27	27	26	25	25	24	24	23	22	21	18	18	17	11	11	11	11	9	9	9	9	9	9	8	8	8	8	8	8	1	1	1	1	1	1	236	535
Hospitals and Residential Care Facilities (Impact in $ Thousands)	$741	$1,768	$2,283	$1,880	$2,232	$2,188	$2,078	$2,037	$1,997	$1,958	$1,919	$1,882	$1,793	$1,706	$1,490	$1,461	$1,383	$909	$891	$874	$857	$769	$754	$739	$725	$710	$697	$683	$669	$656	$643	$631	$618	$54	$53	$52	$51	$51	$50	$19,162	$43,481

APPENDIX B-5 LOW SCENARIO - GROWTH RATE MULTIPLIER OF 1.25

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	Cumulative (2013-2022)	Cumulative 39 years
Universities and Government Education Services (Employment)	19	45	58	48	57	55	53	52	51	50	49	48	45	43	38	37	35	23	23	22	22	19	19	19	18	18	18	17	17	17	16	16	16	1	1	1	1	1	1	485	1,102
Universities and Government Education Services (Impact in $ Thousands)	$1,632	$3,891	$5,026	$4,139	$4,913	$4,817	$4,574	$4,484	$4,396	$4,310	$4,225	$4,142	$3,948	$3,755	$3,281	$3,216	$3,044	$2,001	$1,962	$1,924	$1,886	$1,693	$1,660	$1,627	$1,595	$1,564	$1,533	$1,503	$1,474	$1,445	$1,417	$1,389	$1,362	$118	$116	$114	$111	$111	$109	$42,182	$95,716
Other Municipal Government Services (Employment)	20	49	63	52	61	60	57	56	55	54	53	52	49	47	41	40	38	25	25	24	24	21	21	20	20	20	19	19	18	18	18	17	17	1	1	1	1	1	1	527	1,196
Other Municipal Government Services (Impact in $ Thousands)	$1,899	$4,526	$5,846	$4,815	$5,715	$5,603	$5,320	$5,216	$5,113	$5,013	$4,915	$4,819	$4,592	$4,368	$3,816	$3,741	$3,541	$2,328	$2,282	$2,238	$2,194	$1,969	$1,931	$1,893	$1,856	$1,819	$1,784	$1,749	$1,714	$1,681	$1,648	$1,615	$1,584	$138	$135	$132	$130	$130	$127	$49,066	$111,338
Other Provincial and Territorial Government Services (Employment)	6	15	20	16	19	19	18	18	17	17	17	16	16	15	13	13	12	8	8	8	7	7	7	6	6	6	6	6	6	6	6	5	5	0	0	0	0	0	0	166	378
Other Provincial and Territorial Government Services (Impact in $ Thousands)	$571	$1,360	$1,757	$1,447	$1,717	$1,684	$1,599	$1,567	$1,537	$1,506	$1,477	$1,448	$1,380	$1,312	$1,147	$1,124	$1,064	$700	$686	$672	$659	$592	$580	$569	$558	$547	$536	$525	$515	$505	$495	$485	$476	$41	$41	$40	$39	$39	$38	$14,744	$33,457
Other Federal Government Services (Employment)	12	28	36	30	36	35	33	32	32	31	31	30	29	27	24	23	22	14	14	14	14	12	12	12	12	11	11	11	11	10	10	10	10	1	1	1	1	1	1	305	692
Other Federal Government Services (Impact in $ Thousands)	$1,336	$3,185	$4,113	$3,388	$4,021	$3,942	$3,743	$3,670	$3,598	$3,527	$3,458	$3,390	$3,231	$3,073	$2,685	$2,632	$2,492	$1,638	$1,606	$1,574	$1,543	$1,385	$1,358	$1,332	$1,306	$1,280	$1,255	$1,230	$1,206	$1,183	$1,159	$1,137	$1,114	$97	$95	$93	$91	$91	$89	$34,523	$78,337
TOTAL (Employment)	3,413	8,138	10,510	8,656	10,275	10,073	9,564	9,377	9,193	9,013	8,836	8,663	8,256	7,852	6,861	6,726	6,367	4,185	4,103	4,023	3,944	3,540	3,471	3,403	3,336	3,271	3,206	3,144	3,082	3,022	2,962	2,904	2,847	247	242	238	233	233	229	88,212	200,164
TOTAL (Impact in $ Millions)	$577	$1,377	$1,778	$1,464	$1,738	$1,704	$1,618	$1,586	$1,555	$1,525	$1,495	$1,465	$1,396	$1,328	$1,160	$1,138	$1,077	$708	$694	$680	$667	$599	$587	$576	$564	$553	$542	$532	$521	$511	$501	$491	$482	$42	$41	$40	$39	$39	$39	$14,921	$33,858

APPENDIX B-6 EMPLOYMENT REQUIREMENTS PER PROJECT

Occupation Category	Gitfs Natural Resources		Noront Resources		Rainy River Resources		Rubicon Minerals		Osisko Resources		Stillwater Canada		Goldcorp Red Lake		Bending Lake		Treasury Metals		North American Palladium	
Trades and Undesignated Occupations	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Labourers in mineral and metal processing	41	41	44	22	44	40	3	18	55	29	22	20	7	7	46	20	10	13	0	11
Construction millwrights and industrial mechanics (except textile)	39	39	41	21	42	38	3	17	52	27	21	19	6	6	44	19	9	12	0	10
Underground production and development miners	61	61	65	32	66	60	5	27	81	43	32	29	10	10	68	29	15	19	0	16
Heavy equipment operators (except crane)	27	27	29	14	30	27	2	12	36	19	14	13	4	4	31	13	7	9	0	7
Industrial electricians	22	22	23	12	25	23	2	10	29	15	12	11	4	4	25	11	5	7	0	6
Material handlers	18	18	19	10	14	13	1	6	24	13	10	9	2	2	15	6	3	4	0	5
Machine operators, mineral and metal processing	17	17	18	9	19	18	1	8	22	12	9	8	3	3	20	9	4	6	0	4
Heavy duty equipment mechanics	15	15	16	8	17	16	1	7	21	11	8	8	3	3	18	8	4	5	0	4
Central control and process operators, mineral and metal processing	14	14	15	8	18	17	1	8	19	10	8	7	3	3	19	8	4	5	0	4
Truck drivers	14	14	15	8	15	14	1	6	19	10	8	7	2	2	16	7	3	5	0	4
Welders and related machine operators	13	13	14	7	13	12	1	5	17	9	7	6	2	2	14	6	3	4	0	3
Underground mine service and support workers	10	10	11	5	11	10	1	5	14	7	5	5	2	2	12	5	3	3	0	3
Mine labourers	9	9	10	5	10	9	1	4	12	6	5	4	2	2	11	5	2	3	0	2
Construction trades helpers and labourers	6	6	7	3	6	6	0	3	9	5	3	3	1	1	6	3	1	2	0	2
Steamfitters, pipefitters and sprinkler system installers	5	5	5	3	5	5	0	2	7	4	3	3	1	1	5	2	1	2	0	1
Drillers and blasters - Surface mining, quarrying and construction	3	3	3	1	4	4	0	2	3	2	1	1	1	1	4	2	1	1	0	1
Crane operators	3	3	3	1	19	18	1	8	3	2	1	1	3	3	20	9	4	6	0	1
Carpenters	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Plumbers	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Other trades helpers and labourers	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Professional and Physical Science Occupations	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Geologists, geochemists and geophysicists	10	10	11	5	11	10	1	5	14	7	5	5	2	2	12	5	3	3	0	3
Mining Engineers	8	8	8	4	8	8	1	3	10	5	4	4	1	1	8	4	2	2	0	2
Industrial and manufacturing engineers	5	5	5	3	6	6	0	3	7	4	3	3	1	1	6	3	1	2	0	1
Metallurgical and materials engineers	4	4	4	2	4	4	0	2	5	3	2	2	1	1	4	2	1	1	0	1
Mechanical engineers	4	4	4	2	4	4	0	2	5	3	2	2	1	1	4	2	1	1	0	1
Other professional occupations in physical sciences	3	3	3	1	4	4	0	2	3	2	1	1	1	1	4	2	1	1	0	1
Chemists	1	1	1	1	2	2	0	1	2	1	1	1	0	0	2	1	0	1	0	0
Electrical and electronics engineers	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Chemical engineers	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Civil engineers	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Geological engineers	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Other professional engineers, n.e.c.	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Biologists and related scientists	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Human Resources and Financial Occupations	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Financial auditors and accountants	6	6	7	3	7	7	1	3	9	5	3	3	1	1	7	3	2	2	0	2
Human resources managers	3	3	3	1	4	4	0	2	3	2	1	1	1	1	4	2	1	1	0	1
Financial managers	3	3	3	1	4	4	0	2	3	2	1	1	1	1	4	2	1	1	0	1
Specialists in human resources	1	1	1	1	2	2	0	1	2	1	1	1	0	0	2	1	0	1	0	0
Financial and investment analysts	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Support Workers	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Inspectors and testers, mineral and metal processing	17	17	18	9	8	8	1	3	22	12	9	8	1	1	8	4	2	2	0	4
Dispatchers and radio operators	5	5	5	3	4	4	0	2	7	4	3	3	1	1	4	2	1	1	0	1
Secretaries (except legal and medical)	4	4	4	2	5	5	0	2	5	3	2	2	1	1	5	2	1	2	0	1
Transportation route and crew schedulers	4	4	4	2	0	0	0	0	5	3	2	2	0	0	0	0	0	0	0	1
Administrative clerks	3	3	3	1	2	2	0	1	3	2	1	1	0	0	2	1	0	1	0	1
Production clerks	1	1	1	1	5	5	0	2	2	1	1	1	1	1	5	2	1	2	0	0
Construction estimators	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Cooks	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Inspectors in public and environmental health and occupational health and safety	1	1	1	1	2	2	0	1	2	1	1	1	0	0	2	1	0	1	0	0

APPENDIX B-6 EMPLOYMENT REQUIREMENTS PER PROJECT

Occupation Category	Cliffs Natural Resources		Noront Resources		Rainy River Resources		Rubicon Minerals		Osisko Resources		Stillwater Canada		Goldcorp Red Lake		Bending Lake		Treasury Metals		North American Palladium	
Support Workers	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Engineering inspectors and regulatory officers	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Technical Occupations	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Geological and mineral technologists and technicians	10	10	11	5	11	10	1	5	14	7	5	5	2	2	12	5	3	3	0	3
Chemical technologists and technicians	5	5	5	3	5	5	0	2	7	4	3	3	1	1	5	2	1	2	0	1
Industrial engineering and manufacturing technologists and technicians	4	4	4	2	5	5	0	2	5	3	2	2	1	1	5	2	1	2	0	1
Electrical and electronics engineering technologists and engineering	3	3	3	1	2	2	0	1	3	2	1	1	0	0	2	1	0	1	0	1
Mechanical engineering technologists and technicians	3	3	3	1	2	2	0	1	3	2	1	1	0	0	2	1	0	1	0	1
Land surveyors	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Drafting technologist and technicians	1	1	1	1	1	1	0	0	2	1	1	1	0	0	1	0	0	0	0	0
Civil engineering technologists and technicians	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Mapping and related technologists and technicians	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Land surveying technologists and technicians	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Biological technologists and technicians	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Supervisors, Coordinators and Foremen	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Supervisors, mineral and metal processing	22	22	23	12	25	23	2	10	29	15	12	11	4	4	25	11	5	7	0	6
Supervisors, mining and quarrying	18	18	19	10	20	19	2	8	24	13	10	9	3	3	21	9	5	6	0	5
Primary production managers (except agriculture)	9	9	10	5	10	9	1	4	12	6	5	4	2	2	11	5	2	3	0	2
Contracts and supervisors, pipe fitting trades	4	4	4	2	2	2	0	1	5	3	2	2	0	0	2	1	0	1	0	1
Engineering managers	3	3	3	1	2	2	0	1	3	2	1	1	0	0	2	1	0	1	0	1
Construction managers	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Contractors and supervisors, mechanic trades	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
All Other Occupations	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
All Other Occupations	244	244	260	130	138	127	10	57	325	172	130	119	20	20	143	61	31	41	0	64

APPENDIX B-7 INDIVIDUAL PROJECT INFORMATION & ASSUMPTIONS

Company Name	Production Start Year	Production End Year	Project Name	Capex ($M)	Capex/year Construction ($M)	Capex/Year Pre- Construction ($M)	Construction Jobs	Operation Jobs	Operating Costs (dollars per quantity)	Operating cost ($M per year)	Production (per year)	Product Value ($M per year)
Cliff's Natural Resources	2017	2045	Black Thor Chromite	$1,450	$544	$36	750	750		$900	600,000 tonnes	$1,452
Noront Resources	2016	2026	Eagle's Nest Cu / Ni	$609	$228	$15	800	400	$97 tonne	$97	1,000,000 tonnes	$322
Rainy Rivers Resources Corp	2016	2028	Rainy Rivers Gold	$694	$260	$17	675	618	$486 oz	$15	30,800 oz	$53
Rubicon Minerals	2014	2025	Phoenix Gold	$300	$113	$8	50	278	$300 oz	$58	191,667 oz	$329
Osisko Resources	2016	2029	Hammond Reef Gold	$614	$230	$15	1000	530	$382 oz	$141	369,000 oz	$632
Stillwater Canada	2015	2026	Marathon Cu / Pt / Pd	$400	$150	$10	400	365		$106		$223
Goldcorp	2014	2033	Red Lake Gold	$420	$158	$11	100	100	$350 oz	$91	260,000 oz	$446
Bending Lake	2016	2050	Bending Lake Iron	$1,000	$375	$25	700	300	$50 tonne	$88	1,750,000 tonnes	$200
Treasury Metals	2015	2024	Goliath Gold	$92	$35	$2	150	200	$698 oz gold	$55	79,300 oz gold 189,200 oz silver	$142
North American Palladium	2012	2018	Lac Des Isles	$204	$77	$5		196	$300 oz	$65	215,000 oz Pd	$138

Commodity Prices (Updated 15-Nov-2012)		Tax Rates (based on Dungan, Murphy 2007)	
gold / oz	$1,714	During Construction	
silver / oz	$33	Federal	14.6% GDP
platinum / oz	$1,570	Provincial	11.8% GDP
palladium / oz	$640	Municipal	3.8% GDP
chromite / kg	$2.42	During Operation	
copper / lb	$3.50	Federal	14.6% GDP
nickel / lb	$7.25	Provincial	11.8% GDP
iron / tonne	$114	Municipal	3.8% GDP
GDP per job		$169,152	

ASSUMPTIONS
Assumes 10% Capex for pre - construction activities
Assumes 75% Capex for construction activities
Assumes even annual distribution of Capex within phase
Assumes Construction Phase of 2 years and a Pre-Construction Phase of 4 years
Assumes constant rate of production throughought the years of operation. However, total production through the life of mine does not exceed available resource in each individual mine.
Tax revenues are an estimate based on implied Tax:GDP ratios from "The Economic Impacts of a Representative mine in Ontario" Dungan, Murphy, 2007.
Annual Inflation rate of 2% were assumed in calculating Capex and Operation Costs in 2012 dollars
Stillwater Canada and Noront Resources Production and Operation numbers derived from Life of Mine (LOM) earnings figures within Technical Report (best information available as of 15-Nov-2012)
Rainy Rivers Resources, Bending Lake, Osisko Resources and Rubicon Minerals, Treasury Metals and GoldCorp Inc. Production and Operation numbers were derived from projected annual metal/mineral extraction rates. Operation numbers were derived from operation cost / product amount ratios listed in Technical Reports/ Project Overviews .
Production numbers based on commodity prices were calculated using current prices (date updated indicated in table)
Cliff's Chromite Production values were derived based on annual extraction rates. Operation values are an estimate based on annual production.
Employment Categories proportions were derived from the "Custom Labour Market Report for Thunder Bay 2012" by the MiHR.
Projections on Direct and Indirect Impacts on Employment were based on "Mining: Dynamic and Dependable for Ontario's future", Dungan, Murphy. December 2012

Project Information	
Company Name	**Website**
Cliff's Natural Resources	www.cliffsnaturalresources.com/
Noront Resources	www.norontresources.com/
Rainy Rivers Resources Corp	www.rainyriverresources.com/
Rubicon Minerals	www.rubiconminerals.com/
Osisko Resources	www.osisko.com/
North American Palladium	http://www.napalladium.com/
Stillwater Canada	www.marathonpgmproject.com/
Goldcorp	www.goldcorp.com/
Bending Lake	www.bendinglakeiron.com/
Treasury Metals	www.treasurymetals.com/

Appendix C

Education and Training

- **Occupation Dictionary**
- **Course Dictionary**

C-1: Occupation Dictionary

OCCUPATIONS	Descriptions
Trades and Undesignated Occupations	
Labourers in mineral and metal processing	Labourers in this unit group perform material handling, clean-up, packaging and other elemental activities related to mineral ore and metal processing.
Construction millwrights and industrial mechanics (except textile)	Construction millwrights and industrial mechanics install, maintain, troubleshoot and repair stationary industrial machinery and mechanical equipment.
Underground production and development miners	Underground production and development miners drill, blast, operate mining machinery and perform related duties to extract coal and ore in underground mines and to construct tunnels, passageways and shafts to facilitate mining operations.
Heavy equipment operators (except crane)	Heavy equipment operators operate heavy equipment used in the construction and maintenance of roads, bridges, airports, gas and oil pipelines, tunnels, buildings and other structures; in surface mining and quarrying activities; and in material handling work.
Industrial electricians	Industrial electricians install, maintain, test, troubleshoot and repair industrial electrical equipment and associated electrical and electronic controls
Material handlers	This unit group includes workers who handle, move, load and unload materials by hand or using a variety of material handling equipment.
Machine operators, mineral and metal processing	Workers in this unit group operate single-function machines or machinery that is part of a larger production process to process mineral ore and metal products.
Heavy duty equipment mechanics	Heavy-duty equipment mechanics repair, troubleshoot, adjust, overhaul and maintain mobile heavy-duty equipment used in construction, transportation, forestry, mining, oil and gas, material handling, landscaping, land clearing, farming and similar activities.
Central control and process operators, mineral and metal processing	Central control and process operators, mineral and metal processing, operate and monitor multi-function process control machinery and equipment to control the processing of mineral ores, metals or cement.
Truck drivers	Truck drivers operate heavy trucks to transport goods and materials over urban, interurban, provincial and international routes. This unit group also includes shunters who move trailers to and from loading docks within trucking yards or lots.
Welders and related machine operators	Welders operate welding equipment to weld ferrous and non-ferrous metals. This unit group also includes machine operators who operate previously set up production welding, brazing and soldering equipment.
Underground mine service and support workers	Underground mine service and support workers perform a range of duties related to the operation of orepasses, chutes and conveyor systems, the construction and support of underground structures, passages and roadways, and the supply of materials and supplies to support underground mining.
Mine labourers	Mine labourers carry out a variety of general labouring duties to assist in the extraction of coal, minerals and ore, and in other services in support of underground mining.
Construction trades helpers and labourers	Construction trades helpers and labourers assist skilled tradespersons and perform labouring activities at construction sites, in quarries and in surface mines.
Steamfitters, pipefitters and sprinkler system installers	Steamfitters and pipefitters lay out, assemble, fabricate, maintain, troubleshoot and repair piping systems carrying water, steam, chemicals and fuel in heating, cooling, lubricating and other process piping systems. Sprinkler system installers fabricate, install, test, maintain and repair water, foam, carbon dioxide and dry chemical sprinkler systems in buildings for fire protection purposes.
Drillers and blasters - Surface mining, quarrying and construction	Drillers in this unit group operate mobile drilling machines to bore blast holes in open-pit mines and quarries and to bore holes for blasting and for building foundations at construction sites. Blasters in this unit group fill blast holes with explosives and detonate explosives to dislodge coal, ore and rock or to demolish structures.
Crane operators	Crane operators operate cranes or draglines to lift, move, position or place machinery, equipment and other large objects at construction or industrial sites, ports, railway yards, surface mines and other similar locations.
Carpenters	Carpenters construct, erect, install, maintain and repair structures and components of structures made of wood, wood substitutes, lightweight steel and other materials.
Plumbers	Plumbers install, repair and maintain pipes, fixtures and other plumbing equipment used for water distribution and waste water disposal in residential, commercial and industrial buildings.
Other trades helpers and labourers	Construction trades helpers and labourers assist skilled tradespersons and perform labouring activities at construction sites, in quarries and in surface mines.
Professional and Physical Science Occupations	
Geologists, geochemists and geophysicists	Geologists, geochemists and geophysicists conduct programs of exploration and research to extend knowledge of the structure, composition and processes of the earth, to locate and identify hydrocarbon, mineral and groundwater resources, to plan and implement programs of hydrocarbon and mineral extraction and to assess and mitigate the effects of development and waste disposal projects on the environment.
Mining Engineers	Mining engineers plan, design, organize and supervise the development of mines, mine facilities, systems and equipment; and prepare and supervise the extraction of metallic or non-metallic minerals and ores from underground or surface mines.
Industrial and manufacturing engineers	Industrial and manufacturing engineers conduct studies, and develop and supervise programs to achieve the best use of equipment, human resources, technology, materials and procedures to enhance efficiency and productivity.
Metallurgical and materials engineers	Metallurgical and materials engineers conduct studies of the properties and characteristics of metals and other non-metallic materials and plan, design and develop machinery and processes to concentrate, extract, refine and process metals, alloys and other materials such as ceramics, semiconductors and composite materials.
Mechanical engineers	Mechanical engineering technologists and technicians provide technical support and services or may work independently in mechanical engineering fields such as the design, development, maintenance and testing of machines, components, tools, heating and ventilating systems, power generation and power conversion plants, manufacturing plants and equipment.
Other professional occupations in physical sciences	This group includes metallurgists, soil scientists and physical science occupations which are not elsewhere classified, and involve the conduct of theoretical and applied research in fields of physical science.
Chemists	Chemists conduct research and analysis in support of industrial operations, product and process development, quality control, environmental control, medical diagnosis and treatment, biotechnology and other applications. They also conduct theoretical, experimental and applied research into basic chemical and biochemical processes to create or synthesize new products and processes.
Electrical and electronics engineers	Electrical and electronics engineers design, plan, research, evaluate and test electrical and electronic equipment and systems
Chemical engineers	Chemical engineers research, design, and develop chemical processes and equipment, oversee the operation and maintenance of industrial chemical, plastics, pharmaceutical, resource, pulp, and food processing plants and perform duties related to chemical quality control, environmental protection and biochemical or biotechnical engineering.
Civil engineers	Civil engineers plan, design, develop and manage projects for the construction or repair of buildings, earth structures, powerhouses, roads, airports, railways, rapid transit facilities, bridges, tunnels, canals, dams, ports and coastal installations and systems related to highway and transportation services, water distribution and sanitation. Civil engineers may also specialize in foundation analysis, building and structural inspection, surveying, geomatics and municipal planning
Geological engineers	Geological engineers conduct geological and geotechnical studies to assess suitability of locations for civil engineering, mining and oil and gas projects; and plan, design, develop and supervise programs of geological data acquisition and analysis and the preparation of geological engineering reports and recommendations.
Other professional engineers, n.e.c.	This unit group includes agricultural and bio-resource engineers, biomedical engineers, engineering physicists and engineering scientists, marine and naval engineers, textile engineers and other specialized engineering occupations which are not classified elsewhere.
Biologists and related scientists	Biologists and related scientists conduct basic and applied research to extend knowledge of living organisms, to manage natural resources, and to develop new practices and products related to medicine and agriculture.
Human Resources and Financial Occupations	
Financial auditors and accountants	Financial auditors examine and analyze the accounting and financial records of individuals and establishments to ensure accuracy and compliance with established accounting standards and procedures. Accountants plan, organize and administer accounting systems for individuals and establishments. Articling students in accounting firms are included in this unit group
Human resources managers	Human resources managers plan, organize, direct, control and evaluate the operations of human resources and personnel departments, and develop and implement policies, programs and procedures regarding human resource planning, recruitment, collective bargaining, training and development, occupation classification and pay and benefit administration.
Financial managers	Financial managers plan, organize, direct, control and evaluate the operation of financial and accounting departments. They develop and implement the financial policies and systems of establishments. Financial managers establish performance standards and prepare various financial reports for senior management.
Specialists in human resources	Specialists in human resources develop, implement and evaluate human resources and labour relations policies, programs and procedures and advise managers and employers on personnel matters.
Financial and investment analysts	Financial and investment analysts collect and analyze financial information such as economic forecasts, trading volumes and the movement of capital, financial backgrounds of companies, historical performances and future trends of stocks, bonds and other investment instruments to provide financial and investment or financing advice for their company or their company's clients. Their studies and evaluations cover areas such as takeover bids, private placements, mergers or acquisitions
Support Workers	
Inspectors and testers, mineral and metal processing	Inspectors and testers in this unit group inspect, grade, sample or test raw materials and products from mineral ore and metal processing operations.

Dispatchers and radio operators	Dispatchers operate radios and other telecommunication equipment to dispatch emergency vehicles and to co-ordinate the activities of drivers and other personnel. Radio operators receive, transmit and record signals and messages using radios and other telecommunication equipment.
Secretaries (except legal and medical)	Secretaries perform a variety of administrative duties in support of managerial and professional employers.
Transportation route and crew schedulers	Transportation route and crew schedulers prepare operational and crew schedules for transportation equipment and operating personnel.
Administrative clerks	Administrative clerks compile, verify, record and process forms and documents, such as applications, licences, permits, contracts, registrations and requisitions, in accordance with established procedures, guidelines and schedules.
Production clerks	Production clerks co-ordinate and expedite the flow of work and materials within an establishment, prepare work and production schedules and monitor the progress of production and construction projects
Construction estimators	Construction estimators analyze costs of and prepare estimates on civil engineering, architectural, structural, electrical and mechanical construction projects.
Cooks	Cooks prepare and cook a wide variety of foods. Apprentice cooks are included in this unit group
Inspectors in public and environmental health and occupational health and safety	Inspectors in this unit group evaluate and monitor health and safety hazards and develop strategies to control risks in the workplace. They inspect restaurants, public facilities, industrial establishments, municipal water systems and other workplaces to ensure compliance with government regulations regarding sanitation, pollution control, the handling and storage of hazardous substances and workplace safety.
Engineering inspectors and regulatory officers	Engineering inspectors and regulatory officers inspect transportation vehicles such as aircraft, watercraft, automobiles and trucks and weighing and measuring devices such as scales and meters as well as industrial instruments, processes and equipment for conformity to government and industry standards and regulations.
Technical Occupations	
Geological and mineral technologists and technicians	Geological and mineral technologists and technicians provide technical support and services or may work independently in the fields of oil and gas exploration and production, geophysics, petroleum engineering, geology, mining and mining engineering, mineralogy, extractive and physical metallurgy, metallurgical engineering and environmental protection
Chemical technologists and technicians	Chemical technologists and technicians provide technical support and services or may work independently in chemical engineering, chemical and biochemical research and analysis, industrial chemistry, chemical quality control and environmental protection.
Industrial engineering and manufacturing technologists and technicians	Industrial engineering and manufacturing technologists and technicians may work independently or provide technical support and services in the development of production methods, facilities and systems, and the planning, estimating, measuring and scheduling of work.
Electrical and electronics engineering technologists and engineering	Electrical and electronics engineering technologists and technicians may work independently or provide technical support and services in the design, development, testing, production and operation of electrical and electronic equipment and systems.
Mechanical engineering technologists and technicians	Mechanical engineering technologists and technicians provide technical support and services or may work independently in mechanical engineering fields such as the design, development, maintenance and testing of machines, components, tools, heating and ventilating systems, power generation and power conversion plants, manufacturing plants and equipment.
Land surveyors	Land surveyors plan, direct and conduct legal surveys to establish the location of real property boundaries, contours and other natural or human-made features, and prepare and maintain crosssectional drawings, official plans, records and documents pertaining to these surveys.
Drafting technologist and technicians	Drafting technologists and technicians prepare engineering designs, drawings and related technical information, in multidisciplinary engineering teams or in support of engineers, architects or industrial designers, or they may work independently.
Civil engineering technologists and technicians	Civil engineering technologists and technicians provide technical support and services to scientists, engineers and other professionals, or may work independently in fields such as structural engineering, municipal engineering, construction design and supervision, highways and transportation engineering, water resources engineering, geotechnical engineering and environmental protection.
Mapping and related technologists and technicians	Mapping and related technologists and technicians gather, analyze, interpret and use geospatial information for applications in natural resources, geology, environment and land use planning. This unit group includes technologists and technicians who design and prepare maps, interpret aerial photographs, operate interpretative and airborne remote sensing equipment, and develop and operate geographical information systems.
Land surveying technologists and technicians	Land survey technologists and technicians conduct or participate in surveys to determine the exact locations and relative positions of natural features and other structures on the earth's surface, underground and underwater.
Biological technologists and technicians	Biological technologists and technicians provide technical support and services to scientists, engineers and other professionals working in fields such as agriculture, resource management, environmental protection, plant and animal biology, microbiology, cell and molecular biology and health sciences, or may work independently in these fields
Supervisors, Coordinators and Foremen	
Supervisors, mineral and metal processing	Supervisors, mineral and metal processing, supervise and co-ordinate the activities of workers in the following unit groups: Central Control and Process Operators, Mineral and Metal Processing (9231), Machine Operators and Related Workers in Metal and Mineral Products Processing (941) and Labourers in Mineral and Metal Processing (9611).
Supervisors, mining and quarrying	Supervisors in this unit group supervise and co-ordinate activities of workers engaged in underground and surface mining operations and quarries.
Primary production managers (except agriculture)	This unit group includes managers who plan, organize, direct, control and evaluate the operations of establishments in the following primary industries: forestry and logging, mining and quarrying, oil and gas drilling, production and servicing operations, and commercial fishing.
Contractors and supervisors, pipe fitting trades	This unit group includes plumbing and other pipefitting trade contractors who own and operate their own businesses. This group also includes supervisors who supervise and co-ordinate the activities of workers classified in the following unit groups: Plumbers (7251), Steamfitters, Pipefitters and Sprinkler System Installers (7252) and Gas Fitters (7253).
Engineering managers	Engineering managers plan, organize, direct, control and evaluate the activities of an engineering department, service or firm.
Construction managers	Construction managers plan, organize, direct, control and evaluate the activities of a construction company or a construction department within a company, under the direction of a general manager or other senior manager.
Contractors and supervisors, mechanic trades	This unit group includes heating, refrigeration, air-conditioning, millwrighting and elevator installation trade contractors who own and operate their own businesses. This group also includes supervisors who supervise and co-ordinate the activities of workers classified in unit groups within the following minor groups: Machinery and Transportation Equipment Mechanics (except Motor Vehicle) (731), Automotive Service Technicians (732) and Other Mechanics (733).

Programs	Program Description
Anishnabek Employment and Training Services	
Mining Essentials	Work readiness program for Aboriginals in mining. The program aims to ensure Aboriginal peoples have the essential skills and work-readiness training needed to enter mining and to provide industry with a local employment-prepared workforce
Natural Resources Program	Consists of seven weeks of Foundational Training and Sector Training from one or more of the following eight programs:
Sawmill Worker Training Program	Modules include: Introduction to Wood Products Industry, Safety First, Mill Processes, Work Placement.
Aboriginal Hospitality and Tourism Training	The Aboriginal Hospitality and Tourism Program is designed to provide industry specific training to Aboriginal people looking for a career in the Tourism and Hospitality sector. Certificates include: Tourism essentials, Service Excellence, Computer Applications, First Aid, Food Safety, Smart Serve and WHMIS
Commercial Fisherman | Deckhand	In the Commercial Fishing - Deckhand program, the participants will develop the basic skills and knowledge necessary to prepare for immediate employment onboard commercial vessels. The participants will also be introduced to the notion of value-added products and niche marketing as it relates to fish products. Modules include: Background, Safety, Operations, Hands on Training (on the water)
Business Management & Entrepreneurship	The Business Management and Entrepreneurship program will focus on the designing and management of an outdoor adventure enterprise. This program is based on a highly interactive curriculum that includes learning circles, groups and individual projects. Modules include: Assessing entrepreneurship as a career option, Formulating business ideas, The Business Plan, Conducting a Feasibility Study, Working with Others.
Line Cutting	This 5 week program offers a wide variety of rewarding opportunities. In Basic Line Cutting, participants begin to discover the skills and knowledge necessary to prepare for immediate employment in the mining or forestry sectors. It also provides knowledge and training in a skill that is in high demand in the remote areas of northwestern Ontario, especially in First Nation Communities.
Diamond Driller Helper	The Diamond Driller's Helper is a comprehensive program that prepares individuals for the safety and operational demands of work in the field of diamond drilling. This program will prepare you for employment in the industry as an entry level Diamond Driller's Helper. Modules include: Safety protect self & others; Safe surface diamond drilling environment; Hand and power tools; Operate chainsaw; Lifting devices; Portable pumps; Core recovery and core barrel handling; operate skidder and first aid/cpr, whmis, propane certification, fall arrest, TDG & wilderness training.
Truck driving	Graduates of this program can nd themselves employed as short haul, long haul, local pick-up and delivery, shunt drivers, driver trainers, driver supervisors and managers, tow truck drivers, transporting heavy equipment and/or as owners/operators. Modules include: A-Z manuals and air brake endorsement; Yard demonstration and practice; Trailer manoeuvre demonstration and practice; Road demonstration and practice; Professionalism.
Shooniyaa Wa-Biitong Training and Employment Centre	
Surface diamond driller	Prepares individuals for the safety and operational demands of work in the field of diamond drilling.
Fort William First Nation	
Brush saw training	To clear vegetation on a potential mine site to allow for geological and other surveys.
Common Core training	Common Core Training for basic underground hard rock
Confederation College	
Remote Cooking Program	Remote Food Preparation is an applied certificate program. This unique program provides the basic knowledge and skills needed for an entry level position for preparing and serving food in a camp kitchen in a remote location. It responds to the training needs of individuals who desire excellent employment prospects as food service workers within a growing camp cooking workforce. The Remote Food Preparation Program focuses on food production skills, safety and the knowledge of how to efficiently run a camp kitchen in a remote location. You will develop basic skills in: • Safe food handling in a remote setting • Basic food preparation techniques • Menu planning and camp cooking challenges • Safety in the workplace • Managing a camp kitchen
Mining techniques	Students in the Mining Techniques program will acquire skills in basic geology, mining methods, surveying, computer aided drafting, communications, mathematics, basic computer applications, plus essential employability and general education skills.
Line Cutting	This 5-week program offers a wide variety of rewarding opportunities. In Basic Line Cutting, the participant begins to discover the skills and knowledge necessary to prepare for immediate employment or postsecondary education in the mining or forestry sectors. This special initiative offers participants who are unsure of their career path, an opportunity to explore training options in the mining and forestry sectors. It also provides a skill that is in high demand in the remote areas of Northwestern Ontario, especially in First Nations Communities.
Common Core Underground	The Basic Underground Hard Rock Miner-Common Core Program is a comprehensive program that helps to prepare individuals for the safety and operational demands of work in the field of hard rock mining. This program will help prepare you for employment in entry–level jobs in the mining industry
Surface Diamond Drilling	A welding fitter interprets blueprints in order to cut, fit, assemble and weld metal components while meeting code requirements.
Business Admin - Human Resources	HR professionals work in both management and union positions and share a common desire to work and see others work in a healthy and safe environment. An HR professional understands the importance of following policies and procedures, but also has the intuition to know when it would be best to be flexible. They need to look for solutions to sometimes complicated problems, blending theory, experience and gut instinct.
Business Admin - Accounting	Your opportunity to work as an accountant can begin with this unique Business Administration - Accounting program. The role of accounting is to identify, measure, record, and communicate quantitative information, primarily financial in nature, about economic entities.
Business - Accounting	Students will develop skills and knowledge appropriate for an entry-level accounting position. It will prepare students to serve in a wide range of responsible positions up to and including mid-amangement levels in business, industry, government. This program is designed for students who want to develop skills and knowledge appropriate for an entry-level accountant in business, industry, or the not-for-profit sector. The program has been designed to accomodate students who want to continue their studies towards a professional accounting designation.
Business - Human Resources	Modern business and industry strive to achieve efficiencies to improve profits. This process not only includes technological advances, but devotes attention to the effective use of human resources as well. This sensitive and complex area of study examines the way in which modern businesses manage their people to ensure job satisfaction, staff development, and cordial employee-employer relationships, while ensuring a positive effect on performance and productivity.
Business Fundamentals	The Business Fundamentals program will provide students with a diverse knowledge of all aspects of business, providing students with greater choices in career or educational options. The one-year certificate will open doors for entry-level business positions and provide students with skills to be sucessful in the workplace. The program could also provide students with a pathway into any of Confederation College's two-year diploma programs in Marketing, Human Resources or Accounting.
Human Resources (Post Diploma/Degree)	A one-year graduate program that will provide students with a skill set that is in demand. Students will be involved in a process that not only includes technological advances, but pays close attention to effective use of human resources as well. Graduates of this program are eligible (subject to some grade level requirements) to write the National Exams leading to the CHRP (Certified Human Resources Professional) as granted by the HRPAO (Human Resources Professionals Association of Ontario).

Civil Engineering Technology	Civil Engineering Technologists are needed to provide the infrastructure that makes our society work. This includes everything from sewer, water and road systems to buildings and bridges. One of the greatest challenges facing the industry is to find ways to repair or replace these systems without disrupting the services they provide. Confederation College focuses on provided students with the skills and training students need to succeed in the field. Employment opportunities exist in the facility planning and design, cost estimating and control, and construction inspection and management for new capital projects. Effective management of the finished project is a vital part of the technologist's responsibilities.
Construction Techniques	The Construction Techniques Certificate Program is a one year program that is designed as an introduction to the employment realities and working specifics of the construction trades. The strength of such a program is to directly address the coming shortage of skilled trades professionals in the construction industry in the coming years.
Electronics Engineering Tech - Computer Control	This training will enhance your ability to provide technical solutions and support to local and wide area networks. You will be able to work with a complete range of active data; install, interconnect, configure, implement, and troubleshoot network systems, create and maintain documentation, and be proficient with all aspects of the modern day network solution. Your opportunity to pursue the Microsoft Certified Professional and CISCO certification will open many doors for you in an "in-demand" profession
Electronics Engineering Technology - Computers	Utilizing your technical skills, this training will enhance your ability to provide technical solutions and support to local and wide area networks. You will be able to work with a complete range of active data; install, interconnect, configure, implement, and troubleshoot network systems, create and maintain documentation, and be proficient with all aspects of the modern day network solution.
Environmental Technician	Graduates of the Environmental Technician Program at Confederation College go into many different types of work in the Environmental sector. Some graduates choose to work in laboratory settings, some choose to work primarily out in the field, and some choose jobs that include a combination of booth. While there is a heavy emphasis on water resources in the program, you will also gain extensive experience working with terrestrial ecosystems and in industrial settings. Many graduates have found work with Consulting firms that offer a wide variety of experiences and an increasing number are finding work in the Mining sector.
Forest Ecosystem Management Technician	Your education and hands-on training at Confederation College will prepare you for a challenging and rewarding lifelong career in both the public and private sectors of the forest industry. You will be prepared for a technically competent position in the areas of forest harvesting, forest resource conservation and protection, forest management, silviculture, research support, recreation, project development with Aboriginal communities and/or tribal councils, community economic development and eco and adventure tourism.
Instrumentation Engineering Technician - Process Automation & Control	The program offers optional co-op placements (mandatory in the CODA program) where students have the opportunity to obtain related work experience beyond what can be offered in theory or lab classes. The program is the only one of its kind in the province of Ontario that is nationally accredited by the Canadian Technology Accreditation Board (CTAB). Graduates find employment in process industries such as Power Generation, Mining, Pulp and Paper, Oil Refining, as well as Engineering firms and Sales + Service. Future employment can be expected in Alternate Energy Applications and Biomedical Equipment maintenance and repair.
Mechanical Engineering Technician	This program is designed to increase the training and education options available to you by providing both multi-skills training that is aligned with the apprenticeship requirements, and education applicable to the mechanical engineering field. A well-rounded maintenance team incorporates not only technically-minded individuals with hands-on mechanical skills, but people who can think analytically, and utilize modern and simplified engineering concepts for solving routine or advanced programs.
Mechanical Techniques	The curriculum for this program shares a common first 2 semesters with the Mechanical Engineering Technician 2-year diploma program. This common core provides students with the option to continue on after the first year, for 2 additional semesters to earn BOTH the Mechanical Techniques (1 year certificate) and the Mechanical Engineering Technician (2-year diploma) after only two years of study. Career options include areas such as millwright, industrial mechanic, machinist, tool an die maker, pipe fitter, welder/fitter, sheet metal worker and more.
Motive Power Techniques - Heavy Equipment	The Heavy Equipment Repair & Service Program is designed to give you a firm background in the fundamental areas of the heavy-duty service industry. You will be involved in maintaining and repairing various heavy duty systems such as gear trains, electrical/electronics, diesel fuel systems, air brakes, hydraulics, steering and suspensions on heavy duty trucks, off-road construction and forestry equipment.
Power Engineering Technician	Students will become familiar with the theory, equipment and safe operation power plants, heating plants and refrigeration systems. Power Engineers also operate and maintain boilers that supply process steam for industrial plants and manufacturing processes such oil and gas refining, or pulp and paper production. They also operate and maintain heating and cooling systems in large industrial, institutional and commercial buildings.
Welding Techniques	Students would learn operate equipment that bonds ferrous and non-ferrous metals together. Welders also include machine operators who operate previously set up production welding, brazing and soldering equipment.
Lakehead University	
Faculty of Business Administration	There are programs in this faculty that are related to the following disciplines: accounting, finance, human resources management and industrial relations, information systems, marketing, operations and strategic management.
Faculty of Education	There are over 100 different concurrent programs allowing for the acquisition of a B.Ed degree along with another degree or honours degree in Outdoor Recreation, Kinesiology, or Fine Arts as well as more traditional degrees in History, English, Mathematics, Science, Psychology, etc. Graduate Education can be obtained at both Masters and PhD levels.
Faculty of Engineering	The Faculty of Engineering offers unique engineering programs in Chemical, Civil, Electrical, Mechanical and Software Engineering. Lakehead has the only Faculty of Engineering in Canada where, after completing high school, a student can earn a Bachelor of Engineering Degree and an Engineering Technology Diploma in four years. The Faculty of Engineering also offers post-diploma engineering degree programs in Chemical, Civil, Electrical, Mechanical and Software Engineering designed specifically for graduate engineering technologists.
Faculty of Natural Resources Management	The Faculty of Natural Resources Management is committed to producting high-quality graduates and scientists through student-centred learning and research, to enhancing the management of Canada's forested ecosystems, and to advancing forest science through scientific research to meet the need of society.
Faculty of Health and Behaviourial Sciences	The Faculty of Health and Behavioural Sciences brought together the Schools of Kinesiology, Nursing and Social Work, the Department of Psychology and programs in Publich Health and Gerontology. The Faculty is a dynamic group, poised to provide innovated research and educational programming to meet the ever changing demands of the Chanadian health care sector, with special emphasis and sensitivity to rural, remote, Aboriginal and northern health issues.
Faculty of Science and Environmental Studies	The Faculty of Science & Environmental Studies has nine departments: Anthroplogy, Biology Chemistry, Computer Science, Economics, Geography, Geology, Mathematical Sciences and Physics. There are a variety of programs that cross departmental boundaries that include: Applied Bio-Molecular Science, Environmental Studies, Water Resource Sciences, and Environmental Science.
Faculty of Social Sciences and Humanities	The Faculty of Social Sciences and Humanities is comprised of the following disciplines: Political Science, Sociology, English, History, Languages, Philosophy.
Faculty of Law	The Faculty's focus is threefold. First, there is emphasis on aboriginal law and understanding of aboriginal issues. We will provide stand alone courses on aboriginal law, as well as integrating aboriginal perspectives into our other subject areas where appropriate. Second, we focus on the needs of small practitioners, which include a course concerned with the business of law. Third, there is concentration on natural resources law from mining rights to employment standards.
Northern School of Medicine (Western Campus)	The Northern Ontario School of Medicine (NOSM) is committed to the education of high quality physicians and health professionals, and to international recognition as a leader in distributed, learning-centred, community-engaged education and research.

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