



ANALYSIS OF THE COMMERCIAL/RETAIL SECTORS OF THE GREENSTONE REGION ECONOMY

For the Greenstone Economic Development
Corporation
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1.0 Introduction

The Municipality of Greenstone was established in 2001 through the amalgamation of the former Town of Geraldton, the Town of Longlac, the Township of Nakina, and the Township of Beardmore, as well as a large unincorporated area containing the smaller settlement areas of Caramat, Jellicoe, MacDiarmid, and Orient Bay. Greenstone is located proximate to the First Nations communities of Aroland, Ginoogaming, Long Lake 58, Sand Point, Rocky Bay, and Lake Nipigon Ojibway.

As shown on Figures 1-1 and 1-2, Greenstone is located along provincial Hwy No.11 in Northwestern Ontario, approximately 250 km northeast of the City of Thunder Bay.

Figure 1-1 Greenstone Region



Source: ruralroutes.com



Figure 1-2 Distance – Thunder Bay to Greenstone



Source: *distancias.com*

1.1 Purpose of The Study

Building on economic development and business readiness work conducted both recently and historically by the GEDC and the Municipality of Greenstone, this project is intended to address specific recommendations around forecasting future growth of the commercial/retail sector in the Greenstone Region, and identifying specific sectors where growth might best be facilitated.

The key purpose of conducting this analysis is to:

- Identify opportunities for commercial/retail growth that will help the Region focus it's marketing and outreach to new potential businesses by sector of activity;
- Minimize the "leakage" (maximize the capture) of economic development revenues by capturing as much growth inside the Region as is feasible and sustainable; and
- Determine the level of commercial/retail growth that is sustainable over the longer-term. Over-building during times of short-term growth can result in an unsustainable economy that might be detrimental to longer-term, more sustainable growth.

The approach to identifying strategic commercial/retail growth opportunities will be based on growth scenarios that reflect a number of contributions to potential future growth and demand, including:

- Potential demographic growth (general increases/decreases in population growth);
- Potential growth resulting from an influx of new project spending and new residents (eg. economic growth in the resource sector); and
- Economic disruptors that are not well understood for this type of analysis that will be difficult to factor into forecasting, such as the COVID-19 pandemic, e-commerce and artificial intelligence/automation.

The COVID-19 pandemic is more likely to cause disruption over the near term, although longer term economic effects cannot be ruled out.

1.2 Overview of Methodology

The analysis was conducted in four steps:

Step 1 -- Characterization of Greenstone Demographics Between 2006 and 2016.

Step 2 -- Examination of the historic and current economies and an analysis of the effects of economic influences that could affect the future Greenstone economy including the addition of major projects, as well as the potential effect of economic disruptors.

Step 3 -- Identification and characterization of potential economic influences including major projects that could potentially be developed within the next five years, and other economic disruptors that could influence the economy such as the COVID-19 pandemic, e-commerce and artificial intelligence/automation.

Step 4 -- Analysis of the Effects of Potential Future Economic Growth on the Commercial/ Retail Sectors.

Methodologies for these analyses are described in the following paragraphs.

1.2.1 Step 1 -- Characterization of Greenstone Demographics Between 2006 and 2016

Step 1 of the analysis involved assessing key demographic factors that contribute to economic growth. It was considered important to reach back to 2006 in order to reflect changes in demographics that occurred between 2006 and 2016 to understand the general characteristics of the Greenstone population that contribute to economic growth, such as population growth/decline, education attainment, skill levels, employment, household income, etc.

In addition to documents prepared for and provided by GEDC, Census Canada statistics were used to determine the type and nature of population growth/decline that occurred in that timeframe. Using this



data a number of influencing factors that might have contributed to changes in demographics over that period, as well as trends since then, were identified.

A summary of the demographic analysis conducted for the study is provided in Section 2.0 of this report.

1.2.2 Step 2: Description of the Historic and Current Greenstone Economies and Identification of Potential Influences on the Future Economy

Several activities were conducted in Step 2:

- Characterization of the historic Greenstone economy to understand the Region's economic roots;
- Examination of the existing commercial/retail economy utilizing results of a business survey conducted by GEDC in 2020;
- Examination of the level of diversification in the economy using the Herfindahl Index; and
- Identification of major influences that could have impacts on the Greenstone economy

Examining the historic economy provides the opportunity to examine the economic roots of the Greenstone economy.

Examining the current economy provides an examination of current economic stability and diversification. This also provides an indication of the future economy if the Greenstone population continues along the trajectory of the past 10 years, and major projects are not realized in the near term. To facilitate the analysis of the current economy, a survey of local commercial/retail businesses was conducted by GEDC in 2020. Forty-six (46) business operators responded to the survey. A detailed analysis of the results of the survey is provided in Section 3.0 of this report. In addition to the survey, an analysis of the level of diversification of the existing economy compared to years past and in comparison to Ontario, was conducted to help understand the stability and resiliency of the economy to economic influences. The analysis is based on calculations using the Herfindahl Index, a commonly used index to assess economic diversification.

Building on previous and recent work undertaken by the study analysts, a number of potential influences, primarily potential major projects, were identified that could have significant impact on the Greenstone economy. The major projects identified as having the potential for development within the next five (5) years were:

Mining Projects

- Greenstone Goldmines Hardrock Gold Project
- Noront Resources Eagle's Nest Project (Ring of Fire)

Infrastructure Projects

- Northern Road Link (Nakina to the Ring of Fire mineralized zone)
- Marten Falls First Nation Community Access Road
- Webequie First Nation Supply Road (Webequie First Nation to the Ring of Fire mineralized zone)
- Nakina Multi-modal Transfer facility (transfer of ore from road to rail)



Energy

- Highway 11 Transmission Upgrade

Information about these projects, including capital cost estimates and timing, was either obtained through personal communications with representatives of project development companies, or were calculated/derived from experiences with other similar projects located in areas with similar characteristics to those of Greenstone Region.

In addition to potential major projects, several potential economic disruptors were identified and characterized as having the potential to impact the Greenstone economy:

- COVID-19 pandemic;
- E-commerce; and
- Artificial intelligence/automation.

Results of this step are provided in Section 3.0 of this report.

[1.2.3 Step 3: Identification and Characterization of the Potential Impact of Economic Influences on the Greenstone Economy](#)

Step 3 of the analysis comprised of two key activities:

- Forecast of the potential economic effects (jobs and spending) that could occur as a result of the addition of several major projects, including job creation and spending in the Region; and
- Analysis of the extent to which potential economic disruptors could influence future economic growth.

Extensive forecasting was conducted to determine the potential for new jobs and spending in the Greenstone economy as a result of the addition of the new major projects identified above.

Growth was forecast between 2023 and 2033. This was done to give economic developers an understanding of potential timing of economic growth as major projects are developed, as well as a sense of the scale of growth that could occur within the Region over the ten year period. Analyses were conducted using conservative assumptions to ensure that growth expectations are not exaggerated. Growth was assessed for the construction stage of projects as well as the operations and maintenance stage of projects in order to better differentiate short-term growth from longer-term growth.

Economic disruptors could have both positive and negative effects on the Greenstone economy. Three key disruptors were selected for examination – the COVID-19 pandemic, e-commerce and artificial intelligence/automation. All of these has the potential to cause profound changes to the local economy. The analysis of these disruptors included an examination of both the potential positive and negative economic impacts.



1.2.3 Step 4: Analysis of the Effects of Potential Future Economic Growth on the Commercial/Retail Sectors

The potential for growth of the Greenstone economy will largely depend on the development (or not) of the few major projects listed above and the extent to which they come to market as forecasted. In addition, many of the projects are interdependent. For example, the Noront Eagle's Nest mining project will not advance without development of the Northern Road Link between Nakina and the mineralized zone within the Ring of Fire, and the Nakina multi-modal transfer facility will not be required without development in the Ring of Fire region.

Understanding the extent of jobs that could be created for Greenstone residents, as well as the effect of spending from these projects, both during the construction phase and in the operations and maintenance phase was the first step in analyzing the potential economic impact of these projects. The second step was understanding how this economic growth could affect the commercial and retail sectors of the Greenstone economy.

Results of these analyses are provided in Section 4.0

Conclusions are summarized in Section 5.0 of this report.

Several recommendations for next steps are provided in Section 6.0 of this report.



2.0 Overview of Greenstone Demographics

The purpose of the demographic analysis was to identify the demographic characteristics of the Greenstone Region that will provide important input into the analysis of potential effects on Greenstone's commercial/retail economy. The analysis builds on and updates analyses previously conducted by the GEDC.

The demographic analysis examined trends in population, employment, education, etc. between 2006 and 2016 sourced from Statistics Canada census data. It is recognized that trends in demographic patterns are not necessarily a direct relationship to retail growth/decline and/or the sole statistical foundation for forecasting future demand for retail services. However, as with any analysis of economic trends, changes in the population will always be a strong indicator of future potential.

A number of sources were used to obtain information for this demographic analysis:

- Census of Canada, Statistics Canada 1996, 2006, 2011 and 2016
- Statistics Canada, MHSTCI, US Travel Association and US Bureau of Labour Statistics
- Greenstone Regional Gap Analysis and Market Study Report, Mathew Fischer & Associates, 2010
- Socio-economic Profile for the Geographic Area Served by the Greenstone Economic Development Corporation, Statistics Canada, 2015
- Socio-economic Profile for the Geographic Area Served by the Greenstone Economic Development Corporation, Statistics Canada, 2019
- Mining Sector Needs Analysis, GCK Consulting, 2012
- Economic Development Study, SNC-Lavalin Inc., 2016
- Greenstone Business Capacity Inventory Report, SNC-Lavalin Inc. and Stephen Lindley Consulting Inc., 2018

2.1 Population

The population of the Municipality of Greenstone has declined in recent years (1996 to 2016), compared to an increase in the population of the Province of Ontario over the same timeframe. As shown in Table 1, below, there was an overall decline in Greenstone's population of close to 29% between 1996 and 2016, with the sharpest decline occurring in two back-to-back census periods of over 13% between 1996 and 2001 and again between 2001 and 2006. This compares to a provincial increase of over 26% over the same period. The total population, aged 15 years and older dropped by almost 1,000 (24%) people in Greenstone between 2012 and 2016. Ontario figures show similar trends with a 27% decrease since 2016.

The decline in Greenstone's population levelled off between 2006 and 2016, although remained on a small downward trend between 2011 and 2016 (near 2%). Much of the Greenstone population decline can be likely be attributed to out-migration following the economic downturn in the forestry industry sector.



Table 2-1 Population of Greenstone Region and the Province of Ontario (1996 to 2016)

	1996	2001	2006	2011	2016
Greenstone Population	6,530	5,662	4,906	4,724	4,636
% Change from Previous Census		-13.3%	-13.4%	-2.1%	-1.9%
	1996	2001	2006	2011	2016
Ontario Population	10,642,790	11,410,046	12,160,282	13,364,603	13,448,494
% Change from Previous Census		7.2%	6.6%	9.9%	4.6%
	1996	2001	2006	2011	2016
Aboriginal Population - Greenstone			975	1,320	1,455
% Change from Previous Census				35%	10.2%
Aboriginal Population - Ontario			242,490	301,430	374,395
% Change from Previous Census				24%	24.2%

Source: Statistics Canada national census 1996, 2001, 2006, 2011, 2016

Greenstone is home to several First Nations communities and citizens of the MNO Greenstone Métis Council. First Nations located in the Region are:

- Aroland First Nation
- Animbiigoo Zaagi'igan Anishinaabek
- Bingwi Neyaashi Anishinaabek
- Biinjitiwaabik Zaaging Anishinaabek
- Ginoogaming First Nation
- Long Lake #58 First Nation

Identified Aboriginal population growth between 2006 and 2016 as shown on Table 2-1 is higher than the non-Aboriginal population and also higher than national averages which were 19.4% between 2006 and 2011 and 19.5% between 2011 and 2016. Some of this growth may be attributable to an increase in self-identification and could also be the result of in-migration into the Region.

2.2 Education

As shown in Table 2-2 and Figures 2-1 and 2-2, below, in 2016, roughly 37% of Greenstone residents had a university or non-university (ie. College) certificate, diploma or degree. This is approximately 44% higher representation of post-secondary educated residents than the overall provincial average of 22.1%. This is likely a reflection of the service-oriented nature of the Greenstone economy. It is also a stark contrast from the 27.1% equivalently educated Greenstone residents in 2006 (compared to 22.4% in Ontario). Although data is not available for the 2011 census period, the increase in highly educated residents over 10 years likely reflects a diversification of the economy from a higher reliance on resource-based activity



in 2006 to a more service-oriented economy in 2016 which typically requires higher levels of education to qualify for jobs.

There were 50 residents with advanced professional degrees, Masters degrees and Ph.Ds in the Region in 2016 (no data available for 2006). This is a lower percentage than the provincial average, but without a trend from previous years it is difficult to comment on the trajectory, although, like other post-secondary education levels, it is likely higher.

What is interesting is that despite the changing characteristics of the Greenstone economy and the education profile of it's residents, the number of residents trained in the skilled trades also increased from 10.2% in 2006 to 11% in 2016, almost double that of Ontario in 2016 (6.8%). Overall, this is an impressive reflection of the commitment of Greenstone residents to invest in their training and education and provides a highly employable labour force.

Notwithstanding the impressive credentials of the Greenstone population, and despite improvements between 2006 and 2016, 32% of residents did not have a high school diploma or certificate and 25% were without any type of post-secondary credential. These statistics compare poorly to the 2016 provincial averages of 8.7% and 12.8% respectively.

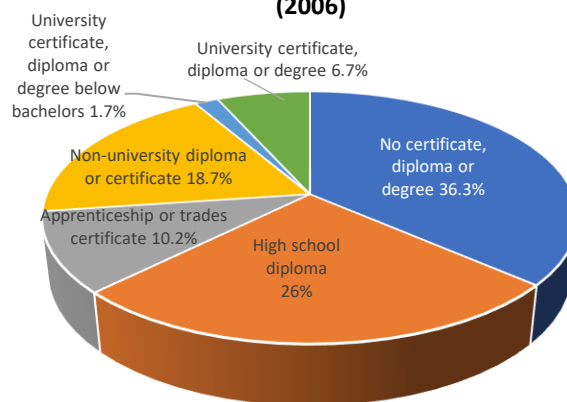
Table 2-2 Education Attainment for Greenstone Region and the Province of Ontario (2006 to 2016)

Characteristics	Greenstone 2006	Greenstone 2006 %	Greenstone 2016	Greenstone 2016 (%)	Ontario 2006 (millions)	Ontario 2006 %	Ontario 2016 (millions)	Ontario 2016 %
Total population 15 years and over	3,930	3,930	3,775	3,775	9.8	9.8	11.0	11.0
No certificate, diploma or degree	1,425	36.2%	1,215	32.1%	2.2	22.4%	0.96	8.7%
High school certificate or equivalent	1,025	26.1%	925	24.5%	2.6	26.5%	1.4	12.8%
Apprenticeship or trades certificate or diploma	400	10.2%	305	11%	0.79	8.0%	0.74	6.8%
College, CEGEP or other non-university certificate or diploma	735	18.7%	840	22.2%	1.8	18.3%	0.98	9%
University certificate, diploma or degree	265	6.7%	405	10.8%	0.41	4.1%	1.3	12.1%

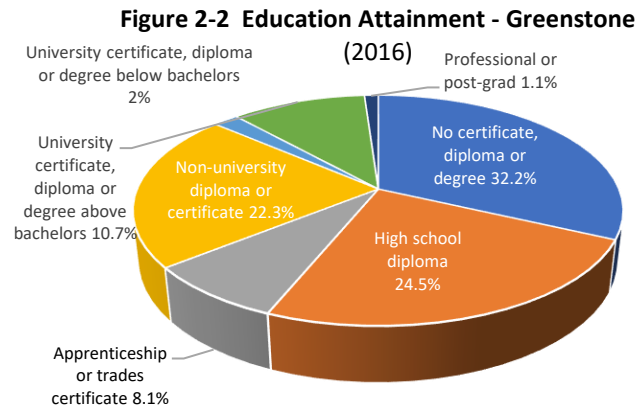
Characteristics	Greenstone 2006	Greenstone 2006 %	Greenstone 2016	Greenstone 2016 (%)	Ontario 2006 (millions)	Ontario 2006 %	Ontario 2016 (millions)	Ontario 2016 %
University certificate or diploma below bachelor level	65	1.7%	75	2%	0.03	0.3%	0.10	0.97%
Bachelor's degree	N/A	N/A	325	8.6%	N/A	N/A	0.85	8%
University certificate or diploma above bachelor level	N/A	N/A	40	1.0%	N/A	N/A	0.08	0.76%
Degree in medicine, dentistry, veterinary medicine or optometry	N/A	N/A	15	0.3%	N/A	N/A	0.042	0.3%
Master's degree	N/A	N/A	35	0.8%	N/A	N/A	0.29	2.6%
Earned doctorate	N/A	N/A	0	0	N/A	N/A	0.061	0.5%

Source: Statistics Canada census

Figure 2-1 Education Attainment - Greenstone (2006)



Source: Statistics Canada census 2006



Source: Statistics Canada census 2016

2.3 Employment

As shown in Table 2-3, below, the employment rate in Greenstone between 2006 and 2011 dropped in every census period from 61.9% in 2006 to 51.2% in 2016. The unemployment rate has been historically higher in Greenstone compared to the Ontario average, although it has been trending down between 2006 and 2016 while Ontario was fairly steady. The labour participation rate in Greenstone was notably higher in 2006 (69.9%) than later periods falling from 64.2% in 2011 to 57.4% in 2016, well below the Ontario participation rate, although the Ontario rate also steadily declined between 2006 (67.1%) and 2016 (64.7%).

The decrease in employment and participation rates for Greenstone below Ontario averages signals a higher economic stress in the Region than provincially. Notwithstanding, the general downward trend in unemployment in Greenstone is positive in that it indicates more jobs became available. However, the fairly significant fall in the Greenstone labour participation rate is concerning as it indicates residents may be chronically unemployed and might have stopped searching for jobs. This could be a sign that the jobs that are available are lower skilled/lower paying and the more skilled workers are not finding the opportunities. Getting these workers back to work and remain in Greenstone is a clear priority for economic growth and the growth in disposable income in the Region.

Table 2-3 Employment Characteristics of Greenstone Region and the Province of Ontario (2006 to 2016)

Characteristics	Greenstone 2006	Greenstone 2011	Greenstone 2016	Ontario 2006 (millions)	Ontario 2011 (millions)	Ontario 2016 (millions)
Total population, aged 15 years and older	3,925	3,785	3,775	9.8	10.5	11.0
In the labour force	2,745 (69.9%)	2,430 (64.2)	* 2,165 (57.4)	6.7 (68.4%)	6.9 (65.7%)	7.1 (64.5%)
Employed	2,430 (61.9%)	2,115 (55.9%)	1,935 (51.2%)	6.2 (63.3%)	6.3 (60%)	6.6 (60%)
Unemployed	310 (7.9%)	315 (8.3%)	230 (6.1%)	0.42 (4.3%)	0.6 (5.7%)	0.5 (4.5%)
Not in the labour force	1,185 (30.2%)	1,355 (35.8%)	1,610 (42.6%)	3.2 (32.7%)	3.6 (34.3%)	3.9 (35.5%)
Participation rate	69.9%	64.2%	57.4%	67.1%	65.5%	64.7%
Employment rate	61.9%	55.9%	51.3%	62.8%	60.1%	59.9%
Unemployment rate	11.3%	13%	10.6%	6.4%	8.3%	7.4%

Source: Statistics Canada census

With approximately 20% of Greenstone residents having a GED certificate or Grade 12 completion, and close to 24.5% having an advanced certificate, diploma or degree, Greenstone's population is in a good position to take advantage of new, highly skilled employment opportunities, and entrepreneurial opportunities (Municipality of Greenstone's Corporate Strategic Plan. 2013; and Greenstone Economic Development Strategy, 2012).

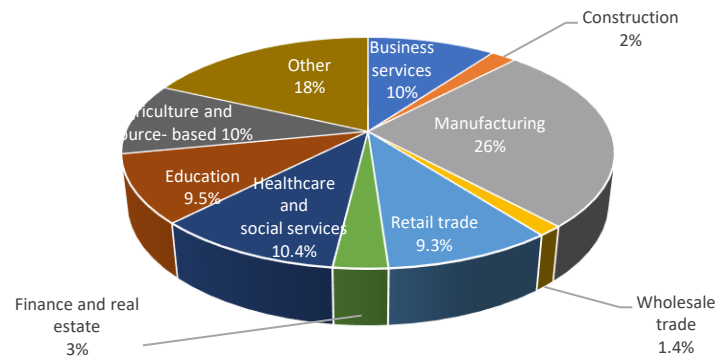
2.4 Occupations

Figures 2-3, 2-4 and 2-5, below, show full details of the Greenstone labour force by occupation for the years 2006, 2011 and 2016 respectively. For the purposes of the summaries, some related occupation categories have been combined. It should be noted that the categorization of occupations in the Canada census was altered between 2006 and 2011 making some comparisons difficult; the 2011 and 2016 categorizations were the same.

As shown on Figures 2-3 to 2-5, Greenstone occupations were dominated by public services (health, education and public administration) throughout the 2006 to 2016 period. In 2016, these occupations accounted for 41.2% of all jobs. As discussed above, the growth in public services jobs reflects the increasingly important role that Greenstone plays as a regional centre of public administration.

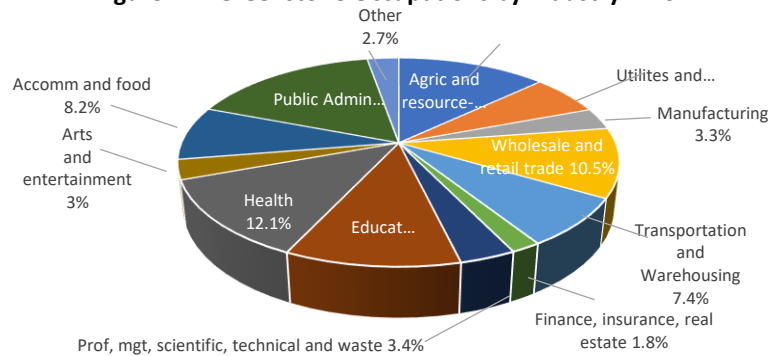


Figure 2-3 Greenstone Occupations by Industry - 2006



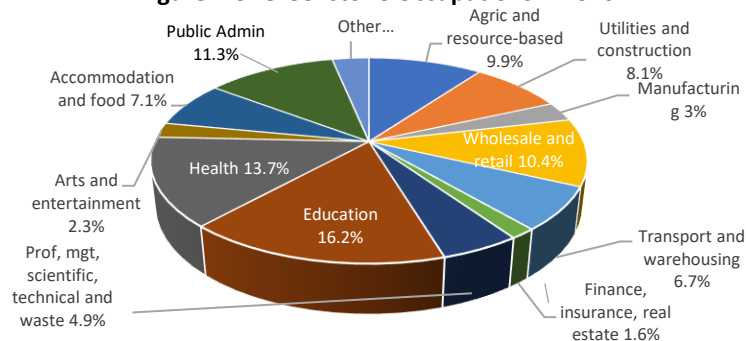
Source: Statistics Canada census 2006

Figure 2-4 Greenstone Occupations by Industry -- 2011



Source: Statistics Canada census 2011

Figure 2-5 Greenstone Occupations -- 2016



Source: Statistics Canada census 2016

The data also demonstrates that despite the known drop in jobs in the forestry sector through the mid-2000's, employment in the resource-based economy held fairly steady between 2006 (10%) to 2016 (9.9%) with a small increase in 2011 (12.8%). Because there were no operating mines in Greenstone between 2006 and 2016, this shows that forest sector jobs are still important to the Greenstone economy.

Another significant trend that is shown by the data is the significant drop in manufacturing jobs. This In 2006 26% of Greenstone employment was in the manufacturing sector. By 2016 it had dropped to 3%. This likely indicates the closure of forest products mills. Also noticeable is the increase in construction (and construction/utilities) rising from 2% in 2006 to over 8% in 2016.

Construction alone represented a small percentage of jobs in Greenstone in 2006 at 2%. This compares to steady growth to 6.1% in 2011 (combined with utilities) and 8.1% in 2016. This represents growth of just over 36% between 2011 and 2016 alone. The growth is much sharper if 2006 is considered, but it is unclear that measurements are comparable to 2011 and 2016 given differences in categorization (with the inclusion of utilities). Nonetheless, growth in the construction industry is always a good indicator of economic growth and spending within the local and regional supply chain, be it wholesale or retail. The construction industry across Ontario is fairly similar to that of Greenstone. The province experienced a small increase in construction jobs from 6.0% in 2006 to 7.3% in 2016.

Accommodation and food services make up a large number of jobs in the Greenstone economy. The 2006 census did not categorize these jobs; they are likely captured under "other" occupations. The sector experienced a small decline between 2011 and 2016, from 8.2% in 2011 down to 7.1% in 2016, a drop of just over 13%. Although reasonably significant, the decline could have been worse given the overall drop in the total number of residents employed between 2006 and 2016 (down over 20%). Occupations in this sector across the province experienced fairly sharp growth between 2011 and 2016, from 3.1% to 6.6% - over 100% growth in that timeframe. However, the overall representation of jobs in this sector is lower across the province than it is for Greenstone, making it that much more important that these jobs and businesses are protected as much as possible. This will become an important issue in the analysis when impacts of the COVID-19 pandemic are considered.

The transportation and warehousing sector, including heavy equipment and related jobs, is a strong contributor to the Greenstone economy at nearly 7% in 2016 – quite a bit stronger than for Ontario as a whole at 4.6% (close to double). This could, in part be a reflection of heavy equipment work in the forest and mining sectors.

Combining a number of sectors into "commercial" (construction, manufacturing, resource-based and transportation/warehousing), the data demonstrates that employment in the sector has been steadily declining from a high of 38% in 2006 to a low of 27.7% in 2016. This also reflects the sharp decline in manufacturing discussed above. If manufacturing is taken out of the tallies, the commercial sector actually grew between 2006 and 2016 (27.7%).

The retail sector, including wholesale trade and food/accommodation, represents a significant percentage of employment. Data from 2006 is not reliable, but between 2011 and 2016 retail employment hovered around 18% of all employment. It is fairly similar for Ontario as a whole, holding steady at around 16% over the 10 year period. The difference in representation between Greenstone and Ontario is very likely due to lower retail diversity in Greenstone compared to other larger urban centres which likely experience



less residents travelling to out-of-town retail centres to do their shopping. This is of course, an important aspect to consider in the analysis of opportunities for retail growth.

Although not specifically considered “retail”, it is worth noting that there has been a steady increase in professional services, insurance and real estate. By 2016 professional services accounted for 6.5% of total employment, up from somewhere around 3% in 2006. With professionals having the ability to work from home offices and the general trend towards home-office employment as a result of COVID-19 pandemic restrictions, it is incumbent upon economic planners to identify ways to increase and hold these jobs. As has been discussed in past reports, selling the idyllic lifestyle of Greenstone could be an important contribution to marketing.

2.5 Income and Earnings

Table 2-4 demonstrates the income and earnings characteristics of Greenstone Region and the province of Ontario for the 2006, 2011 and 2016 census periods. As with all census income data, the information reported for each census period is actually for the previous tax year (2005, 2010 and 2015 respectively).

Table 2-4 Income and Earnings – Greenstone and Ontario (2006 to 2016)

Characteristics	2006		2011		2016	
	Greenstone Total	Ontario Total	Greenstone Total	Ontario Total	Greenstone Total	Ontario Total
Persons 15 years of age and older with income	2,945	6,991,670	3,780	10,473,670	3,795	11,038,440
Median income (15 years and over)	35,204	27,258	31,840	30,526	34,842	33,539
Average income	N/A	N/A	37,727	42,264	43,137	47,915
Median income – persons 15 years and over who worked full-year, full-time	51,766	44,748	55,363	50,116	57,788	55,121
Average income – persons 15 years and over who worked full-year, full-time	N/A	N/A	57,273	61,495	63,311	68,628
Median after-tax income	30,315	24,604	29,398	28,118	31,808	30,641
Average after-tax income	N/A	N/A	32,742	35,249	37,071	39,318
Median total household income	64,153	60,455	62,643	66,358	63,488	74,287
Median total after-tax household income	55,530	52,117	55,478	58,717	57,024	65,285

Source: Statistics Canada

There are a number of interesting observations from the data. As shown, median income for Greenstone was higher than for Ontario as a whole for all three census periods, although the gap closed between 2005 and 2015 -- 23% in 2005; 4.1% in 2010 and 3.7% in 2015.



The data also shows that income levels in Greenstone dropped by 9% between 2005 and 2010, and had not fully recovered to 2005 levels by 2015. Adjusted for aggregated inflation (consumer price index) between 2005 and 2015, it would be expected that salaries would have increased by approximately 21%. Unfortunately, for Greenstone, median income only rose 1%, compared to an increase in provincial salaries of 23% between 2005 and 2015. So, the closing wage gap between Greenstone and Ontario is more likely attributed to a slow rebound in Greenstone wages, rather than a rapid increase in provincial wages. Although it could be argued that the overall decline in Greenstone wages is due to the loss of high paying jobs due to downturns in the resource-based sectors, this is not entirely reflected by the general increase in education levels and government-sponsored employment over the same time period. It is still promising for marketing purposes to acknowledge that Greenstone residents are, on average being paid better than provincial averages.

In fact, income and earnings numbers correlate well with employment and education data for the Region. The downturn in the natural resources industries in the mid to late 1990's resulted in some economic negativity for Greenstone. However, with the increased rate of post-secondary education in the Region, there are many opportunities for increased salaries/wages in future, particularly in the public services and professional services sectors.

Another observation from the income data is that despite experiencing individual earners' higher wage levels in Greenstone than Ontario as a whole, median household income, after being higher by 6% in 2005, was lower than Ontario by 6% in 2010 and by over 14% in 2015. There could be a number of reasons for this, but from previous studies, it is known that one of the reasons is very likely that the spouse of a worker attracted to well-paying skilled employment in Greenstone may not have employment opportunities for themselves, potentially resulting in more single family income households, compared to Ontario that likely has a higher rate of multiple income households. Although the employed individual may benefit from a higher wage, the combined family income is lower. This will have implications for the analysis of retail opportunities and the spending of disposable income in the Greenstone Region that will be examined further in later stages of the study.

2.6 Observations and Conclusions from the Demographic Analysis

The population of Greenstone declined between 2001 and 2016, with the largest drop of just over 13% between 2001 and 2006. Interestingly, declines diminished between 2006 and 2016, averaging approximately -0.2% per year, and holding steady at those levels. Although the Ontario population has been increasing year over year since 2001, increases dropped over each census period between 2006 and 2016, averaging a 10 year increase of approximately 0.6% per year. The general trend in Canada has been steady growth around 1% per year between 2006 and 2016. Over the same period, the population of the USA grew by less than 1% per year.

The Greenstone population has historically been subject to fluctuations in resource industry growth and decline. Because the Region's population is small, adding one major project with a workforce of 200 to 250 (viz. Greenstone Gold Mines Hardrock Project), would have a dramatic positive effect on the population. During the limited construction period of this type of project (typically 2 years), the economy



could experience the addition of between 1,000 to 1,500 workers, having an even more dramatic effect on population, although, as discussed further in Section 4.0, the actual increase will depend on the type of operational model employed – either fly-in/fly-out/drive-in/drive-out, or more of a historic resource town model where many more families would locate in Greenstone. Additionally, the growth during construction would be short-term, and planning around that growth should be somewhat cautious, looking more towards the longer-term, more sustainable workforce and economic contributions during the operations and maintenance period.

Median income and earnings levels in Greenstone remain higher than Ontario averages despite a comparative lag in growth between 2005 and 2010. This is also reflected in a steady decline in the number of persons employed in the Region, and a dropping employment rate. However, although not easy to explain, the Regional unemployment rate has seen some modest improvement over the 10 year period, down to 10.6% in 2016 from 13% in 2011, and even stronger than 2006 when the number of residents employed was the highest in the 10 year period. Overall, the decline in incomes is likely reflective of 1) a drop in high-skilled, high-paying positions in the forest products sector; and 2) the 2008-09 recession. It should be noted that the Ontario employment rate also declined between 2006 and 2016, but not as dramatically, perhaps suggesting that the Ontario economy was more diversified during the challenging years of recession in 2008 and 2009 with the ability to recover more quickly. Many of the job losses in Greenstone were very likely permanent job losses, necessitating economic diversification to fully recover.

The combined household income of Greenstone residents lagged behind Ontario in the 2011 and 2016 census periods. As discussed in Section 4.0, it is expected this is likely a reflection of the inability of spouses of employed residents to find employment in the Region. This is likely, in large part, due to an economy that is much smaller and less diversified than Ontario as a whole. Because individual incomes tend to be attractive in the Region, this trend could continue. It is interesting to note, that by contrast, combined after-tax household incomes actually rose, although by only 3% between 2006 and 2016, well below inflation-adjusted wage growth (21% for Ontario) for the same period. Ontario wage growth fared better than Greenstone, rising by just over 25% for the same period, which is just above the inflation-adjusted provincial average.

The strong growth in education and health services occupations, which tend to pay good wages and provide a steady form of income provides a strong foundation for disposable income spending in Greenstone. Similarly, although declining, public administration jobs also tend to pay good wages and benefits. Between the three sectors, over 40% of jobs in the 2016 Greenstone economy were steady, high paying occupations supported by reliable government wages/benefits.

Increasing the skill level of Greenstone residents will give them better access to high-skilled, high-paying jobs in future. Encouraging residents to stay in school and successfully complete their Grade 12 education is particularly important as most highly skilled occupations in the trades require Grade 12 as a minimum qualification. Achieving higher levels of post-secondary education will also have positive impacts on the Greenstone economy.

Increasing education levels and job qualifications will only be helpful if the Greenstone economy has jobs to offer. The general decline in employment levels between 2006 and 2016, although reflective of an economy that has historically been dependent on the resource sector, combined with drops in population



(although fairly modest), could be a reflection of Greenstone residents leaving the Region to seek employment elsewhere.

From a retail sales perspective, out-migration and dropping population would tend to indicate the same relative declines in retail sales. However, it is very promising that Greenstone residents tend to be well-paid, compared to provincial wages, indicating availability of after-tax disposable income, which steadily, although conservatively, grew in each census period between 2006 and 2016. This is somewhat supported by more modest increases in household after-tax income over the same period, although growth did not match expected inflation-adjusted increases.

Opportunities for modest retail growth in Greenstone appear to be supported by the demographic data, without the addition of a major employer. Obviously, the addition of a major employer would change the potential quite dramatically. This will be examined in later sections of the report.

Other factors that likely affect the potential for retail growth in Greenstone will also be explored in later sections of the report. Of most importance is the global trend in on-line spending which is threatening traditional “bricks-and mortar” retailers around the world. Greenstone has historically experienced challenges in growing retail outlets being conveniently proximate to Thunder Bay, where the shopping experience for Greenstone residents is diverse and represents an opportunity for destination shopping. Loss of this disposable income to another region is difficult to address. Adding on-line shopping to the same “leakage” could be even more difficult to address.

A second factor of importance that has been affecting retail sales globally, and will likely continue to affect sales for the unforeseeable future in Greenstone (and elsewhere), is the COVID-19 pandemic. It is hoped that this will be a temporary impact to the retail economy. However, the strain of reduced spending during COVID-restrictions could have a long-term effect on the ability of existing retailers to survive the “shock”. Although very difficult to predict and forecast, this factor will also be examined in later sections of the report.



3.0 Overview of Greenstone Economy

The following sections provide a characterization of the historic and current economies of Greenstone Region, plus a description of factors that could potentially influence the economy in future.

3.1 Historic Economy

The Greenstone area was initially established as a centre for the transportation industry, acting as a service centre for the Transcontinental Railway System. Nakina was an important railway service stop from 1923 until 1986. The town had a railway round-house as well as a watering and fueling capability. Cost controls in the railway industry meant that service and maintenance could be consolidated at points much more distant from one another than had been common in the first half of the 20th century. As a result, the value of Nakina, Caramat and Jellicoe as railway service communities was greatly diminished, to the point where it was no longer a substantial employer in the town (GEDC, 2010).

Longlac is the oldest of the settlements in Greenstone, originally established as a Northwest Company Trading Post in the early 1800s. It became a regional forestry centre in 1948 and up until recently the community supported three major mills, Longlac Wood Industries, waferboard and plywood mills owned by Kruger and the Long Lake Forest Products lumber mill owned by Buchanan. Both Kruger mills have closed and the Long Lake Forest Products mill remains under an indefinite lay-off status (GEDC, 2010).

Geraldton and Beardmore were also home to ten former producing gold mines between 1936 and 1970. The Geraldton-Beardmore Gold Camp has numerous mineralized zones which continue to be explored for potential development. The mines in Geraldton and Beardmore were closed in and around 1970 when economic conditions and a gold price of \$35 per ounce made them uneconomic (GEDC, 2010).

Tourism has also been an important sector of the Greenstone economy. Nakina continues to be a jumping off point for remote Northern regions with two air service companies, Nakina Air Service and Leuenberger Air Service, flying cargo and passengers to the hunting and fishing outfitters further north (GEDC, 2010).

From those beginnings, the local economy has grown with activity in the gold mining, pulp and paper, and tourism industries. Historically, in Northern Ontario, success of the primary sectors has driven success of the overall economy. When the primary sector economy has declined, the overall economy has declined.

According to a 2019 report by the Northern Institute, the Canadian economy has experienced significant employment growth during the past three decades. Total employment in Canada and Ontario grew at a rate of between approximately 38 and 40 per cent during that period. On the other hand, total employment in Northwestern Ontario declined by approximately 7.7 per cent during the same period.

According to a report released by Statistics Canada in 2006 which examined economic trends in Northern Ontario between 1981 and 2001, jobs in the primary sectors of agriculture, forestry and mining fell by 47 percent over the 1981 to 2001 period, declining from 11 percent of all jobs in 1981 to 6 percent of all jobs



by 2001. The largest decline was in mining, where the number of jobs fell by 18,000, down 61 percent from the 1981 level of mining employment.

During this period, manufacturing jobs involved in the processing of agricultural products, lumber and minerals also declined. Pulp and paper mills, sawmills and wood manufacturing recorded a decline of 23 percent over the 20 year period. By 2001, only 5 percent of all jobs in Northern Ontario were in traditional forestry manufacturing.

Together, the metal manufacturing sector and the primary plus manufacturing sectors represented 28 percent of all jobs in 1981. Led by the changes noted above, the share of jobs in 2001 for these same sectors had declined to only 16 percent.

The Northern Institute report cites that provincial and regional employment in the goods-producing industries that include agriculture, forestry, mining, manufacturing, construction, and utilities declined by 19.5 per cent in Ontario and 42.2 per cent in Northwestern Ontario between 1986 and 2016. The major reason given for the higher employment decline in Northwestern Ontario is that forestry and forest-based manufacturing industries represented a higher proportion of total employment. According to the Institute, in 1986, 58.1 per cent of total employment was in the goods-producing sector in Northwestern Ontario. Between 1986 and 2016, employment in this sector had declined by 74.3 per cent in Northwestern Ontario. The only goods producing industries that experienced significant employment growth were construction and support activities for mining industries. Construction industry employment rose by 37.1 per cent in Northwestern Ontario and rose by 58.7% in the support services for mining and oil and gas sector (mostly mining in Northwestern Ontario). Total mining employment in the mining sector of Northwestern Ontario has been cyclical, with a small increase (less than 10%) between 1986 and 1996, declining 16.4% between 1996 and 2006, and rising again by 21% between 2006 and 2016.

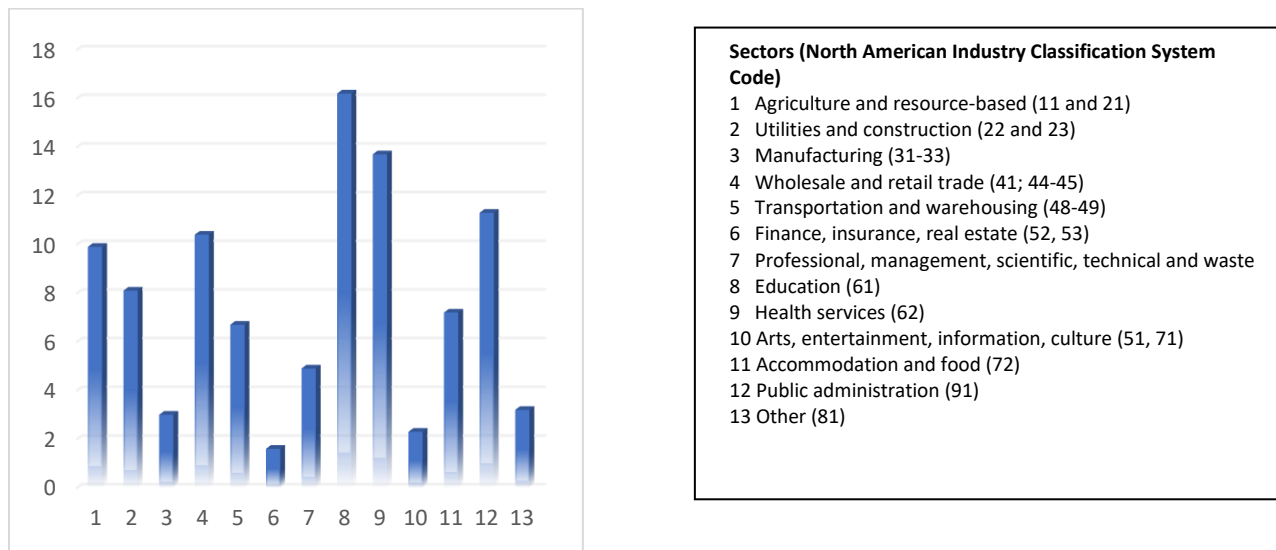
One big difference in the recent past in Northern Ontario is that some of the declines in the primary sectors have been offset by gains in other sectors such as education and health and social services.

3.2 Current Economy

Despite declines over the past decades, the current Greenstone economy continues to derive economic benefits from the forestry sector, but is increasingly driven by the services sector (health, education and public administration), retail and wholesale, food and accommodation, and to a declining extent, the forest products industry. As discussed in Section 2.0, a large percentage (41%) of all employment in the Region relies on employment from the services sector including government administration, health services and education services. The remainder of economic activity in the Region, as reported by the Statistics Canada 2016 census falls into a number of sectors as shown on Table 3-1.



Table 3-1 Greenstone Region – 2016 Employment by Sector (% of total labour force)



Source: Statistics Canada, 2016 census

As shown, and as discussed in Section 2.0, the public services sectors are the three largest by numbers of employees, followed by wholesale and retail, then primary resources. However, it should not go unnoticed that if employment in the resource-based sector (forest and mining operations) is combined with manufacturing (forest products and metal processing mills), the contribution would be higher, underscoring the importance of the natural resource sector to the Greenstone economy.

3.2.1 Economic Diversification

As part of the analysis conducted for this study, the relative diversification of the economy was examined. Typically, a diverse economy sees employment spread over a variety of sectors. The more even the spread, and the more sectors, the more diversified the economy is considered to be. A specialized economy that relies more heavily on one or two sectors while not considered as diversified, might also reflect that the economy is grounded by a large employer that provides jobs and revenues to the regional economy. This is typically referred to as a 'specialized' economy. Neither type of economy is wrong or better than the other. However, as has been experienced in Northern Ontario over the past 3 decades, an economy that is largely based on the primary resource sectors of forestry, forest product manufacturing and mining, can be vulnerable to the typical cycles of resource-based economies. Specializing too heavily in the natural resources sector can lead to boom-bust economies.

The level of economic diversification or specialization can change quickly, especially for a small economy such as Greenstone Region. With less than 3,000 working age community members, the influx of jobs and revenues from a large resource project can change the economy from diverse to specialized very quickly. Although the influx of jobs and revenues from that project into the regional economy would obviously be welcomed, it changes the vulnerability of the economy in addition to providing economic opportunities.

To examine the level of diversification within the Greenstone economy, in addition to an analysis of the business survey conducted for the study, an analysis of the diversification of the Greenstone economy was conducted using the well-known Herfindahl Index (HI). A high HI indicates lower economic diversification (more specialization) than a lower HI. Comparing the changes in HI over time provides an indication of whether an economy is becoming more diversified (lower HI) or more specialized (higher HI).

The formula for HI is:

$$HI = (\text{employment share of sector 1})^2 + (\text{employment share of sector 2})^2 + (\text{employment share of sector 3})^2$$

For example, if a local economy has five sectors where 20% are employed in sector 1, 5% in sector 2, 10% in sector 3, 40% in sector 4, and 25 percent in sector 5, the HI would be:

$$HI = (0.2)^2 + (0.5)^2 + (0.1)^2 + (0.4)^2 + (0.25)^2 = 0.28$$

If the numbers were to change, reflecting a higher share of the market for one of these sectors, the HI would also change. For example, if the market share of sector 1 became 5%, sector 2 became 5%, sector 3 became 5%, sector 4 became 5% and sector 5 became 80%, the HI would be as follows:

$$HI = (0.05)^2 + (0.05)^2 + (0.05)^2 + (0.05)^2 + (0.8)^2 = 0.65$$

A much higher HI indicates that this market has become much more specialized and more dominated by one sector. A community is considered diversified if its Herfindahl Index lies between 0.1 (or less) and 0.19. Diversification is higher with a lower HI score.

The Herfindahl Index was calculated for Greenstone and Ontario for the years 2006, 2011 and 2016. Results are shown in Table 3-2.

Table 3-2 Herfindahl Index of Economic Diversification for Greenstone and Ontario (2006 to 2016)

Herfindal Index (HI)	2006	2011	2016
Greenstone	0.197	0.048	0.041
Ontario	0.084	0.068	0.075
Greenstone (inc public services)	0.116	0.098	0.098
Ontario (inc public services)	0.097	0.088	0.089

Two sets of calculations were performed – one including the services sector (health, education and public administration); and a second that does not include public services. The calculations demonstrate that with or without including employment in the public services, Greenstone’s economy is well diversified and on a trajectory of increased diversification between 2006 and 2016. However, the scores also clearly demonstrate that with the addition of the public services, the HI scores increase and diversification decreases, demonstrating the high percentage of Greenstone residents employed in the public services sector. As discussed earlier, this trend might naturally be occurring as the reliance on the forest sector has declined over that 10-year period. This could be considered both good, in that a diversified economy is



less vulnerable to economic shock; and bad in that population, jobs and revenues also declined with the declines in the forest products sector.

Diversification of the Greenstone economy also compares favourably with diversification of the Ontario economy. The Region outperformed Ontario when public services employment was not considered in all three census years. However, the Province was considered more diverse than Greenstone when public services jobs were considered in the calculations. This is likely due to the fact that public services are important sectors of both the Ontario and Greenstone economies, but more important, represent a higher percentage of employment in Greenstone than Ontario, which reduces overall economic diversification. It should be noted that the high representation of public services in the Greenstone economy, although indicating a somewhat specialized economy, the economic vulnerabilities of 'specializing' in public services is far lower than the vulnerabilities of the cyclical nature of the natural resources sectors, in particular the mining sector.

It should be noted that the introduction of a major project into a fairly small economy like that of Greenstone, would reduce diversification and increase specialization, although the jobs and economic contribution of these types of projects into the economy would be welcomed. The biggest challenge would be ensuring the economy is buffered against traditional cyclical economies that are typically associated with the types of major projects examined later in Section 4.0 of this report.

3.2.2 Business Survey

GEDC performed an on-line and mail-in business survey to obtain information from Greenstone businesses that could feed into this commercial/retail analysis.

3.2.2.1 Methodology

Retail and wholesale businesses were the primary target of the business survey, but other businesses were included. It was agreed during development of the survey that franchises and institutions such as banks would not be included due to their representation in the national/international marketplace, and due to previous experiences of lengthy response times due to complex internal authorization procedures. The survey also did not include public administration, health or education services, which represent a large proportion of employment in the Region.

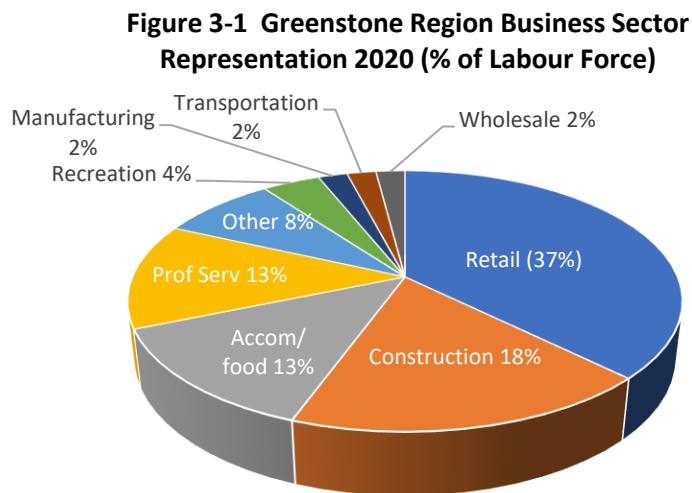
The questions asked (the survey instrument) are provided in Appendix 2. The survey was either accessed on-line or (for some) mailed-out for mail-in return during November and early December 2020. Forty-six responses were received. Business respondents fall into the following sectors:

- Accommodation and food services
- Retail sales
- Wholesale sales
- Professional services
- Transportation
- Manufacturing



- Construction
- Other

Forty-five (45) responses were received. Representation of respondents by economic sector is shown on Figure 3-1.



Source: Greenstone Economic Development Corporation Business Survey, 2021

3.2.2.2 Analysis

The following paragraphs provide an analysis of the results of the business survey.

Market Sector Representation of Respondents

As shown on Figure 3-1, amongst the sectors surveyed (public services, health services and public administration were not included in the survey), retail is the most represented at 37% of respondents. Construction is well represented at 18% of respondents. Most of those responding as construction businesses are providing small-scale services to the residential market. Professional services (employment services, insurance, legal, accounting, etc.) and accommodation/food services businesses were also well represented with each having 13% of respondents. At 8% of respondents, the “Other” category includes utility services, property maintenance and painting services, among others. The smaller representation in the transportation, manufacturing and wholesale sectors makes analysis difficult as there was only one respondent in each sector.

The distribution of respondents across a fairly diverse number of sectors supports the HI diversification analysis discussed in Section 3.2.1.



Sales and Anticipated Growth

Respondents were asked to disclose their general annual sales/revenues, whether their primary customers are Greenstone residents or customers from outside the Region, and their general growth trend over the past five years. They were also asked whether they anticipate making any significant capital investments within the next five years.

Not all survey respondents were willing to disclose financial information. However, annual revenues amongst business respondents are generally fairly healthy. Among the total of those who disclosed, average revenues were around \$766,000 per year per business. This includes a high of \$7,000,000 (although this could represent revenues generated in other regions), and a low of \$5,000, so there is quite a spread across a fairly small sample size. Average annual revenue per employee across all businesses that disclosed, is approximately \$185,000. These revenues include overhead, inventory, etc., but generally depict a fairly healthy local economy, even when the two lowest annual revenues and the two highest are removed from the averages (\$211,334 per employee).

Interestingly, the retail and the accommodation/food sectors ranked amongst the top three best performing sectors on the basis of annual revenue per employee, with retail the top earner at \$309,103 per employee, and accommodation/food ranking third, but only 18% lower. The “other services” sector which included utility services, property maintenance and painting services, ranked second, 8% behind the retail sector. Not surprisingly, these three sectors combined represent 65% of the businesses that responded to the survey. However, upon examination of business respondent longevity, retail and accommodation/food average 15.7 years in business, compared to an average of 40 years amongst construction business respondents and over 80 years amongst the recreational sector respondents, perhaps indicating higher turn-over in the retail and accommodation/food sectors.

Another measure of economic health is stability of employment. Close to 70% of survey respondents indicated that their number of employees within the past 5 years has remained fairly constant. Approximately 9% of survey respondents indicated that their number of employees is up; and approximately 9% indicated their numbers are down. Without specific data, it is difficult to know the causes for those that are “up” and those that are “down”. As we know, 2020 was a challenge for many businesses due to COVID restrictions and lock-downs, especially those in the accommodation/food sectors. This is likely reflected in the number of businesses reporting declines. Approximately 67% of businesses in the accommodation/food sector reported declines. While 12% of retail businesses reported an increase in their number of employees, approximately 24% indicated declines, with the majority (64%) indicating no significant change.

Also interesting is that when asked to respond to whether their primary customers are from outside the Greenstone Region or from within (high, moderate or low), 60% of survey respondents provided a “low” response, indicating that Greenstone residents are typically their primary customers. Just over twenty-seven percent (27.5%) of respondents responded with a “high” response, indicating that an important element of their sales is to customers outside the Greenstone Region. This was true across all sectors. The construction sector reported the most “high” responses (50%), indicating many of these businesses rely on customers outside the Region, although almost as many businesses reported “low” responses (38%), also indicating the importance of customers from inside the Greenstone Region. Although a small sample size, the accommodation/food sector reported the highest reliance on sales within Greenstone (83.3%). Only one respondent in that sector reported “high” volume of sales to customers outside the



Greenstone Region. The retail sector also reported a fairly high reliance on sales to Greenstone residents (59%), although it is interesting to note that a fairly high percentage (29%) reported high sales volume to non-Greenstone customers. It could be speculated that the retail businesses located on the highway and selling to the travelling public are the ones with the higher sales to customers outside the Region.

In addition to the economy of Greenstone demonstrating a high level of diversification, in general, these responses indicate the Greenstone economy is also well diversified across its customer base, indicating that Greenstone businesses could be somewhat resilient to increases and decreases in regional population and incomes. The ramifications of this diversification and resilience will be discussed further in later sections which address the future economy.

Investment by Greenstone businesses has been good, with 67.4% of survey respondents indicating they have made major capital investments within the past five years. Investment was strongest in the accommodation and food sector within which 83% of respondents indicated they had made investments, although 50% of businesses or more in all sectors reported having made investment in the past five years. Despite the business optimism as reflected by investment over the past five years, only 37% of respondents indicated they would be making investments in the next five years and 50% clearly indicated they would not. This lack of intent to invest was fairly evenly represented across all sectors with the exceptions being the professional services and construction sectors, within which 50% of businesses in both sectors indicated an intent to make capital investments within the next five years. The lack of intent to make capital investments in the near future could be the result of several factors including the COVID pandemic and concerns about continued lock-downs and uncertain economic conditions; no need for further investment having invested in the previous five years; general fiscal conservatism; or a combination of factors.

It is interesting to note that the number of businesses intending to make capital investments increases significantly if a major project comes to the Region. Even more interesting is that the retail sector was the only sector within which less than 50% of businesses intended to make capital investments if a major project were to be realized --35% of respondents -- the same as without a major project. Among sectors with more than one respondent, not surprisingly, the construction sector was most optimistic about capital investment if a major project came to Greenstone (75% of respondents).

Effect of On-line Sales (E-Commerce)

An aspect of modern business that can be an important factor in the success or failure of the enterprise, is on-line sales. Some businesses experience competition from on-lines sales, while other businesses are utilizing the internet as a means to boost sales. Similar to the effect of local customers shopping outside the Region, on-line sales can represent “leakage” of revenues and potentially jobs. However, building on-line sales as a component of the business can actually represent opportunities for growth and the potential for new businesses, which is good for the Regional economy.

Survey respondents were asked to provide information about the effect of on-line sales to their business. Respondents were asked to comment on the following:

- Estimated percentage of sales generated on-line in the current year;
- Extent to which your business is affected by on-line sales (eg. positive; negative; no effect); and
- Plans for the business to increase on-line sale in the near future.



Results of the survey indicate that approximately 35% of respondents are already generating sales through on-line activity. The sectors most active in generating on-line sales are professional services (100%) and other services (50%). Only 22% of respondents indicated that they were negatively affected by on-line sales, while many businesses indicated they are planning to increase on-line sales in the near future (24%). Together, it is estimated that in the near future, the majority (57%) of Greenstone businesses will be generating some level of on-line sales.

Businesses in the retail sector indicated the most negative effects (41%), although the majority (59%) indicated they are unaffected by on-line sales.

E-commerce is discussed in the context of future economic challenges and opportunities in Section 3.3.2.1.

3.3 Economy of the Future

This section provides a discussion of the influences that are expected to affect growth of the Greenstone economy in the coming years. Of course, there is no certainty that proposed development will occur, that it will occur as scheduled, or that it will be of the scale initially estimated. As a result, the forecasts presented should be considered an indication only.

In addition to prospective development of new projects, there are also some other economic disruptors that are discussed in Section 3.3.2.

3.3.1 Economic Outlook for Ontario and Canada

Ontario and Greenstone are part of an integrated global economy, connected with the rest of Canada, the United States and the world. Both Ontario and Greenstone have access to open and efficient markets which connects them to national and global capital and trade flows.

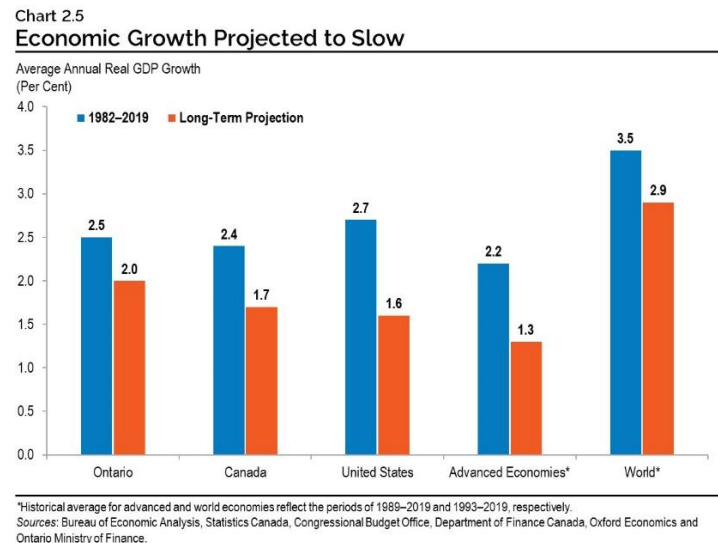
Long-term projections developed by the Ontario Ministry of Finance in 2020 assume that over the long term, after the global economy recovers from the impacts of COVID-19, the external environment will evolve in a manner consistent with trends leading up to the pandemic (Ontario Ministry of Finance, 2020). A discussion of some potential economic impacts of the COVID-19 pandemic is provided in Section 3.3.2.2.

As shown on Figure 3-2, although predicted by the Ontario Ministry of Finance to be slightly better than Canada's growth in Real GDP over the long-term, Ontario real GDP growth is projected to moderate from an average of 2.5 per cent annually between 1982 and 2019 to 2.0 per cent per year over the long-term projection. Moderate growth is expected in other jurisdictions as well. Canada, the United States, overall advanced economies, and the world economy are expected to experience a slower pace of economic growth over the long-term projection (Ontario Ministry of Finance, 2020). This is attributed largely to flat growth or declines in the growth of the labour force, which, in turn is driven by population growth or decline. Stronger rates of growth in the working-age population will typically lead to stronger growth in



the labour force (Ontario Ministry of Finance, 2020). Declines in growth of the working-age population could be offset by immigration.

Figure 3-2 Average Annual Real GDP Growth (Ontario and Canada) – Long Term Projection



Source: Ontario Ministry of Finance, Ontario's Long-Term Report on the Economy, June 2020

Overall, although the Ontario economy is not predicted to grow at historical rates, the predicted long-term rate of growth is still positive. It should be noted that the projections shown in Figure 3-2 are not adjusted for the economic impacts of the COVID-10 pandemic. A discussion of the potential impacts of the pandemic are provided in Section 3.3.2.2.

Without significant investment in new major projects, the Greenstone economy will face many of the same headwinds that the Canadian and Ontario economies will face, including a decline in population and labour force. As discussed in Section 2.1, the reduction in the population of Greenstone Region has been levelling off in recent years from the years during which the forest products sector was in general decline. Ontario's population has actually been increasing over the same period (from 2006 to 2016). However, population projections provided by the Ontario Ministry of Finance draw the following conclusion about the working age demographics:

"The growth rate of the [Ontario] population aged 15–64 is projected to continue to trend lower until the early 2030s. From an annual rate of growth of 1.0 per cent at the beginning of the projection, this age group is projected to grow by only 0.3 per cent by 2027–28."
(Ontario Ministry of Finance, 2020)

Because of the close linkages of the labour force (ages 15 to 64) to economic growth, there is an argument that can be made that our economies would benefit from an influx of working age people. For Greenstone that could come from in-migration of permanent residents or an influx of outside labour that will work on new developments. Over the longer term, growth through the addition of new permanent residents will have a higher level of long-term sustainability than major resource projects with workers typically leaving the municipality once work on the projects dries up.



3.3.2 Major Economic Influences

This section presents projects planned within the Greenstone Region within the coming few years. Information about the projects was obtained through personal communications and websites of project developers, or was derived from experiences of similar projects in similar types of settings.

3.3.2.1 Hardrock Gold Project

The Greenstone Gold Mines (GGM) Hardrock project (the “Project”), to be located on Hwy 11 south of Geraldton is on a new trajectory following a number of recent developments.

Project Update

Since the 43-101 Technical Report was released in 2016, GGM reports significant progress in the advancement of the Project. Highlights reported include:

- The Federal EA was approved in December 2018 and the Provincial EA was approved in March 2019.
- All permits required to initiate construction activities have been received, including the Closure Plan as well as the Environmental Compliance Approval and Permit to Take Water for initial construction activities. Indigenous communities and various government agency reviews of the remaining construction permits are underway.
- Agreements are in place with local Indigenous communities, and implementation activities are underway.
- Additional drilling campaigns totaling 38,000 metres were successfully undertaken in 2018 and 2019. The drilling program targeted additional areas that are planned to be mined in the first five years of operations.
- In addition to the drilling, various optimization activities were completed and updated in 2019.

According to the *Greenstone Gold Mines Hard Rock Herald (Issue No.23, Q2/Q3 2020)*, throughout 2020, GGM was focused on completing detailed engineering and permitting. The Company also initiated new exploration throughout the region. During the second and third quarters of 2020, the Hardrock Project obtained several permits. GGM planned on finalizing the detailed engineering for the Project in 2020. With approved Environmental Assessments and many key permits in place, the Project is much closer to initiation of construction.



Figure 3-3 Proposed Configuration of the Hardrock Open Pit



Source: *mining.com*

In December 2020, Premier Gold also announced the results of an updated and optimized Feasibility Study for the Project, summarizing significant optimization and de-risking of the Project. The update is based on a revised mineral reserve, life of mine plan, advances in detailed engineering reflecting firm price bids for all major equipment including the processing plant, mobile fleet, power plant, and the water and sewage treatment plants (Premier Goldmines Ltd. Newsrelease, December 16, 2020).

Highlights of the Study and updated life-of-mine Open Pit Mine Plan (“LOM”) include:

- \$1.05 billion after-tax net present value (NPV) of 5%
- 20.1 % after-tax Internal Rate of return (“IRR”)
- 3.2 year Payback Period
- AISC of \$618 per oz and total operating cost of \$20.39 per tonne
- 5.54 million ounces (oz) proven & probable mineral gold reserves averaging 1.27 g/t Au (0.35 g/t Au cut-off grade)
- 5.05 million oz of total gold to be produced with a 91.2 % process recovery and 5.1 to 1 strip ratio
- 358,000 oz average annual gold production throughout the mine life
- 414,000 oz First Five years average production at an average head grade of 1.45 grams of gold per tonne mined; and
- \$952 Million initial capital cost and total LOM sustaining capital of \$323 million (initial capital cost includes working capital and IBA payments).

GGM and its Joint Venture Partners have not yet made a decision on construction. The main objective of the current workplan is to continue to develop the Project towards being in a position to make a Construction Decision. The current workplan includes:

- Continuing permitting activities, including submitting the remaining construction permits.
- Implementing the agreements with local Indigenous communities, in particular planning for training and business opportunities.
- Completing the Process Plant detailed engineering that was initiated in 2019.
- Advancing exploration activities including further development of exploration targets and refinement of geological models.
- Finalizing draft agreements for the infrastructure relocation with MTO and Hydro One.

Source: Greenstonegoldmines.com

Ownership Update

In addition to advances made technically, there were important changes in ownership of the Project. On December 15, 2020, Premier Gold announced that a subsidiary of Orion Mine Finance was purchasing all of Centerra Gold's holdings/shares to become a 50% owner in Greenstone Gold Mines, with Premier retaining the other 50% ownership interest.

Three days later Equinox Gold announced it would acquire a 50% interest in the Project through a complete buy-out of Premier Gold's ownership interest and the formation of a joint venture between Equinox Gold and Orion Mine Finance (*Source: Equinox Gold/Premier Gold joint press release, December 16, 2020*).

It is expected that the joint venture will initiate construction in or around Q3 2021. Equinox is expected to be the mine operator.

Current estimates indicate there could be sufficient resource to sustain a 20 year mine life.

Employment and Procurement

In the Greenstone Business Readiness report prepared for Greenstone Municipality in 2019, estimates of employment and procurement contained in the Hardrock Project EA were reviewed. No updates of these estimates have been publicly released.

1) Employment

Total direct employment during construction, expected to be drawn from within Ontario was estimated at 1,280, including 340 positions drawn from the Greenstone local assessment area (LAA); and 440 positions to be drawn from within regional assessment area (RAA -- Northwestern Ontario). Considering indirect and induced employment, total employment from within the LAA was estimated to be close to 6,000 full-time equivalent jobs.

With the construction stage expected to take between 24 to 36 months, it is important from an economic development perspective to recognize this level of employment is relatively brief compared to an



estimated mine life of 20 years. It was estimated that average annual employment during operations would be around 125 from within Ontario, which includes 20 from the LAA and 20 from the RAA. In addition to operations employment, GGM also estimated an additional 1,295 positions generated within Ontario from sustaining capital (generated by capital invested in maintaining the facilities), including 860 from within the LAA and 130 within the broader RAA. These estimates were based on a 14 year life of mine. Adjusting to a 20 year mine life would add an additional 380 annual positions within the LAA and close to an additional 60 positions within the broader region.

A number of employees during construction are expected to be housed in on-site camp facilities. The Company is currently planning that the camp will be temporary and will be demolished following completion of construction.

2) Procurement

The Hardrock Project EA also provides estimates of capital spending during the life of the project. GGM estimated that total capital spending over the life of mine would be approximately \$3 billion, including close to \$1 billion during construction with approximately \$100 million expected to be expended in the LAA and approximately \$250 million within the broader RAA. In addition, it was estimated there will be \$2 billion spent during operation and approximately \$200 million on sustaining capital. Together, approximately \$350 million in operational and sustaining capital will be spent within the local assessment area and close to \$2 billion spent within the broader region. The estimates for operations and sustaining capital were based on a 14 year mine life.

With additional resource identified since these estimates were calculated, GGM currently estimates that mine life could be extended to as much as 20 years. This would add more maintenance and sustaining capital spending within both the LAA and RAA. Taking the average annual spending over the 14 year mine life, it is estimated the additional 6 years of mine life could add an additional \$1 billion in operational and sustaining capital, with an estimated \$160 million spent within the LAA and an additional \$700 million spent within the RAA.

Given that many of the construction contracts would be bundled into larger contracts aimed at larger contractors, GGM previously suggested that local businesses focus their readiness activities on the Operations and Maintenance phase of the Project. Contracts will be more appropriately scaled to the capacity of local suppliers and contractors and will be longer term. For example GGM is already aware of a local concrete supplier (Barino) and civil contractor (Cloutier). For the construction period they suggest that local businesses seek to partner with or subcontract to larger firms. Focusing on the operations and maintenance period will also provide more lead time to prepare.

3.3.2.2 Ring of Fire

Interest in mining development in the area known as the Ring of Fire has prompted much speculation about future economic development opportunities arising from development of the mineralized zone proximate to McFauld's Lake.



In recent years there has been regional pessimism about the timelines for development of the Ring of Fire. However, there is some reason for optimism based on the initiation of the Environmental Assessment process for the Northern Road Link which will connect the mineralized zone of the Ring of Fire to the provincial highway system and the national railway network in Greenstone. This infrastructure project is of paramount importance to development of the Region due to its remoteness and isolation.

It is widely accepted that the area around McFauld's Lake, known as the Ring of Fire, is highly mineralized, with estimates of potential revenues exceeding \$60 billion. Tapping this potential will be challenging for a number of reasons, not the least of which is the extreme isolation of the region and the cultural importance of these lands to First Nations in the region.

Despite the unprecedented scale of the combined opportunities, there are very few deposits which have been proven to the point of market feasibility. The project that is closest to development is the Noront Resources Eagle's Nest project. The Eagle's Nest Mine is described by Noront as a high-grade nickel-copper-platinum group element (PGE) deposit. It is expected to produce 3,000 tonnes of ore per day, which will be mined by underground methods and processed to deliver 150,000 to 250,000 tonnes of nickel-bearing concentrate per year. The mine is expected to reach commercial production 3 years after permits are received with an anticipated mine life of 11 years with the potential for 9 additional years. The mine currently has over 20 million tonnes of measured, indicated and inferred resources containing high-grade nickel mineralization with significant copper, palladium and platinum content (Noront Resources).

Aside from issues associated with permitting and First Nations acceptance (which are significant), the biggest single challenge to developing the Eagle's Nest mine is lack of road connection to the provincial highway system.

With \$1 billion previously committed to the project by Ontario, and notional commitments of additional financial support from the federal government, work on the Northern Road Link from Nakina to McFauld's Lake is now underway. The environmental assessment process is expected to be in 2021.

With an estimated timeframe of 2 years to complete the EA process and preliminary engineering, and two years for detailed design and construction, an optimistic schedule to mine commissioning would be early in 2025.

A key aspect of the Eagle's Nest mining project is that Noront has stated they intend to utilize positive cashflow from the development of this project to finance development of their Black Thor chromite deposit. With agreements in place with Algoma Steel to jointly develop ferrochrome processing facilities in Sault Ste Marie, this could potentially unleash the development of a number of other chromite deposits in the Region.

The implications to the Greenstone Region of this development moving forward would be transformative. With construction of the Northern Road Link estimated to start in 2025, and expected to take two years to complete, there would be a number of opportunities for employment of local residents, procurement of goods and services from local businesses, and long-term opportunities for economic development once the road becomes operational. These benefits could last many years based on the estimates of mining potential in the Ring of Fire region.



3.3.2.3 Ring of Fire Infrastructure

The Ring of Fire deposits will not be developed without significant investment in infrastructure, including roads, power supply/transmission, off-load facilities, etc.. These are described in the following paragraphs.

Northern Road Link

The Northern Road Link is a proposed all-season road that will connect the mining camps at McFauld's Lake with the provincial highway system and the national rail system in the Township of Nakina, approximately 60 km north of the town of Geraldton. Although previously part of the Noront Eagle's Nest Mine EA, the proponents of this project are now the Webequie and Marten Falls First Nations who have partnered to undertake the EA and preliminary engineering with funding provided by the Ontario government. The project is currently entering the initial stages of the EA process. It is expected the EA process will last 2 years. This could be an optimistic timeline given the anticipated complexities of consultation with Indigenous communities throughout the James Bay Lowlands area (which is further complicated by COVID-19 restrictions), and some of the environmental challenges that will have to be addressed and mitigated (such as impacts to the peatlands).

It is unknown at this stage whether the Government will follow traditional procurement processes following the EA. Over the years there has been casual discussion about design-build as well as discussions about private-public partnership (design-build-own-operate).

With the EA process scheduled to be completed within 2 to 3 years, construction of the road could be initiated within 4 to 5 years (2025 to 2026). Although preliminary engineering is just underway, it is estimated the capital costs for the road could be over \$1 billion.

Two other roads are also under consideration – the Webequie Supply Road that would connect the Webequie airport to the mining camps at McFauld's Lake, and the Marten Falls Community Access Road providing all-season road connection of the Marten Falls community to the provincial highway system at Nakina. This road would also be the first phase of the North Road Link project, although the specific characteristics of connection are still under study. The EA process for the community access road project is underway and is currently in the EA Terms of Reference stage (Dillon Consulting). The Webequie Supply Road is also in the EA Terms of Reference stage (SNC-Lavalin Inc.). Similar to the North Road link, beyond the EA/preliminary engineering stage, there is little certainty as to the type of procurement processes that could be selected for detailed engineering, construction and operations/maintenance, with the option of private-public partnerships still on the table. These projects are expected to add an additional \$300 million in capital spending, in addition to spending on the Northern Road Link road.

In addition to the uncertainty surrounding procurement processes, it is worth noting that it is also unclear who will own the various roads and whether or not they will be public or private access roads (similar to the many forest resource roads throughout Northern Ontario). Ownership is likely to have an important bearing on the type of procurement processes that are executed. There could be significant opportunities for engineering/construction companies to develop innovative and cost-effective approaches to developing some of these projects in partnership with First Nations communities.



In addition to the all-season road projects discussed above, there are other related projects that are worth following including mine camps in the Region and service centres to support travellers along the all-season roads. There are no specific details available for any of these opportunities. However, it is clear there is an opportunity for interested parties to take initiative, including exploring opportunities for First Nations partnerships.

It is also expected that an off-loading multi-modal transfer facility will be built at the intersection of the rail system and the Northern Road Link. Capital costs for this project are unknown, but would add to the capital spending for other infrastructure.

It is expected that all construction access and staging would occur through Greenstone Region and the Township of Nakina.

It is also anticipated that a trans-modal (road-rail) transfer facility will be built at Nakina to facilitate the transfer of ore from trucks to trains for transportation to processing facilities, as well as goods and equipment being shipped to the various mine sites by rail from outside the region for transfer to trucks. This could also include warehousing and equipment servicing facilities.

3.3.2.4 Georgia Lake Lithium Project

The Georgia Lake Project is an early stage integrated lithium production project wholly-owned by Rock Tech, a Canadian junior mining company with their head office located in Vancouver, BC. The mine component of the integrated project, referred to as the Georgia Lake Project, is located approximately 160 km northeast of Thunder Bay, 17 km south of the town of Beardmore, within the Greenstone region.

In 2020, Rock Tech and Advanced Avalon Materials signed a letter of intent to propose a chemical plant (referred to as a “converter” facility), to be located in Thunder Bay. The plant would take the lithium concentrate made at their respective projects in Northwestern Ontario and upgrade it into battery-grade material - lithium sulphate - for electric vehicle manufacturers. Rock Tech intends to upgrade the lithium sulphate into lithium hydroxide using processing facilities located in Europe. The Thunder Bay processing facility will have a production capacity of approximately 15,000 tonnes per year. If constructed, it would be the first processor of its kind in North America.

Schedule

Rock Tech completed an Preliminary Economic Assessment (PEA) of their project in 2020. The PEA was prepared in accordance with National Instrument 43-101, Standards of Disclosure for Mineral Projects. The Company plans to initiate a Pre-Feasibility Study in 2021 (www.rocktechlithium.com).

According to the Rock Tech website, it has been determined that a federal Environmental Assessment (EA) is not required as the mine rate does not exceed the threshold. A provincial EA and work to obtain required permits will be initiated in 2021. The Company will also proceed with establishing agreements with First Nations in the area in 2021. The Company is expecting to initiate construction of the mine and the processing facility in 2023.

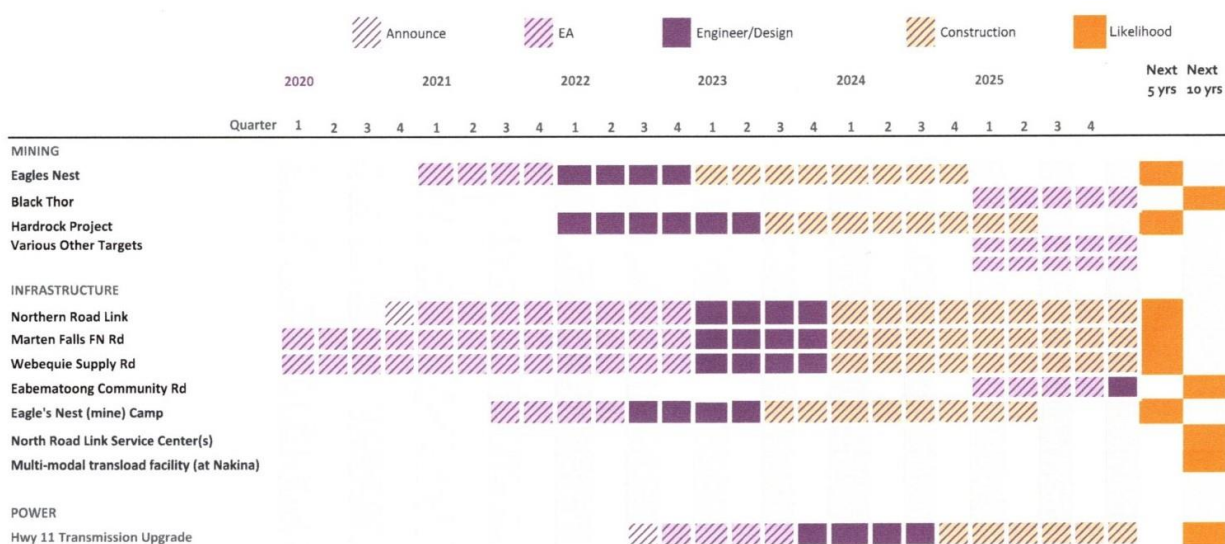


Although still very early, but with an aggressive timeline, the Georgia Lake Project could become a unique new Project.

3.3.2.5 Schedule of Potential Projects

As shown on Figure 3-4, a number of projects are projected to occur within the next 5 to 10 years, while others could fall outside the 10 year window.

Figure 3-4 Estimated Timeline of Project Development



Source: Personal communications with Industry, Provincial and Municipal Government, and First Nations representatives in 2020, company websites and some derivation from similar projects in other jurisdictions.

As shown on Figure 3-4, it is possible that a number of projects could be in construction phase before 2025. Even if only one or two of these projects came to market in that timeframe, there is little time for planning and preparation before construction employment increases within the Region, requiring infrastructure and commercial/retail goods and services.

3.3.3 Potential Economic Disruptors

The following sections discuss trends in economic development that could potentially affect the Greenstone economy – e-commerce, the COVID-19 pandemic, and automation/artificial intelligence. Although the tendency

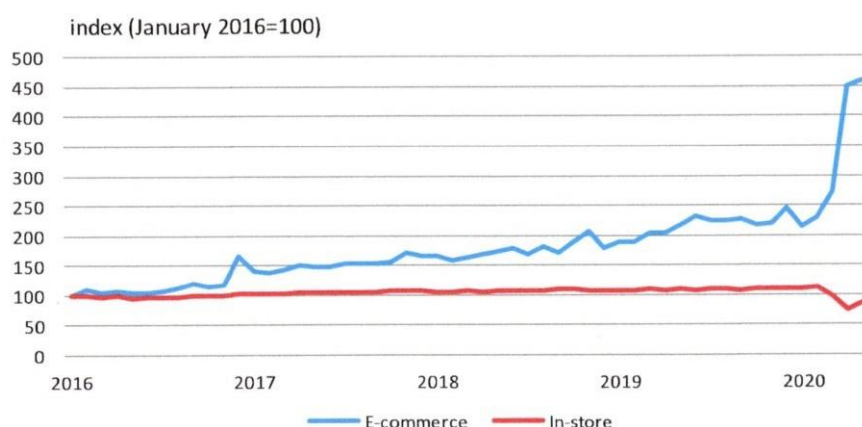


might be to consider these disruptors as having negative economic impacts for Greenstone businesses, there are many aspects of these market conditions that could have a positive economic impact.

3.3.3.1 E-Commerce (On-Line Sales)

All consumers in the modern economy are aware of, and likely contributing to, the rapid growth of e-commerce or on-line sales. As shown on Figure 3-5, e-commerce sales rose at almost 150% of the rate of in-store sales between 2016 and 2019 (pre-pandemic), and 200% more as a result of the economic impact of the COVID-19 pandemic in 2020 alone. Other effects of the pandemic are discussed in Section 3.3.2.2. For the purposes of this section, the national growth of on-line sales, even prior to the pandemic, is notable.

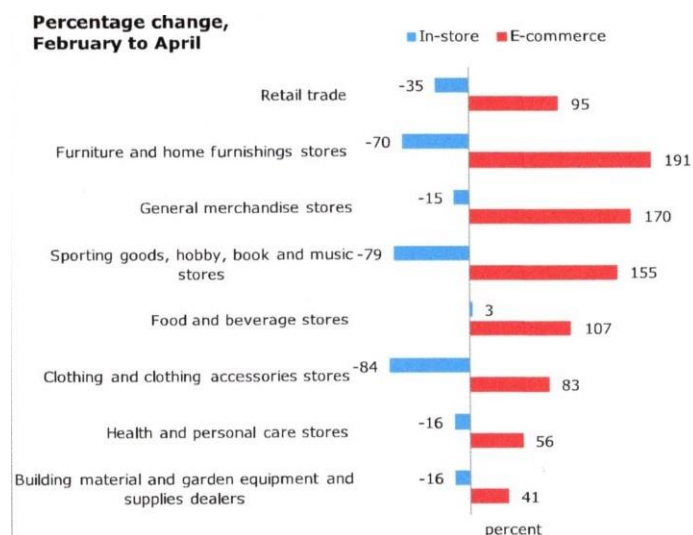
Figure 3-5 In-Store versus On-line Sales (Canada) 2016 to 2020



Source: Statistics Canada, 2020

As shown on Figure 3-6, although likely influenced by the change in consumer activities during the early stages of the pandemic, the switch from in-store sales to on-line sales across Canada has been dramatic across all non-essential retail sectors. Considering the general rise in the growth of e-commerce reported by Statistics Canada between 2016 and 2019 (150% more than the growth rate of in-store sales), even attributing only half of the change in consumer spending prior to the pandemic, the switch from in-store to on-line sales is striking.

Figure 3-6 E-Commerce versus In-store Sales – Non-essential businesses (February to April 2020)



Source: Statistics Canada, 2020

In comparing the national trend (as shown above) to the trend reported by Greenstone business survey respondents, although perhaps not as dramatic, the situation is similar, with 24% of respondents already selling goods and services on-line, and an additional 24% indicating they intend to increase on-line sales in the near future. Perhaps somewhat predictably, business respondents in the retail sector reported being the most negatively affected by the growth of on-line sales (41% of retail respondents), most recently due to a drop in in-store sales resulting from pandemic restrictions, but likely also due to the general trend of consumers away from bricks-and-mortar shopping to on-line shopping. However, it is noteworthy that only 22% of Greenstone business survey respondents indicated that on-line sales were negatively affecting their business, providing a fairly strong indication that Greenstone business operators either feel confident they can compete in an ever increasing e-commerce market, either by increasing on-line sales, or because their business model is not threatened by the on-line sales of their competition. Both are good indicators that the Greenstone business community is generally either optimistic or unconcerned about the on-line economy.

It is difficult to predict how well the Greenstone businesses that are planning to increase on-line sales will succeed. However, economies are turning more and more to work-from-home environments. Working from home and generating on-line sales represents a big opportunity for Greenstone residents. Where historically, employees were tied to resources and bricks-and-mortar locations, as the economy expands on-line, more Greenstone residents can be working in e-commerce type jobs or selling goods and services on-line, thereby significantly increasing their market access beyond the Greenstone Region. In fact, selling the idyllic Greenstone lifestyle could be very attractive to newcomers and new businesses that are able to work and sell on-line from any location, while enjoying the benefits of the Greenstone way-of-life.

A critical aspect of growing an e-economy will be ensuring reliable, secure and cost-effective high-speed internet service. Recent upgrades to internet service in the Region, funded jointly by FedNor and the Northern Ontario Heritage Fund, should help make Greenstone competitive in the e-commerce economy.



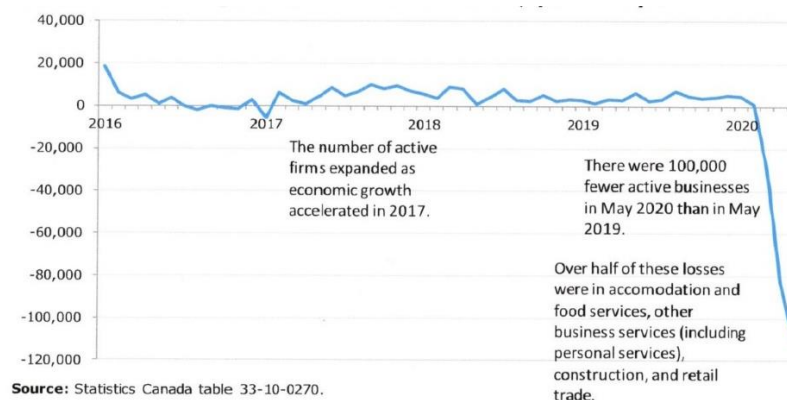
3.3.3.2 The COVID-19 Pandemic

The COVID-19 pandemic has had an unprecedented impact on the global economy. The large and abrupt reductions in economic activity and uncertainty of the long-term economic effects of the pandemic, uncertainty regarding the future path of the pandemic and the related easing of the necessary measures related to its containment, have created a unique economic environment. The adverse economic impact of COVID-19 will depend primarily on how long activity remains suppressed which, in turn, will depend on the evolution of the pandemic and the measures taken to suppress it. There could also be long-term changes to consumer behaviour and shopping patterns.

The timing and pace of recovery will depend on a broad range of factors. Recovery will mainly be shaped by the decline and end of the pandemic, the corresponding easing and ultimate removal of measures taken to suppress it, as well as the success of policy measures taken by all levels of government to mitigate the associated economic impact (Ontario Ministry of Finance, 2020).

As shown in Figure 3-7, Statistics Canada reports a steep drop in the number of operating businesses across Canada between 2016 and 2020, with the heaviest losses occurring in 2020, coinciding with the loss of business resulting from COVID-19 protocols and restrictions. The impact of COVID-19 on certain sectors, particularly those that provide consumer-facing services and rely more on travel and tourism, has been particularly severe. Lower-wage services have been impacted to a much greater extent than high-wage services.

Fig 3-7 Change in Number of Businesses in Canada 2016-2020



Source: Statistics Canada, 2020

The recovery in jobs will depend in large part on the ability of many businesses to adapt to changes in financial and operating conditions, including more uncertain demand for their products and services. The pandemic is likely to have a transformative impact on existing business models, accelerating trends toward greater teleworking, digitalization and automation (Statistics Canada, 2020).



As the situation evolves in the coming months, the full impact of COVID-19 on the economy will become clearer. For Greenstone, although it is equally difficult to predict the impact of the COVID -19 pandemic, it is clear from results of the business survey that some sectors are struggling more with the effects of the pandemic than others. In general, out of 46 Greenstone business survey respondents, only 10 businesses indicated a decline in number of employees. Four of these businesses were in the accommodation/food sector and another 4 were in the retail sector. Given the timing of the survey in November 2020, it is very likely that at least some of these declines are related to a downturn in business resulting from COVID-19 restrictions and protocols.

The business survey also demonstrates that while a majority of Greenstone businesses reported that their sales volume outside the Region is “low”, many other business operators (27.5%) indicated a “high” percentage of sales, either to customers outside the Region, or to visitors to the Region. It is assumed that some of these sales are the result of tourism and long-haul transportation, given the strategic location of Greenstone on the Trans-Canada Hwy. No.11, a national artery that experienced high volumes of both commercial and tourist traffic during pre-pandemic economic conditions. It is difficult to anticipate how the pandemic will affect the volume of long-haul transportation along the highway, if at all, although there is likely a higher chance that changes in tourism behaviour could have longer-term negative effects on tourism reliant industries such as accommodation and food. There might also be a correlation between an increase in on-line sales leading to increased demand for long-haul transportation services, and a resulting increase in transport volumes. This would have a positive impact on the retail and accommodation sectors of the Greenstone economy.

On the positive side, and as discussed in Section 3.3.3.1, the demand for on-line goods and services has risen sharply during the pandemic and is likely to continue it’s upward trajectory over the long-term.

3.3.3.3 Automation and Artificial Intelligence

According to a report prepared by the Northern Policy Institute (NPI), in partnership with the North Superior Workforce Planning Board and the Local Employment Planning Council, in 2019, automation and artificial intelligence can have both positive and negative impacts on northern economies.

As discussed in Section 2.4, above, in 2016, 47.7% of occupations in the Greenstone Region were in the health services, education services, public administration and professional services sectors. NPI refers to these types of jobs as “non-routine cognitive and analytical”. According to the NPI, non-routine cognitive and analytical jobs have a very low potential of being automated. NPI goes further and estimates that, overall, 76.2% of jobs in Northwestern Ontario have a very low potential of being automated, which means that the employment of most Greenstone residents will not be negatively affected by the trend of automation, which in the short and medium-term means no significant negative pressure on population. Although representative of less than 10% of employed Greenstone residents in 2016, “routine cognitive and routine manual jobs” that are more typical of the forestry, forest products and mining sectors, are more likely to be automated (NPI, 2019). This could have an impact on economic growth from new major resource projects that are likely to look to automation to reduce costs and increase efficiencies, resulting in fewer jobs in the Greenstone economy.



In general, over the past 10 years, the share of employment in “non-routine cognitive and analytical” occupations in Northern Ontario has been increasing while the share of “routine cognitive and routine manual jobs” has been declining significantly (NPI, 2019), as the economy continues to diversify and rely less heavily on the natural resource sectors for employment.

However, as mentioned, some sectors are looking to automation and artificial intelligence as technologies of the future. The mining sector is increasingly relying on electrification and automation to help reduce carbon footprint and operating costs and increase efficiencies. The types of equipment being deployed include (Kumar, undated):

- Semi Automated /Automated Systems Driverless trains
- Automated rail management
- 'Intelligent' driverless trucks
- Remote control 'intelligent' drills
- Automated mine-to-mill operations
- Automated excavators
- Automated loading, transport and dispatch systems (OITDS)
- Smart sensors and mine safety technologies
- 'Smart' communication and tracking systems
- 'Smart' head mounted portable devices (HMDs)

Although improvements in mine safety, and efficiency (including access to previously inaccessible resources and improved environmental practices), and cost reductions are positive developments of automated mining systems and equipment, there will undoubtedly be a reduction in direct employment.

Increasingly the global mining supply chain is also experiencing the same shifts in technology (World Gold Council). As with any shift in paradigms, it can be expected it will take a period of time to adjust to the shift. During that period, employment will be affected as jobs are replaced by smart and autonomous technologies. However, there could be an employment offset as manufacturing, servicing and systems operations grow to meet the increasing demand for equipment and technology as well as equipment maintenance and servicing. Gold and other metals that will be mined in the local mining projects discussed above, are important components of batteries and other electrification and automation systems and products. Increased demand for these metals could help to keep commodity prices strong or even trend upwards over time, which in turn would be expected to contribute to increased exploration, mine development and economic development.

4.0 Assessment of the Effects of Potential Economic Influences on the Greenstone Commercial/Retail Sectors

An overview of the historic and current Greenstone economy was discussed in Section 3.0, along with discussion of a variety of economic opportunities and challenges that could affect the economy over the coming years. The following section will put these factors into the context of potential future growth for the commercial and retail sectors.

The following sections will provide an overview of the existing Greenstone economy, based largely on the business survey conducted in 2020. This will be followed by a review of potential factors that affect economic growth in Greenstone, followed by an analysis of the effects that various economic influences and disruptors could have on the Greenstone economy, with specific consideration given to the commercial/retail components of the economy.

4.1 The Future Greenstone Economy without the Addition of Major Projects

The Greenstone economy, without the addition of new major projects will continue to rely on the base industries that are currently operating, primarily in the forestry sector, with the bulk of employment occurring within the public services sector (health, education and public administration).

From a commercial/retail perspective, the majority of businesses in Greenstone (60%) rely on Greenstone customers for sales, indicating that those businesses that supply the Greenstone market are doing well at the scale they are at, selling the product line they are currently selling to a reliable customer base – a stable equilibrium. With average years in business being 24.4 years across all sectors surveyed, it is a clear sign that business in Greenstone is generally scaled to the size and demands of the local market. Supporting this observation is that close to 70% of businesses in Greenstone have experienced a steady number of employees over a fairly long period. Only 21.7% of businesses reported a decline in the number of employees in the past five years. It is speculated that some of that decline could be attributed to changes in consumer behaviour during the COVID-19 pandemic. This is supported by the overrepresentation of declines in the accommodation/food services and retail sectors, those hardest hit by the COVID pandemic in Greenstone and across all economies.

Over the course of the past 10 or so years, the GEDC has recorded 26 closed businesses, mostly in the accommodation/food services and manufacturing sectors. This represents approximately 13% of the existing nearly 200 businesses currently listed in the GEDC business directory. Turn-over in the accommodation/food services sector is well documented in any economy.

It is not known the extent to which Greenstone residents purchase specific types of goods and services that are not available from Greenstone vendors, in neighbouring, larger centres such as Thunder Bay, or from on-line vendors. More importantly, it is unknown if they would purchase more goods and services from local vendors if the products were available locally. Many factors would be at play in those



considerations including comparative price, the value of convenience, comparable quality and availability of selection for comparison shopping.

With a total (marginally declining) population of 4,636 in 2016, and with just under 2,000 employed, the ability of retailers to provide the type of product diversity that consumers may demand to avoid residents from purchasing outside Greenstone, is unlikely, especially given the ease of access to competing markets such as Thunder Bay and e-commerce. The costs of inventory would soar as would occupancy costs as additional space is added to accommodate the additional inventory. There would also be the risk of stranded or spoiled inventory that becomes outdated or past the best-before-date before it sells, potentially causing financial challenges to vendors.

Business capital investment was fairly strong over the course of the past five years with 67.4% of business respondents indicating they have made “significant” capital purchases. This is also an indicator of business stability and an optimistic economic outlook. The COVID-19 pandemic has likely affected that business outlook and vendors may be less optimistic about the security of their market given the economic uncertainties of the pandemic. Still, even with that potential risk, 37% of Greenstone businesses indicated they plan to invest capital into their businesses within the next five years. That number increases to 52.2% of businesses if a new major project comes into the Greenstone economy.

Without the addition of a major project, the commercial sector of the Greenstone economy would be expected to remain fairly steady. It is recognized that manufacturing is difficult to maintain in small, rural communities, especially in Northern Ontario, and especially economies that are supporting a declining (or at best flat) forest products sector, notwithstanding that some economists see a potential upswing in the demand for forest products as a result of increasing house construction in the United States (Canadian Rural Revitalization Foundation, 2017).

Overall, the Greenstone economy as it is currently operating is well-suited to the scale of the market and the level of demand (and purchasing) of the local population and is competing relatively well with larger markets and e-commerce to sustain their businesses. However, given the small population, it is unlikely the Greenstone economy would support any significant additional diversification, especially with larger centres in relatively close proximity to Greenstone shoppers. As discussed in a previous GEDC economic development report published in 2010, without an increase in revenue and employment from the addition of “basic” industries, primarily in the forestry and mining sectors (plus supporting infrastructure), the level of commercial and retail activity is expected to continue to service the existing economy at, or close to, the current scale, as it has been doing for the past years.

One area that could provide potential growth is on-line sales. On-line sales could be particularly well-suited to professional services, insurance etc.. As mentioned, a number of these types of businesses that already operate in Greenstone are looking to increase their on-line sales. There is also every opportunity for other on-line sales entrepreneurs to locate in Greenstone to enjoy the lifestyle while continuing to service markets outside the Region. These opportunities are discussed further in Section 4.4.2.



4.2 Potential Future Economic Changes to the Greenstone Economy with the Addition of New Projects

If the current Greenstone economy is as stable as the business survey indicates, changes (increases or decreases) to the future Greenstone economy will depend on variables that could change. These could include the addition of a new major project, or projects, in the Region, a protracted COVID pandemic, changes in consumer behaviour that affect economic leakage, and/or growth in e-commerce, etc.

As discussed in Section 2.0, the population of Greenstone Region has been in decline since 2006, attributed at least in part, to the decline of the forest products sector. Although the population decline between 2011 and 2016 was only marginal, it is still an indication that economic growth (commercial/retail and/or other sectors) in the Region is not likely to occur as a result of a rising population.

The following sections examine the most likely drivers of economic change in the Region over the next 5 to 10 years.

Understanding the extent to which the Greenstone commercial/retail sector will have to change in the future will depend on the change in demand for goods and services arising from anticipated changes in the economy. Adding to the “basic” industries in the Region would likely result in the most dramatic changes to the economy.

The most challenging aspect of determining the effect major projects, or “basic” industries, could have on a local economy is determining the chances of the project occurring, or occurring within a reliable timeline. As discussed in Section 3.3.2, there are a number of potential projects that could have a significant economic impact on the Greenstone Region economy within the next 5 to 10 years. Owners of these projects are all fairly confident that the projects will go ahead within a predictable timeline. However, experience is such that these timelines have been shifting for many projects to the point that a number of Greenstone businesses are skeptical that they will occur at all, let alone whether they will occur in the near future.

For those reasons, it is important to forecast the potential economic impact of these projects conservatively so as not to overstate economic upside that could potentially have negative impacts. For example, overestimating the influx of workers, could lead to an overestimation of increased demand for municipal services such as water and wastewater that could lead to costly municipal infrastructure investment decisions and underutilized services with lower than expected tax revenue. The retail and commercial sectors could be faced with similar risks and investment decisions based on expected growth in their customer base and a corresponding demand for their goods and services. Striking a reasonable balance between proactive planning and conservative investment will be important.

It is also important to recognize that a number of the projects are linked in that one project would not proceed without the other. For example, it is unlikely that the Eagle’s Nest project in the Ring of Fire region would proceed without the Northern Road Link (all-season road) that would link the mine cap to the provincial highway system and the national railway system. Similarly, it is unlikely the Hwy 11 transmission upgrade would occur without an increase in demand for electricity; and the Nakina multi-



modal transfer facility would not be needed without the Eagle's Nest mine. Having said that, if the all-season road and the Eagle's Nest mine proceed, all of the projects would likely proceed, although timing remains an uncertainty.

In addition to the uncertainty of project timing, there is also uncertainty about the extent to which employees of these major projects will spend their wages locally. Because of the economic efficiencies of fly-in-fly-out (FIFO) or drive-in-drive out (DIDO) rotational operations models, many mining companies are adopting this operating model whereby workers live in a company-provided camp (much like a resort hotel) for a specified period (often two to four weeks), working 12 hour shifts, 7 days per week, then leaving the region completely for a specified period (often one to two weeks). Many modern mines operate 24 hours, 7 days a week based on two 12 hour shifts. The FIFO/DIDO model not only suits the mining company, it has been demonstrated that most workers prefer to live in larger, often metropolitan centres with better access to services, infrastructure and alternative job opportunities than adjust to living permanently in a remote town (Perry and Rowe, 2015). It is expected this model will be adopted for both the Greenstone Gold Mines Hardrock Gold project and the Noront Resources Eagles Nest project (Ring of Fire) (personal communications). Similar to the mining sector FIFO/DIDO model, it is expected this model could also apply to some of the major infrastructure projects that could affect the Regional economy, such as the Northern Road Link between Nakina and the Ring of Fire area.

To understand the potential for economic growth arising from the development of new major projects it is necessary to conduct forecasts of potential employment and spending. Forecasts conducted for this study were based on information provided directly by the project development company, or deduced using information from other similar projects, and scaled to what would be expected. Estimates of "spin-off" effects of a both direct and indirect spend or direct and indirect employment, were calculated using multipliers developed by respected organizations. Direct spend is considered to be the capital spent directly by the development company; and indirect spend is the money spent throughout the supply chain by project contractors and subcontractors. Induced spending, which is the money spent from project employee wages, is discussed in a later section of the report.

Employment and spending for the operations and maintenance periods of the projects was estimated separately from that estimated during the construction period. Forecasts were projected out to 2033, providing a 10 year planning window. Project start-up times were provided by representatives of the project development company or were estimated based on the relationship of timing, one project to another. Except where known to be otherwise, construction periods were assumed to be two years. The estimated construction start times for the various projects examined are shown on Figure 3-4. Aggregate estimates of direct and indirect employment and spending were then developed for each year between 2023 and 2033.

Estimates of potential direct and indirect spending resulting from the major projects examined, is summarized in Tables 4-1 and 4-2 for the construction periods and the operations and maintenance periods, respectively.



Table 4-1 Construction-Related Employment and Spending Estimates (Direct and Indirect)

Sector	Capital Estimate (\$M)	Estimated Direct Jobs	Estimated Direct Jobs in Thunder Bay District	Estimated Indirect Jobs per Direct Job Created in Thunder Bay District	Estimated Direct Jobs in the Greenstone Region	Estimated Indirect Jobs in the Greenstone Region	Estimated Direct and Indirect capital spending in Thunder Bay District (\$M)	Estimated Direct and Indirect capital spending in Greenstone Region (\$M)
Cell Address (for Notes)	B	C	D	E	F	G	H	I
3-Mining		<i>Per Company Estimates</i>	<i>38% of Total Direct Jobs</i>	<i>rate of 1.8 X Direct Jobs in Thunder Bay District</i>	<i>Per Company Estimates</i>	<i>3.2% of Indirect Jobs in Thunder Bay District</i>	<i>rate of 1.37 X Direct Spend in TBay @38% (Capital Investment)</i>	<i>3.2% of Direct and Indirect capital spending in Thunder Bay District</i>
4-Hardrock Project	\$410	1,280	486	890	340	28	\$213	\$7
5-Eagles Nest Project	\$600	780	296	534	211	17	\$312	\$10
6-Georgia Lake Lithium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7-Infrastructure		<i>5.5/\$M</i>	<i>38% of Total Direct Jobs</i>	<i>rate of 1.47 X Direct Jobs in Thunder Bay District</i>	<i>3.2% of Direct Jobs in Thunder Bay District</i>	<i>3.2% of Indirect Jobs in Thunder Bay District</i>	<i>rate of 1.43 X Direct Spend in TBay @38% (Capital Investment)</i>	<i>3.2% of Direct and Indirect capital spending in Thunder Bay District</i>
8-Northern Road Link	\$256	1,100	418	614	13	20	\$133	\$4
9-Nakina Trans-Modal Transfer Facility	\$25	138	52	77	2	2	\$13	\$0.4
10-Marten Falls Community Access Road	\$250	1,375	523	768	17	25	\$130	\$4
11-Webequie Supply Road	\$150	825	314	461	10	15	\$78	\$2
12-Energy		<i>1/\$M</i>	<i>38% of Total Direct Jobs</i>	<i>rate of 1.81 X Direct Jobs in Thunder Bay District</i>	<i>3.2% of Direct Jobs in Thunder Bay District</i>	<i>3.2% of Indirect Jobs in Thunder Bay District</i>	<i>rate of 1.46 X Direct Spend in TBay @38% (Capital Investment)</i>	<i>3.2% of Direct and Indirect capital spending in Thunder Bay District</i>
13-Hwy 11 Transmission Upgrade	\$350	350	133	241	36	8	\$182	\$6
TOTALS	\$2,040	5,848	2,222	3,585	628	115	\$1,062	\$34



Notes to Table 4-1

- N/A = Not Available
- B5, C5, F5 - source: Noront Resources website
- B4, C4, F4 - source: Greenstone Gold Mine
- B8 - source: GFMI - KWG (\$218.2M) X 1.14 inflation factor 2013 to 2021 (Bank of Canada calculator) = \$248.8M plus 2 additional years (2022 @ 1.27% inflation rate 2023 @ 1.62% inflation rate) = \$256M (Statista, 2021)
- B9:B13 - source: Lindley, Wood Report
- C7, C12 - source: Economic Policy Institute
- D3, D7, D12 - source: Ontario Mining Association
- E3, E7, E12 - source: Northern Policy Institute No.28
- F7, F12, G3, G7, G12, I3, I7, I12 = multiplier assumed to be regional; Greenstone = 3% of population of Thunder Bay District
- H3, H7, H12 - source: Northern Policy Institute, Research Paper No.28

Table 4-2 Annual Operation-Related Employment and Spending Estimates (Direct and Indirect)

Sector/ Project	Annual Operating and Sustaining Capital Estimate (\$M)	Estimated Direct Jobs	Estimated Direct Jobs in Thunder Bay District	Estimated Indirect Jobs per Direct Job Created	Estimated Indirect Jobs in the Thunder Bay District	Estimated Direct Jobs in the Greenstone Region	Estimated Indirect Jobs in Greenstone Region	Estimated annual operating and sustaining capital spending in Greenstone Region (\$M)
Cell Address (for Notes)	B	C	D	E	F	G	H	I
3-Mining		<i>Per Company Estimates</i>	<i>19% of Total Direct Jobs</i>	<i>rate of 1.8 X Direct Jobs</i>	<i>19% of Indirect Jobs</i>	<i>Per Company Estimates</i>	<i>19% of Indirect Jobs</i>	<i>19% of Annual Operating and Sustaining capital spending (\$M)</i>
4-Hardrock Project	\$168	125	24	225	43	34	43	\$31.9
5-Eagles Nest Project	\$160	390	148	702	133	105	133	\$30.4
6-Georgia Lake Lithium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7- Infrastructure		<i>5.5/\$M</i>	<i>19% of Total Direct Jobs</i>	<i>rate of 1.47 X Direct Jobs</i>	<i>19% of Indirect Jobs</i>	<i>19% of Direct jobs</i>	<i>19% of Indirect Jobs</i>	<i>19% of Annual Operating and Sustaining capital spending (\$M)</i>
8-Northern Road Link	\$8.7	44	8	64	12	8	12	\$1.7



Sector/ Project	Annual Operating and Sustaining Capital Estimate (\$M)	Estimated Direct Jobs	Estimated Direct Jobs in Thunder Bay District	Estimated Indirect Jobs per Direct Job Created	Estimated Indirect Jobs in the Thunder Bay District	Estimated Direct Jobs in the Greenstone Region	Estimated Indirect Jobs in Greenstone Region	Estimated annual operating and sustaining capital spending in Greenstone Region (\$M)
Cell Address (for Notes)	B	C	D	E	F	G	H	I
9-Nakina Trans-Modal Transfer Facility	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-Marten Falls Community Access Road	\$5.1	28	5	41	8	5	8	\$1.0
11-Webequie Supply Road	\$3.6	20	4	29	6	3.8	6	\$0.7
Energy		1/\$1M	19% of Total Direct Jobs	rate of 1.43 X Direct Jobs	19% of Indirect Jobs	19% of Direct jobs	19% of Indirect Jobs	19% of Annual Operating and Sustaining capital spending (\$M)
13-Hwy 11 Transmission Upgrade	\$1.3	1.3	0.3	2	0.4	0.4	0.4	\$0.3
TOTALS	\$346.7	608	190	1,063	202	157	202	\$65.9

Notes to Table 4-2

- N/A = Not Available
- B4 - source: Hardrock EA
- B5 - source: Noront Resources
- B8 - sources: Ontario Good Roads Association, North American and Arctic Defense and Security Network, KWG Resources
- B13 - source: Wataynikaneyap Power
- C4- source: Greenstone Gold Mines Hardrock EA
- C5 - source: Noront Resources Eagle's Nest EA
- C7, C12 - source: Economic Policy Institute
- C8-C11 - based on half of 276 workers for 97 km (2.8/km) of Tlicho Road construction; source: Government of Northwest Territories
- E3, E7, E12 - source: Northern Policy Institute No.28
- Columns D, F, G, H, I - 50% of the 38% "local" spend per Ontario Mining Association -- higher than construction due to smaller contract sizes and local suppliers locating close to the projects



4.2.1 Estimated Direct and Indirect Employment in Greenstone

Tables 4-1 and 4-2 provide estimates of potential employment both during construction and during the operations and maintenance phases of the projects examined. Appendix 3 demonstrates the estimated annual distribution of employment for the period 2023 and 2033. Employment estimates were provided either directly by the resource companies themselves in personal communications, or were derived proportionate to similar recent projects in the same sector. Estimates were assumed to be full-time equivalents (FTEs) and were spread across the expected construction period for each project.

As shown on Table 4-1, it is expected that construction of all of the projects examined will generate just over 600 direct jobs and just over 100 indirect jobs in Greenstone Region. Most of these jobs are estimated to occur in the years 2025 and 2026, when many of the projects are projected to be under construction. Indirect jobs were calculated using multipliers developed by the Northern Policy Institute for the Thunder Bay Region, and specific to each sector. The multipliers used are shown on Table 4-1 for the construction period and Table 4-2 for the operations period.

Based on research conducted by the Ontario Mining Association, published in 2015, it is estimated that approximately 38% of direct and indirect spending by a mining project will remain in the local area. The local area is somewhat difficult to define, but for the purposes of the estimates provided in this analysis, it was assumed that during construction, “local” would include all of the Thunder Bay District, reflecting the just-in-time nature of many goods and services required for construction in what could be a short amount of time prior to construction start-up; as well as the expected (large) scale of most contracts. A larger centre, such as Thunder Bay and even beyond, would be expected to have higher capacity to deliver the goods and services in a short period of time. Although likely conservative, for the purposes of estimating employment for this analysis, it was assumed that employment would track at the same rate as spending (38% of total), and that Greenstone would provide employees at a percentage that is proportionate to the Thunder Bay District population (3.2%)(Statistics Canada). It was also assumed for projects in other sectors that the 38% of local employment would be reasonably equivalent. Table 4-1 demonstrates this could be close to 750 jobs between 2023 and 2027, or close to a 50% increase over the current number of employed Greenstone residents in 2016 (1,935)(Statistics Canada).

The annual distribution of employment between 2023 and 2033 is demonstrated in Appendix 3.

This assumption was changed for the operations and maintenance periods during which it is expected there will be an increase in the provision/purchase of local goods and services as local companies increase their capacity and new companies move into the Region to provide their products close to the location of their customer’s operations. Although likely somewhat less conservative, it was assumed that employment in Greenstone would be closer to half of the total “local” demand, or the equivalent of 19% of total employment. As shown on Table 4-2, the operations period nets a lower number of total jobs, but for a longer, more sustainable period than construction. The annual distribution of estimated employment for the years 2023 to 2033 is shown in Appendix 3. As shown, it is estimated that there will be an annual demand of approximately 350 employees per year from the Greenstone Region. For the years 2025 to 2027 employment estimates are for a combination of construction and operations – as



projects are completed and they become operational. Because of that it is estimated there will be a slightly higher demand for employment in 2025 at 416.

The distribution of estimated direct and indirect employment for both construction and operations, between 2023 and 2033 is approximately 350 employees per year drawn from within the Greenstone Region. This represents an increase of approximately 38% over 2016 employment levels in the Region.

If the projects that were examined are considered to follow the FIFO/DIDO rotation model, and if the 50% estimate provided by Perry and Rowe is reasonable, this would have a fairly significant effect on the number of employees that are drawn from and stay within the Region, the number of families that locate in the Region, and the estimated additional spending within the Region. The number of employees that would remain in the Region would be expected to drop to approximately 175, or a 19% increase over 2016 levels of employment.

4.2.2 Estimated Direct and Indirect Spending in Greenstone Region

Estimated spending resulting from the addition of the major projects to the Greenstone economy was analyzed through an examination of potential direct and indirect costs during both the construction period and the operations periods. A second analysis was conducted to understand the potential implications of the projects to household spending. All three types of spending – direct, indirect and induced – will contribute to growth of the Greenstone economy. Direct and indirect spending is more likely to affect the commercial sector that is selling goods and services directly to the projects and through their own supply chain. Induced spending (dollars spent from employee wages) is more likely to contribute to growth of the retail and food sectors in the community where the employee is a permanent resident.

Estimates are described in more detail in the following sections.

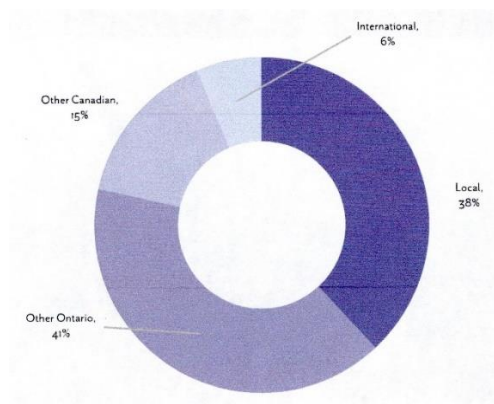
4.2.2.1 Direct and Indirect Spending

Direct is the capital spent directly by the project Owner on goods and services. Indirect spending is spending by the direct contractors throughout the supply chain. For Greenstone Region, for the types of projects being examined, this would typically include general construction contractors, subcontractors, manufacturing, fabrication, transportation, etc.. To estimate potential direct and indirect spending in Greenstone Region for each of the projects listed in Tables 4-1 and 4-2, a percentage of total direct and indirect capital to be spent during construction and total direct and indirect operations and sustaining capital estimated to be spent during the operations phase of the projects was calculated as shown in Tables 4-1 and 4-2, above.

The Ontario Mining Association has estimated that approximately 38% of total spending by a mining operation will be spent in the “local” area or Region (OMA, 2015), as shown on Figure 4-1.



Figure 4-1 Ontario Mine Supplier Locations



Source: Ontario Mining Association, 2015

For the construction period, to be conservative, it was assumed that much of the “local” direct and indirect spending would most likely occur throughout the Thunder Bay District as Greenstone does not have the capacity to provide all, or even a significant portion of the goods and services that would be required, and is unlikely to develop the capacity in time to meet early estimates of construction start. Early construction start times are shown on Figure 3-4. As shown, the earliest construction would start in Q1 2023, although this is still considered optimistic. The Greenstone Gold Mines Hardrock Project could be under construction as early as 2021, in accordance with recent company statements. However, for planning purposes, it is considered construction would be initiated in Q3 2023.

For the purposes of estimating the distribution of direct and indirect spending during the construction period for all major projects, it was assumed that Greenstone would benefit from spending proportionate to the 2016 population of the Region as a percentage of total 2016 population for the Thunder Bay District (3.2%)(Census Canada). Not having similar estimates of local spending for other sectors, the OMA estimate was applied to all sectors. Indirect spending was calculated using multipliers developed by the Northern Policy Institute for the Thunder Bay Region, and specific to each sector. The multipliers used are shown on Table 4-1 for the construction period and Table 4-2 for the operations period.

As shown on Table 4-1, total direct and indirect capital spending in Greenstone Region for all projects is estimated to be just over \$30 million during construction. This spending will obviously not occur all at the same time. To better understand the pattern of spending, estimated start time and duration of construction, as shown on Figure 3-4, was used to distribute spending over a ten year period between 2023 (earliest construction) and 2033. Annual spending distribution estimates are provided in Appendix 3. As shown in Appendix 3, construction spending is expected to have largely passed through the system by 2026, with a small amount being spent in 2027. All projects are expected to still be in operation by 2033, although the mining projects start coming close to their estimate of early mine completion. Of course, it will be necessary to conduct updates of these estimates and the distribution of spending with real numbers as projects come to market.

For the operations period of these projects, it is anticipated that over time local business capacity will increase and new suppliers will set-up facilities in Greenstone to be close to their customers. For this reason, it was assumed that the percentage of spending in Greenstone Region would substantially increase during the operations period to 50% of the spending estimated for the Thunder Bay District (ie., 50% of the 38% of total CAPEX estimated will remain in the Region)(Ontario Mining Association, 2015). Again, not having similar estimates of local spending for other sectors, the OMA estimate was applied to all sectors.

As shown in Appendix 3, the value of annual operational and sustaining capital estimated to be spent in Greenstone Region at \$65.7 million, is higher than the estimated value of capital that will be spent in total over the 4 to 5 years of project construction. Because some projects will go into operation in 2025, 2026 and 2027, while others are still under construction, the actual total (combined) estimated spending for those 3 years is slightly higher than an average year of operations as there is both capital and operations spending occurring.

These estimates confirm what Greenstone Gold Mines expressed to GEDC in 2017 – that planning for the operations and maintenance period of the project will likely result in much better and longer-term returns than during construction when many contracts are performed by larger companies outside the local area, and over a relatively short period of time. That doesn't mean the GEDC should not plan at all for the construction period as there will be some local spending as shown on Table 4-1. But the sustained and higher benefits during operations are evident, even if the estimates provided are considered high.

4.2.2.2 Induced (Household) Spending

The potential impact of the major projects on local household spending can be estimated by looking at potential “induced” spending. These are the monies spent by mine workers and employees in the local/regional area from wages earned. This can be difficult to estimate as it will vary by Region and the type of mining operation, ie., whether it is fly-in/fly-out/dive-in/dive-out (FIFO/DIDO) or resource town style operation.

In an examination of the economic impacts of construction of the Casino Mine in Yukon Territory, it was estimated that worker wages accounted for approximately 24% of the project capital costs (MNP, 2013). Examining the total capital estimates for all projects examined in the current study (just over \$2 billion), and assuming a similar percentage of wage costs to capital spent (24%), it is estimated that employees could spend in the neighbourhood of \$500 million during the construction phases of the projects (largely between 2023 and 2026). However, only a portion of this spending will occur in Greenstone Region.

For most of the projects considered in this study (in particular the mining and all-season roads projects where construction will occur remotely), it is expected most workers will be living in camps provided by the various companies. It is also expected these projects will be fly-in/fly-out or drive-in/dive-out (FIFO/DIDO) operations where workers work for several weeks on 12 hour, 7-day shifts, then are off for a couple of weeks and will fly or drive out of the Region. Some analysts estimate as many as 50% of rotational mine workers are typically FIFO/DIDO at a modern mining facility (Perry and Rowe). A fly-in/fly-



out or drive-in/drive-out operation will result in lower spending within the Region than if workers and their families are living in the community. Given the remote nature of construction for the all-season roads, it is expected the same pattern of rotation would apply. It may be less so for the Hwy No.11 transmission line upgrade and for the Nakina multimodal transfer facility where workers are more likely to be living in the community or staying in local hotels. However, to be conservative, the same assumption was applied to all projects examined to determine the potential impact on spending.

Because FIFO/DIDO workers live in fully-serviced company supplied camps, their demand for local goods and services will be lower than it would be if they lived in the community. Food and other services provided by camp operators tend to be purchased in bulk outside the local community. As a result, spending per worker in the local economy will be less than it would be with the historic/classic resource town model, and total spending will be even lower when considering the families of the workers will not be living in the project town -- family purchases will be made in the location where the workers' families reside permanently. An additional challenge of the FIFO/DIDO operating model is that because workers are working 12 hour shifts, 7 days per week, there is little time left in the day for the workers to explore the offerings of the local economy. Because of these factors, estimating the money that will be spent in the local economy per FIFO/DIDO worker, or per dollar of capital/operating spending becomes challenging. For the purposes of conducting conservative estimates, it was assumed that none of the 50% rotational workers' wages would be spent in Greenstone.

For the other 50% of workers it was assumed they would spend their wages in the local/regional economy. Using the estimate of spending provided MNP for the Casino Mine in the Yukon (24% of capital), with only half of the workers considered to spend in Greenstone, a factor of 12% (half of the 24%) of project capital and operating costs was applied. Spreading this spending over the period 2023 to 2033 provides an estimate of annual induced spending per year as shown on Table 4-3.

Table 4-3 - Estimate of Employee (Induced) Spending in Greenstone Region 2023-2033

Sector	Employee (Induced) Spending - Greenstone Region (\$M)										
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Mining											
Hardrock Project	\$24.6	\$24.6	\$20.2	\$20.2	\$20.2	\$20.2	\$20.2	\$20.2	\$20.2	\$20.2	\$20.2
Eagles Nest Project	\$18.0	\$36.0	\$27.6	\$19.2	\$19.2	\$19.2	\$19.2	\$19.2	\$19.2	\$19.2	\$19.2
Georgia Lake Lithium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Infrastructure											
Northern Road Link			\$10.2	\$10.2	\$10.2	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0
Nakina Trans-Modal Transfer Facility			\$2.0	\$1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Marten Falls Community Access Road			\$15.0	\$15.0	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6
Webequie Supply Road			\$9.0	\$9.0	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4



Energy											
Hwy 11 Transmission Upgrade		\$5.3	\$21.0	\$15.8	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2
TOTALS	\$42.6	\$65.9	\$105.0	\$90.3	\$50.8	\$41.6	\$41.6	\$41.6	\$41.6	\$41.6	\$41.6

To check the validity of these estimates, a second approach to estimating was conducted by multiplying the number of employees projected annually (as shown in Appendix 3) by expected average annual salary per employee. The estimate of total number of employees expected to reside in Greenstone (all projects) is around 350 per year during the operations and maintenance periods (per Appendix 3). At an average salary of \$80,000 per year for a skilled worker (OMA, 2015), this would result in \$28 million per year in household (induced) spending within the Region, compared to the estimates provided in Table 4-3 – approximately 30% lower for the operations period. However, it worth noting that the estimates provided in Table 4-3 do not account for the potential of some families having double income (both spouses earning wages). Although not the most conservative approach, it was considered reasonable to utilize the slightly higher estimates provided in Table 4-3, especially given the number of other conservative assumptions applied to the estimate of spending in Greenstone as shown in Appendix 3.

To understand the implications of this spending on the commercial/retail sector in Greenstone (during each year of operations), in 2016 there were 2,040 Greenstone households that reported income (Statistics Canada). Average combined household income was \$77,505 for a total estimated annual revenue of just over \$158M (Statistics Canada). According to the Government of Canada, Office of Consumer Affairs, Canadian households spent roughly half (48.6% in 2002) of their income on goods and services on consumable items (not including taxes, medical expenses, education, insurance and shelter costs (mortgage, rent, etc.), resulting in just under \$80M in spending per year on commercial and retail goods and services. Household spending estimates are reported by Statistics Canada to have increased to just over 50% in 2019 according to Statistics Canada data. However, for purposes of estimating, and to be conservative, the 48.6% was applied.

During the two heaviest periods of construction (2025 and 2026) with the addition of some operating spending in 2026, spending by project employees could be as high as \$105 and \$90.3 million, for each respective year. If this occurs as estimated, it would add an enormous amount of household spending during those years, resulting in more than double the estimated current household spending in Greenstone. However, the construction period is brief, and by 2027 total annual spending will start to decrease to a lower, but more sustainable level.

As shown on Table 4-3, induced household spending by project employees is estimated to potentially contribute close to an additional \$42 million annually to the local economy during the operations phases. Applying the same household percentage of spending on goods and services other than health, education, taxes, insurance and mortgage/rent, etc. (48.6%), this would add an additional \$20 million in spending on retail goods and services by the project employees and their families, a 25% increase over current levels of household spending, to an annual total of \$100 million in spending in the Region.

Although the extent of “leakage” is unknown, it is known that a percentage of household spending is, and will continue to be, spent outside Greenstone Region, in larger centres such as Thunder Bay and via on-line sales. If it is assumed that all Greenstone residents (existing and new) will spend half of the estimated



\$100 million within the local economy, total annual household spending (existing plus new) would be around \$50 million during the combined operations periods, a 25% increase over estimated current household spending.

The implications of these estimates for the commercial/retail sector in Greenstone Region are discussed in the next section.

4.3 Economic Implications for the Greenstone Commercial/Retail Sector

From the analysis conducted in the previous sections, it is clear that the addition of major projects into the Greenstone economy will result in direct, indirect and induced spending that will increase current levels of spending in the Region and generally contribute to growth of the Greenstone economy including the commercial/retail sectors. Although assumptions have been made to develop these estimates, they are considered to be fairly conservative. What is not known is if the projects will be developed within the projected timelines.

The next step of the analysis is to examine the potential effects the additional direct, indirect and induced spending could have on the commercial/retail sector in Greenstone Region.

4.3.1 Commercial Sector

It has been assumed that growth of the commercial sector of the economy will come primarily from the direct and indirect spending discussed in Section 4.2.2.1 as a result of growth in the local supply chain.

As shown by the estimates presented in Appendix 3, Greenstone can expect to see the economy grow by between \$6 million and \$9 million annually as a result of direct and indirect spending during the years of construction. The contribution is expected to increase substantially during the periods of operation as it is expected that new businesses that service the projects will move into the Region to provide their goods and services more local to their customer(s), and local Greenstone businesses will have had time to make growth investments to add capacity, with certainty that the investments are not high risk.

The estimate from the analysis in this study indicates the Regional economy could recognize as much as \$66 million in direct and indirect spending per year during the operations periods. It is expected that much of this spending will go to new businesses that are not currently located in Greenstone. There will also be organic growth of existing businesses that are able to capitalize on growth opportunities and benefit from the indirect spend within the local supply chain. It would be expected that existing commercial construction and transportation companies, building and construction materials suppliers, fuel suppliers, equipment maintenance providers, etc., would have the clearest opportunities to benefit. Areas of new growth would be expected to include manufacturing, fabricating, vehicle maintenance, construction supplies, engineering and environmental services, etc.



As discussed in previous GEDC reports, existing Greenstone companies could also benefit by partnering with other companies to add capacity and to diversify their service and product offerings.

The implications of this analysis, no matter whether the estimates are high or low, or early or late, is that there will be an expectation that there will be growth in the commercial sector of the Greenstone Region economy that would be expected to be sustained over the operating life of the projects, in particular the mining projects, as shown in Appendix 3. Planning for this growth does not have to be undertaken urgently. To avoid stranded investments in infrastructure, training facilities, etc., that may not end up being required if projects are delayed or cancelled, requires no more than waiting for a positive construction investment decision on each project, which would typically happen 6 months to a year prior to construction commencement. There are two to three years from construction start to construction finish and the beginning of the operations period when it is expected Greenstone is most likely to see more sustained growth. These timelines should provide sufficient time for planners to determine how real the projects are, assess scale, and update potential estimates of spending for the purposes of investment planning in things like infrastructure.

These investment decisions will apply equally to local business operators who responded to the GEDC 2020 business survey, over 50% of whom indicated they would invest new capital into their businesses if a major project was developed in the Region.

4.3.2 Retail Sector

As discussed in earlier sections, understanding the implications of potential growth in the retail sector of the Greenstone economy will depend on a couple of important variables, namely, the type of operations that the development Companies run (FIFO/DIDO rotational operations will result in higher economic leakage), and the extent to which there will be leakage to larger centres and on-line sales.

How much additional spending that could occur is discussed in Section 4.2.2.2. As shown on Table 4-3, it is expected that employee (induced) spending will be high during the relatively brief construction period, and return to a consistent, more sustainable, year-over-year annual increase in household spending of approximately \$42 million, increasing the overall spending by Greenstone households by approximately 25% of current estimates of household spending. This figure does not account for leakage of spending to larger centres and on-line sales. What the estimate does provide is an understanding of the basic order of magnitude of the growth from the addition of major projects in the Region. As discussed above, a conservative assumption was applied that predicts leakage will account for a loss of approximately 50% of potential induced spending. This is supported by the fact that the largest household expenditure (approximately 26%) is on transportation which includes replacement/purchase of vehicles (see Table 4-4), likely outside the Region. It is not expected that there will be a surge in growth of auto retailers in Greenstone given the proximity of Thunder Bay and other larger centres and the level of competition and product diversity offered there in retail vehicle sales.

As discussed in Section 4.2.2.2, it is estimated that Greenstone residents are likely spending approximately \$80 million per year on purchases other than taxes, shelter costs (mortgages and rent), health care,



education, insurance, etc., as highlighted on Table 4-4. Again, this estimate does not include leakage to larger centres and on-line sales. Applying the 50% leakage factor, it is estimated that the residents of Greenstone are currently spending in the order of \$40 million annually on purchases from suppliers within the Region. With the addition of the project employee induced spending, and assuming the same leakage rate of 50%, the Greenstone retail economy could see an addition of approximately \$20 million per year in household spending, or around 25% growth from the additional project employee household spending.

With an understanding of how much spending could occur, it is also important to understand where the money is spent. Table 4-4 provides a break-down of how average Canadian households spend their income. Of course, spending patterns will vary from region to region. However, this breakdown of spending provides a helpful understanding of Canadian spending choices.

Table 4-4 Annual Spending per Household in Canada in 2019

Household expenditures, summary-level categories*	Average expenditure per household (\$)
Food purchased from stores	\$7,536
Food purchased from restaurants	\$2,775
Shelter	\$20,200
Water, fuel and electricity for principal accommodation	\$2,535
Household operations	\$5,448
Communications	\$2,670
Household furnishings and equipment	\$2,486
Clothing and accessories	\$3,344
Transportation	\$12,737
Health care	\$2,780
Personal care	\$1,384
Recreational equipment and related services	\$995
Home entertainment equipment and services	\$209
Recreational services	\$2,593
Recreational vehicles and associated services	\$826
Education	\$1,691
Reading materials and other printed matter	\$165
Tobacco products, alcoholic beverages and cannabis for non-medical use	\$1,785
Games of chance	\$186
Miscellaneous expenditures	\$1,838
Income taxes	\$17,167
Personal insurance payments and pension contributions	\$5,297
Gifts of money, support payments and charitable contributions	\$2,280

*Highlighted items are not considered in the analysis of potential retail spending

Source: Statistics Canada. Table 11-10-0222-01 Household spending, Canada, regions and provinces (<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1110022201>)



As shown on Table 4-4, food and transportation account for just under half of all discretionary household spending (48%). Although these estimates are not specific to Greenstone, or even a rural economy, there is sufficient basis to assume that there wouldn't be dramatic differences.

Transportation is the highest single aspect of household spending at 26%. It is assumed this includes fuel, vehicle repair/maintenance and replacement/purchase. It is interesting that food purchased from restaurants accounts for 36% of all family food purchases. Household operations, which would be expected to include renovations, repairs and upgrades accounts for 11% of a family's spending, indicating that the demand for local contractors and home repair service providers is an important component of a local economy that would be expected to grow with increased demand for increased retail floor space and housing.

It is assumed that spending patterns are not likely to change dramatically as a result of an influx of new money from project employee household spending. For retail planning, it makes sense to continue planning growth in the spending categories that typically account for the highest percent of family spending, namely, transportation, food and household operations, including repairs and renovations. This would include the need to expand building materials supplies, fuel supplies, etc., and would likely lead to an increased demand for vehicle maintenance suppliers. As local businesses grow, there will also be an expected increase in demand for office supplies and other business services.

As stated earlier, one of the ways to increase spending and opportunities for retail growth in Greenstone is to reduce the leakage of spending to larger centres and on-line sales. For a rural community like Greenstone, it would intuitively be expected that 'household furnishings/equipment' and 'clothing and accessories' would be the types of spending most likely to be purchased outside the Region or through on-line sales. However, these areas of spending account for only 5% and 7% of household spending, respectively, representing only a small percentage of family spending, and a small percentage of the local economy, indicating that leakage on this spending is not likely highly impactful. Although a small increase in local retail clothing and accessories and household furnishings/equipment may be likely with the general increase in available spending, the economic impact will not be as significant as in other types of retail. As discussed earlier, to compete with retailers in larger centres and on-line vendors, clothing retailers are encouraged to consider some of the challenges of offering product diversity and choice, competitive pricing, product quality, and the financial impact of increasing floor space and maintaining inventory before considering significant investments.

There is also likely a significant percentage of leakage in family spending on transportation, especially vehicle replacement/purchase. As discussed above, it is unlikely that any amount of planning will reduce this leakage as the Greenstone market is not likely large enough, even with the increase of spending by project employees, to provide the type of competition and product diversification necessary to entice purchasers away from buying vehicles in larger centres such as Thunder Bay, Timmins, Sudbury and even Toronto.

Many other components of the retail economy, such as food, personal care services, recreation services and tobacco/alcohol sales are not as likely to be significantly affected by leakage. Growth in these sectors will likely increase proportionate with the increase in overall spending. Increasing floor space and



equipment to accommodate a 25% growth in regional household spending would require significant investment on the part of retail operators. However, as discussed above, in regards to commercial investment, the retail sector will have time ahead of the operations periods of project development to assess risk and investment decisions based on a fairly high level of certainty. Once it is known that projects are real, and estimates of household spending are updated with more accurate projections, more certain investment decisions can be made with reduced risk. Making significant investments in advance of construction is considered riskier and would require much quicker, more reactive investment decisions that could leave the retailer with additional space and equipment that is not required when adjusting to the lower demand during the operations periods. This could result in squandered investments, business closures and lay-offs.

4.4 Implications of Disruptors to the Greenstone Economy

The three key disruptors that were discussed in Section 3.0 were:

- On-line sales or e-commerce
- COVID-19 pandemic
- Artificial Intelligence and automation

As discussed in Section 3.3.2, it is not well understood the extent to which these disruptors will impact the Greenstone economy. Each is discussed in the following sections.

4.4.1 The COVID-19 Pandemic

The COVID-19 pandemic, at it's inception, caused mine closures and disruption in services for a variety of sectors. Food services and accommodation, or any other goods or service providers reliant on the tourism market (and continue to be) and/or subject to pandemic restrictions were affected most significantly. The question we face now is the extent to which a) restrictions continue for a longer period than hoped; and/or b) there is no "return to normal" and many businesses will simply have to adjust to the "new normal".

For communities like Greenstone, the impact of the restrictions has no doubt been unpleasant, but perhaps not as severe as other parts of Ontario considered to be "hot spots" that experienced, and continue to experience higher caseloads per capita and longer, more prolonged periods of lock-down or restriction. The uncertainties for business operators in these parts of the Province are, and will likely continue to be, difficult to plan around, and for many, will not result in growth, at least not in the near-term. It is hoped the impact is less severe in Greenstone.

The resources sector, after some initial uncertainty, seems to be regaining operations closer to a pre-pandemic pace as is much of the construction sector. This is likely due to the effectiveness of rapid testing and highly responsive and effective methods and means for the quarantine and isolation of COVID-



positive workers from the general public. However, there is evidence in other jurisdictions that travel restrictions may have longer-term effects on the FIFO/DIDO employment model. This could result in increased local hiring, a return to resource-town type economic models, reduced production and/or a surge in automation (Mining.com, 2020). The effect of this on direct, indirect and induced spending in regional economies could be positive with potential reduction of “leaked” spending to hometown jurisdictions if the proportion of local hiring increases and/or workers choose to relocate to the Greenstone Region. Mining.com reports that the top 20 global mining companies have announced significant cuts in their capital spending for 2020. Impacts resulting from lower capital spending could result in lower production, slower pace of capital spending, delayed development of new projects and delayed economic contributions to local economies. As discussed in previous sections, these types of negative impacts could reduce the number of projects that are developed, thereby reducing direct, indirect and induced spending in the Greenstone economy from the forecasts presented in this report. It is impossible to predict how this will play out.

Another aspect of resource development that could be affected by the COVID-19 pandemic is timing of the development phases (permitting/approvals and financing). COVID-19 restrictions have caused regulatory processes to be extended for many, if not all, major projects in the planning and design stages in Ontario. This could have a slowing effect on the timing of construction start, delays in getting into operation and delays in economic contribution to local economies.

4.4.2 On-Line Sales/E-Commerce

As discussed in Section 3.3.2, there are positive and negative aspects to on-line sales/e-commerce, particularly for the retail sector in rural communities. There are two areas to examine: 1) on-line sales of retail and other goods and services; and 2) economic implications of the on-line virtual office and the new realities of work-from-home employment.

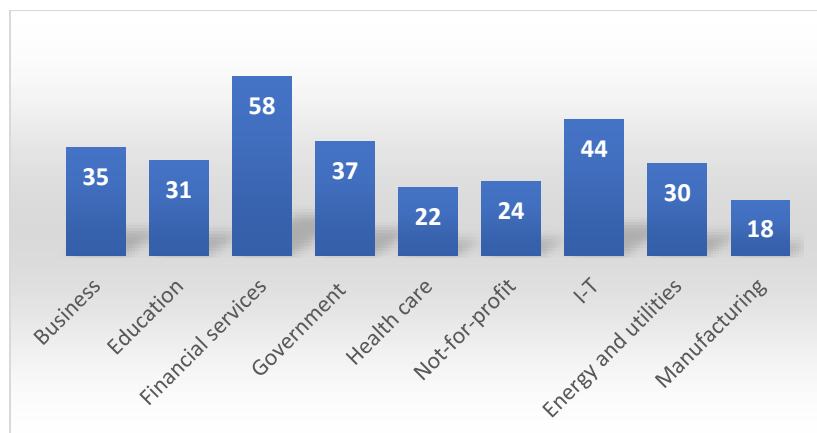
On-line sales have given customers access to goods and services that would not likely otherwise be available in the local economy, or can be purchased on-line for selection, convenience and perhaps lower prices. It has also given vendors from rural areas like Greenstone access to larger markets that would not have been accessible prior to the explosion of e-commerce. As innovation and creativity continue to change the nature and logistics of on-line sales, it is very likely going to grow. This will provide opportunities for existing and new vendors in the Greenstone Region. For bricks-and-mortar vendors that struggle to compete with the convenience, selection and affordability of goods and services offered on-line, this competition will likely continue, even grow. Vendors will have to adapt to the demands of the local market for goods and services that are, and will continue, to be purchased locally. In particular this will include any product that is consumable such as restaurant food, groceries, fuel, convenience items such as confectionary, tobacco and lottery tickets, and alcohol.

Another growing area of increased on-line business is the trend towards work-from-home and home offices. Although this trend was initiated by the on-set of the COVID-19 pandemic, experts are arguing that there will be a continuance of home office/work-from-home practices into the foreseeable future. Forbes predicts that by 2025, an estimated 70% of the workforce will be working remotely at least five



days a month (Forbes, 2021). According to a survey conducted by PWC in July 2020, before the pandemic, 89% of Canadian employees worked predominantly at the employers place of work (“the office”), but by July 2020, 60% of employees were working full-time from their home office (PWC, 2020). Further, the survey demonstrated that, post-pandemic, 51% of respondents indicated they prefer to work 50% of their time or more from their home office. Employee preferences to work primarily or entirely from home are shown on Figure 4-2, by sector.

Figure 4-2 Employee preference to work primarily or entirely remotely (%)



Source: PWC, 2020

As shown on Figure 4-2, 35% of business sector employees, 58% of financial services employees and 18% of manufacturing employees expressed their preference to work from home most of the time. It is clear that some types of business are more suited to remote work than others, such as professional services, government administration, etc.. Others, such as retail, food and resorts/outfitters/accommodation businesses are less likely suited to remote work and will continue to sell their goods and services from ‘bricks-and-mortar’ locations with in-person employees and associates. These types of businesses account for a significant number of businesses operating in the Greenstone Region.

It is difficult to predict how the evolution of on-line sales and e-commerce will affect the Greenstone economy. From the GEDC 2020 business survey it is clear that a number of businesses in Greenstone already sell goods and services on-line, and many others plan to get started in the near future. Of course, there were also businesses that indicated that on-line sales were a threat to their business. Some businesses will thrive, others may pivot to selling goods and services on-line, and some may continue to compete with on-line sales. There are also likely opportunities to attract new residents who have the ability to work remotely and enjoy the idyllic lifestyle of the area, as well as new businesses that could relocate to Greenstone and operate as well from there as anywhere else. How many and when is impossible to predict, but there may be opportunities to market the area as a place to live a preferred lifestyle while working remotely and conducting e-commerce.

4.4.3 Artificial Intelligence and Automation

As discussed in Section 3.3.3.3, artificial intelligence (AI) and automation are not likely to have significant impacts on the current Greenstone economy, in large part due to the low percentage of low skilled labour that can more easily be replaced. However, as discussed in Section 4.4.2, above, the mining sector continues to increase automation, and this trend could increase following the COVID-19 pandemic. Clearly this would have an impact on the number of employees required to operate a mine.

It is not likely that AI and automation will have a significant impact on the commercial/retail sectors in Greenstone in the near-term, but over time, as mining operations increasingly gravitate to automation, this could result in reduced numbers of employees, especially those in lower skilled jobs, and a resulting negative impact on induced (household) spending.



5.0 Conclusions

The following sections draw conclusions from the analysis of the historic, current and future economies discussed in Sections 3.0 and 4.0.

1. *The economy of Northern Ontario has had to pivot away from primary goods producing (“basic”) industries such as forest products and mining, increasingly relying on growth in public services such as public administration, education and health service.*

The historic primary goods producing economy (eg. forestry and mining) of the mid-1900’s declined in the latter part of the century, although still are important components of the Greenstone economy. In addition, while the Ontario economy as a whole grew by close to 40% over the past three decades, employment in Northern Ontario fell by nearly 8%, again, largely due to job losses in the primary goods producing economy, and forest products in particular. In 2016, public administration, education and health services represented 41% of total employment in the Greenstone Region.

2. *Despite job losses in some sectors of the Greenstone economy in the past two to three decades, population demographics are stabilizing.*

Although still on a slightly downward trajectory, the drop between 2011 and 2016 was less than 2%. Although a population that is not growing is not likely to fuel economic growth on it’s own, the stability of declines in recent years should provide some stability to the existing economy.

3. *The current Greenstone economy provides employment and revenue from a diverse mix of sectors. These include:*

- Agriculture and resource-based
- Utilities and construction
- Manufacturing
- Wholesale and retail trade
- Transportation and warehousing
- Finance, insurance, real estate
- Professional, management, scientific, technical and waste
- Education
- Health services
- Arts, entertainment, information, culture
- Accommodation and food
- Public administration

Employment in Greenstone’s public services in 2016 represented 41% of all employment. Although analysis using the Herfindahl economic diversification Index of the Greenstone economy indicates good diversification that compares favourably with, or better than, the Ontario economy, diversification scores were clearly better when public services were removed, highlighting the reliance



on this type of employment. Amongst the Greenstone businesses surveyed in 2020, the retail (37%) and smaller-scale construction sectors (18%) are the highest represented.

4. *Greenstone residents are skilled, providing a highly employable workforce for employers looking to establish in the Region, which in turn will provide well-paying jobs and economic return to the Region.*

Approximately 45% of Greenstone residents in 2016 had a post-secondary degree, certificate or diploma or an apprenticeship or trades certificate, compared to 41% for Ontario as a whole. Greenstone annual median income exceeded that of the Ontario median income for the periods 2006, 2011 and 2016, demonstrating the economic benefit of a trained/skilled population. This will be attractive to future employers coming into the Greenstone economy, and should result in higher levels of local employment, which in turn would be expected to contribute to growth of the Greenstone economy from increased indirect and induced spending.

5. *From the 2020 GEDC business survey, Greenstone businesses indicate fairly steady revenues and employee levels over the past 5 years.*

Seventy per cent (70%) of businesses indicated no real change in employee levels in that time period. The food/accommodation sector was more likely to experience decreases, perhaps due to the effects of the COVID-19 pandemic.

6. *Approximately 60 % of Greenstone businesses indicated their primary customer base is Greenstone residents, while 27% of businesses indicated their primary customer base is non-Greenstone residents.*

Together with conclusion no.5, this indicates that the Greenstone economy is fairly robust, and with many Greenstone residents employed in relatively high paying and steady employment such as government, education and health services, and highly skilled labour positions, the risk to economic downturn is likely quite low. This indicates that if major projects do not transpire, or do not transpire as planned, the current local economy is fairly robust and capable of continuing to provide steady revenues and incomes without any foreseeable significant disruptions.

7. *Capital investment by Greenstone businesses over the past five years has been good with 67% of respondents indicating they had invested recently.*

Optimism for further capital investment over the next five years was not strong with the majority of business operators indicating they would not be investing, perhaps reflecting economic uncertainties associated with the COVID-19 pandemic. However, over 50% of business respondents indicated they would invest capital if a major project came to the Region. This also contributes to the conclusion that current local economy is robust and that business operators are willing to increase capacity to meet increased demand.

8. *There are a number of major projects that could be developed either directly within Greenstone Region, or proximate regions with primary links into the Greenstone economy, projected to start in 2023, that would be expected to provide significant opportunities for economic growth of the Greenstone economy within the next 10 years, including the commercial and retail sectors.*



Development of these projects is primarily tied to new mining projects – the Hardrock Gold Project in Geraldton; and the Eagles Nest nickel-copper-platinum-palladium project and the Black Thor Chromite project, both of which would be located in the Ring of Fire region and linked to the Greenstone economy via the anticipated Northern Road Link. A number of infrastructure projects, including all-season roads, a multi-modal materials transfer facility in Nakina, and a transmission line upgrade on Hwy 11, would primarily be ancillary to these mining projects – without the mining projects these infrastructure projects would not be required. With all projects being tied to the mining projects, the certainty of these projects being developed directly links to the certainty of the other projects being developed. If any of these projects are developed there would be a positive economic impact to the Greenstone economy.

9. *Direct and indirect spending from the identified major projects is estimated to potentially add \$34 million to the Greenstone economy during the construction period (primarily 2023 to 2026) and annual operating and sustaining capital investment during the operations period is estimated to add close to \$66 million per year, all of which would contribute to growth in all sectors of the Greenstone economy, including commercial and retail (assuming they all go ahead as projected).*

Estimates were developed based on reasonably conservative assumptions, the primary of which is that the Greenstone economy will not have the ‘just-in-time’ capacity to address a significant portion of construction spending, nor do Greenstone businesses have the scale to undertake the large general contracting and subcontracting opportunities that are typical during construction of a major project. However, as projects are developed and become operational, it is expected that the local supply chain would grow to address customer needs closer to their location of production. Local Greenstone businesses would also have the opportunity to invest capital into growth and take on a higher percentage of contracts that are typically awarded during the operations period of major projects.

As a result, investing in supporting infrastructure within the Region until major projects are committed to capital investment/construction could be risky until further details of the projects are known to planners. One of the most important questions will be the type of employment model that is adopted to operate the major projects. A fly-in/fly-out (FIFO) or drive-in-drive-out (DIDO) model would result in 50% or more of project employees working on a rotation involving 12 hour/seven day shifts that would see them leave the Region for a period after several weeks “in” and spending most of their earnings in their home jurisdiction. In addition to the impact on the amount of induced spending in the Region, this would also have a fairly significant impact on expected housing growth as well as any other public services as the rotational workers would live in fully serviced Owner provided camp facilities. Risks to the municipality would be significantly reduced by delaying investment decisions until more is known about investment decisions as well as the projected direct, indirect and induced spending that would be expected during operations. The same patience would be advised for local commercial and retail businesses to avoid over-investment in what could become stranded assets.

10. *Induced spending is estimated to be much higher during the brief construction period (primarily 2023 to 2026), than during the operations periods of the examined major projects, although less sustainable. During the Operations periods it is estimated that annual induced spending in the Greenstone economy could be as high as \$42 million, representing a 25% increase annually over the existing level of household spending during the project operations periods.*



Growth in the retail sector will be tied to growth in induced (household) spending (money spent from project employee wages in the Region). The estimate of induced spending was based on reasonably conservative assumptions. It was assumed that only 50% of project workers will be from and/or live in the Greenstone Region. The remaining 50% of employees are expected to be FIFO/DIDO and all of their induced spending is expected to “leak” to their home jurisdiction. Living in fully serviced Owner supplied camp facilities, these workers are not expected to spend much of their wages in the Greenstone Region. In addition, these estimates are aggregated to include all major projects examined. Planners are encouraged to consider the impact of reduced induced spending based on the projects that are developed, as well as the timing of projected development. This projected increase in induced spending does not include “leakage” to larger centres, such as Timmins and Thunder Bay, nor on-line sales. It was conservatively assumed that 50% of induced spending would leave the Greenstone Region, resulting in an economic influx of an additional \$21 million per year into the Regional economy. It is estimated that the current Greenstone residents generate approximately \$160 million in induced spending. Assuming the same leakage rate for Greenstone residents as project employees at 50%, the contribution of induced spending from the examined major projects could increase total spending within the Greenstone local economy by as much as 25% annually. This is a fairly significant increase that would only transpire if all examined projects were to proceed to operations in the timeframes that have been projected.

- 11. For retail planning, from the analysis conducted, it is unlikely that either existing or new residents will significantly change their typical household spending patterns, and the most retail growth will likely occur in areas of typical household spending, namely food, transportation and household operations.*

Opportunities for growth in these and other sectors such as building materials supplies and office supplies should be considered proportionate to the expected increase in household spending.

- 12. Economic disruptors such as on-line sales (e-commerce), the COVID-19 pandemic, and the growth in artificial intelligence and automation could affect the estimate of increases in employment and economic growth, although the significance of the disruption cannot be estimated, and there could be economic upside.*

Although difficult to assess the potential economic effect of these economic disruptors, from the analysis conducted it is apparent that there are both potential negative aspects of each disruptor, as well as potential positive impacts.

COVID-19 contributes a high level of uncertainty and risk to the estimates of potential economic growth in the Region as well as the timing. Although there are indicators that the resource and construction sectors are recovering, the extent of impacts to investment decisions and timing of project development and investment are uncertain. Clearly, delays in project development will delay any stimulation to the Greenstone economy. However, as discussed in the context of Conclusion no.9, above, there is sufficient time in advance of any capital investments for regional economic planners and business operators to be reasonably certain of any investment decisions, reducing the risk of COVID-19 as a disruptor. From the business survey, it is clear that COVID-19 restrictions have affected some existing Greenstone businesses who have had to reduce their number of employees and have experienced reduced revenues. From the GEDC 2020 business survey it seems these are primarily food and accommodation type businesses. It is expected these impacts will continue disproportionately to the food and accommodation sector with or without the addition of major



projects to the Greenstone economy until restrictions are largely removed both in Greenstone and throughout the province, allowing a return to full capacity spending and a return to normal tourism levels.

Economic disruption resulting from on-line sales and e-commerce is expected to continue to impact bricks-and-mortar businesses which experience competition from on-line vendors who compete in price, convenience, and selection of products. These businesses will likely continue to face this competition and will have to be cautious about the investments they make to compete so as not to be stuck with occupancy space and inventory that could affect short- and long-term business sustainability. The survey also indicated that other existing businesses in Greenstone are either currently benefitting from on-line sales, or are expecting to in the near future.

The other aspect of e-commerce is the growing trend towards working remotely from home. This can provide economic upside for the Region by attracting employees who choose to live the idyllic lifestyle offered in Greenstone without being negatively affected as an employee. Additionally, there is the opportunity to attract new businesses that can sell goods or services on-line from any location, and also would enjoy the Greenstone lifestyle. Retailers in major centres have been negatively affected by stay at home work primarily because workers who worked pre-pandemic in central downtown locations that were serviced by business operators located in these areas are no longer contributing to the downtown economy to the same level. When employees started working from home, the demand for retail, food and accommodation services in these areas dropped dramatically. This is considered a more urban phenomenon that is not likely having the same impact on Greenstone retailers, notwithstanding the impact of restrictions on in-store dining and capacity limits on retail outlets. There is undoubtedly some potential for Greenstone businesses to grow through increases in on-line sales, and there is also the potential to attract new residents and businesses to the Region, but the increase is not likely to have a significant impact on the Region's overall economic growth.

Artificial intelligence (AI) and automation are not expected to have a significant impact on the existing Greenstone economy given the high percentage of professional and other highly cognitive types of employment. These types of employment are much less vulnerable to AI and automation compared to low skilled labour jobs. It is recognized that the mining sector in particular has improved efficiencies based on the automation of a number of mining activities. It is expected this will likely continue and could have a negative effect on the number of jobs created, and hence the amount of induced spending in the Region. However, it is assumed that this will not occur over night, and planners and businesses will have opportunities to react. There is also the potential that new jobs will be created such as service and maintenance of automated machinery.

6.0 Recommendations

This section provides a series of recommendations resulting from the analysis presented in the previous sections, and the conclusions provided in Section 5.0.

Recommendation No.1 – Monitor new business openings

The information provided by GEDC on business closures over the past 10 years was very helpful and contributed to the conclusion that the Greenstone economy is stable, and likely to continue to be stable, even without the addition of new major projects. Having similar information on business openings would help with the assessment of trends.

Recommendation No.2 – Continue to conduct business surveys

It is understood that surveys take a lot of time to prepare and analyze. It is also understood that businesses wouldn't likely react positively to frequent surveying. However, having results from multiple surveys over time would also help planners better understand economic trends which would lead to more informed planning and decision-making on investments such as public infrastructure.

Recommendation No.3 -- Develop communications materials that will help to market the advantages of the Greenstone Region lifestyle in turn attracting new on-line vendors and flexible stay-at-home workers to the Region.

As discussed in Sections 3.0 and 4.0, the current trend towards an increase in on-line sales and work-from-home employment is contributing to an outmigration from more populated centres to less populated centres. Migrants are citing factors such as lower house prices, lower stress, closer proximity to and better access to nature, access to more varied outdoor activities and recreation, cleaner environment, etc.. Many employees and on-line entrepreneurs are flexible in where they are located in order to conduct their work or generate their sales. Why not Greenstone? Gaining access to, and attracting these types of workers/entrepreneurs requires communications materials using a variety of platforms, including the traditional outlets such as print, radio and television, but increasingly via social media.

Recommendation No.4 – Continue to monitor employment trends through the census and periodically calculate the Herfindahl Index for the Region to better understand trends in diversification.

The Herfindahl Index is only one tool that can be used to understand how diversified the Greenstone economy is from census to census. However, it is very simple to use and can reflect very small changes in diversification which could also have important implications for economic development planning.

Recommendation No.5 – Conduct a detailed assessment of spending leakage in both the commercial and retail sectors.

Greenstone Region would benefit from a more detailed understanding of the amount of spending that is leaking from the local/regional economy, and the type of spending that is leaking out. The current analysis relied on a number of assumptions to determine the potential for economic growth in the



Region, including an assumption for leakage. A more accurate estimate would help planners better understand gaps in the commercial and retail sectors that could be filled to reduce leakage and increase local revenues. Knowing the specific gaps would also help planners better target prospective businesses. Conducting a representative survey of Greenstone households to determine where they spend their money and on what products or services would provide important information to determine potential gaps.

APPENDIX 1

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APPENDIX 2

GEDC 2020 Business Survey Questionnaire



Greenstone Retail Gap Analysis
Business Survey Questionnaire

This survey is designed to provide GEDC with an understanding of current trends in the retail economy based on responses from local business owners. It is estimated that the survey should take between 5 and 10 minutes to complete. Please keep your answers brief, providing numbers as much as possible.

Note: Any financial information provided will not be publicly released or published in any form other than in the form of sector aggregates

- Name of company?
- What is your title at your company?
- How long has your company been in business?
- In which sector does your business operate (eg. retail, transportation, professional services, wholesale, food and accommodations, etc.)?
- Does your company sell direct to consumers, businesses or both?
- How many people are employed at your company?
- Is this up or down over the past 5 years?
- What was the annual revenue for your company over the last 5 years?
- Have you made any significant capital purchases (e.g. Real-estate purchases or major renovations, equipment over the past 5 years?)
- Do you have plans for major capital investments and or renovations in the next 5 years?
- Would your investment strategy change if a major project within the region was to move forward (mining, forestry, infrastructure/roads, electricity)?
- What percentage of total sales was generated on-line in the last year?
- Is your company's sales affected by on-line sales (positive or negative)?
- Are you planning on increasing on-line sales in the near future?
- What percentage of your annual sales are to customers outside the Greenstone region? (estimate only – ie. low, moderate, significant)



APPENDIX 3

Forecast of Jobs and Spending per Year in Greenstone as a Result of Future Major Project Construction and Operations



Appendix 3 - Estimated Total Direct and Indirect Jobs and Spending in Greenstone Region 2023 to 2033 (Construction and Operations Phases)

Sector/ Project	2023			2024			2025			2026			2027			2028			2029			2030			2031			2032			2033		
	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)	Jobs (Dir and Indir; Cons and Ops)	CAPEX (\$M)	OPEX (\$M)
Mining	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
5 - Noront Eagle's Nest	120	\$5.0		120	\$5.0		238		\$30.4	238		\$30.4	238		\$30.4	238		\$30.4	238		\$30.4	238		\$30.4	238		\$30.4	238		\$30.4	238		\$30.4
6 - Black Thor Chromite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 - Hardrock Project	94	\$1.7		187	\$3.5		132	\$1.7	\$16.0	77		\$31.9	77		\$31.9	77		\$31.9	77		\$31.9	77		\$31.9	77		\$31.9	77		\$31.9	77		\$31.9
Infrastructure																																	
9 - Northern Road Link							11	\$1.3		11	\$1.3		11	\$1.3		20		\$1.7	20		\$1.7	20		\$1.7	20		\$1.7	20		\$1.7	20		\$1.7
10 - Multi-modal Transload transfer facility							3	\$0.3		1	\$0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 - Marten Falls FN Rd							22	\$2.0		22	\$2		13		\$1.0	13		\$1.0	13		\$1.0	13		\$1.0	13		\$1.0	13		\$1.0	13		\$1.0
12 - Webeque Supply Road							10	\$3.6		10	\$4		10		\$0.7	10		\$0.7	10		\$0.7	10		\$0.7	10		\$0.7	10		\$0.7	10		\$0.7
Power																																	
14 - Hwy 11 Transmission Upgrade							0	\$0.0		1	\$0.2		1	\$0.1	\$0.2																		
TOTALS	214	\$6.7	\$0	307	\$8.5	\$0	416	\$9.0	\$46.4	359	\$7.2	\$62.3	349	\$1.4	\$64.2	358	\$0.0	\$65.7	358	\$0.0	\$65.7	358	\$0.0	\$65.7	358	\$0.0	\$65.7	358	\$0.0	\$65.7	358	\$0.0	\$65.7

Notes:

All Figures from Tables 4-1 and 4-2

- **B5, E5** = Noront - const - total direct and indirect jobs (FTE) in Greenstone Region/yr of construction = 228 (211+17) = 10 FTE/month; construction is 24 months spread equally through 2023 and 2024

- **B7, E7, K7** = Hardrock - total direct and indirect jobs (FTE) in Greenstone Region/yr of construction = 374 (340+34) = 15.6 FTE/month; construction is 6mos 2023 - 12 months 2024 - 6 months 2025

- **K7** - Hardrock 2025 - 6 mos construction @ 15.6 FTE/mo (94) + 6 mos Ops @ 34/2 + 43/2 per mo = 94+17+21.5 =

- **H5, K5, N5, Q5, T5, W5, Z5, AC5, AF** - Noront - Ops - Direct (105) plus indirect jobs (133) = 238 per year

- **C5, F5** - Noront - CAPEX = \$10M/24 = \$0.42M per mo; constrution spread equally across 2023 and 2024 = \$5M per year

- **C7, F7, I7** - Hardrock - CAPEX - \$7M/24 = \$0.29M per mo; 6 mos in 2023; 12 mos in 2024; 6 mos in 2025

- **J5, M5, P5, S5, V5, Y5, AB5, AE5, AH5** - Noront - opex - from Table 4-2

- **H7** - Hardrock - ops - direct and indirect jobs = 77 (34+ 43) per year; only 6 mos of ops in 2025 = 77/2 = 38.5 PLUS 6 mos of const @ 15.6 FTE per month X 6 = 93.6 = 132.1

- **J7** - Hardrock - OPEX = \$31.9M per year; only 6 mos of const in 2025 = 31.9/2 = \$16M

- **H9, K9, N9** - Northern road link - const - direct and indirect jobs = 32 (13+20); 36 mo const period spread equally across 2025, 2026, 2027 = 0.9 FTE per mo = 10.8 (11) FTE per year

- **I9, L9, O9** - Northern Road Link - CAPEX - \$4M; 36 month construction period spread equally across 2025, 2026, 2027 = \$0.11M per mo = \$1.3M per year

- **Q9, T9, W9, Z9, AC9, AF9** - Northern Road Link - ops - direct and indirect jobs = 20 (8 + 12) per year

- **S9, V9, Y9, AB9, AE9, AH9** - Northern Road Link - OPEX = \$51.7 per year

- **H10, K10, N10** - Multimodal facility - const - direct and indirect jobs = 4 (2+2) = 0.33 FTE per month; 12 mo const period - Q2+Q3+Q4 in 2025 (9 mos); Q1 in 2026 (3 mos)

- **I10, L10** - Multimodal facility - CAPEX - \$0.4M = \$0.03M per mo; 9 months in 2025 (\$0.3M); 3 mos in 2026 (\$0.1M)

- **H11, K11** - Marten Falls Road - const - direct and indirect jobs = 42 (17 +25) = 1.8 FTE per mo over 24 mo constr period spread equally between 2025 and 2026 = 22 per year

- **I11, L11** - Marten Falls Road - CAPEX = \$4M; 4/24 mos = \$0.17M per mo

- **N11, Q11, T11, W11, Z11, AC11, AE11** - Marten Falls Road - ops - direct and indirect jobs = 13 (5+8)

- **P11, S11, V11, Y11, AB11, AE11, AH11** - Marten Falls Road - OPEX = \$1M per year

- **H12, K12** - Webeque Supply Road - const - direct and indirect jobs = 25 (10 +15) = 0.83 FTE per month; 24

- **I12, L12** - Webeque Supply Road - CAPEX - \$7M; 7/24 = \$0.3M per mo

- **N12, Q12, T12, W12, Z12, AC12, AE12** - Webeque Supply Road - ops - direct and indirect employment = 9.8 (3.8+6) per year = 0.8 FTE per month; spread evenly across 2025 and 2026

- **H14, K14** - Hwy Tx Upgrade - const - direct and indirect jobs = 0.8 (0.4+0.4) =0.07 FTE per mo; construction

- **I14, K14** - HwyTx Upgrade - CAPEX - \$0.3M over 24 months = \$0.0125M per mo

- **Q14, T14, W14, Z14, AC14, AE14** - Hwy 11 Tx upgrade - ops - direct and indirect jobs = 0.8 (0.4+0.4) per year = .07 FTE per month

- **N14** = Hwy Tx Upgrade - direct and indirect jobs - 9 mos of cons in 2027 (0.07*9=0.6) PLUS 3 mos of ops

- **P14** - Hwy 11 upgrade - OPEX - \$0.3M per year = \$0.025M per mo; 9 mos in 2027 (0.025*9=0.23)

