2.0 ENVIRONMENTAL SETTING

This Chapter provides an overview of the environmental setting for the Project and the broader regional context where relevant, in order to provide context for the EA. An overview is provided for existing and historical land uses, biophysical and socio-economic features, and the effects of historical mining activities on water quality within Kenogamisis Lake.

A more detailed description of existing environmental conditions within spatial assessment boundaries is provided in each respective VC assessment (Chapters 7.0 to 19.0) and environmental baseline reports (Appendix E).

2.1 PROJECT LOCATION AND PROJECT DEVELOPMENT AREA

The Project is located in a rural area of northern Ontario, approximately 275 km northeast of Thunder Bay, in the Municipality of Greenstone, Ward of Geraldton. The Project is generally centred at the intersection of Highway 11 and Michael Power Boulevard. Highway 11 currently traverses the property in an east-west direction.

A Project development area (PDA) has been identified for the purposes of the EA, and is defined as the combined Project footprint of all facility components, as well as the anticipated area of physical disturbance associated with all phases of the Project (Figure 2-1). Detailed information on the location of Project components is provided in Chapter 4.0 (Project Description).

The centroid coordinates of the open pit, which is one of the primary components of the Project, are: UTM- Easting, 504405, Northing 5502930; Decimal Degrees, Long- 86.93 Lat- 49.67; Degrees Minutes Seconds, 86° 56' 2.029W, 49° 40' 46.477N.
2.2 OVERVIEW OF HISTORICAL LAND USE

2.2.1 Mining

The Project is partially situated within a historical mine site for which the mining claim was acquired in December 2008. The brownfield portion of the site was actively mined during the 1930-1970s by the MacLeod-Mosher and Hardrock Mines, two of the most productive mines in the Geraldton gold mining camp which was host to twelve mines at its peak in the mid-1940s. The following provides a brief summary of mining within the immediate vicinity of the PDA.

“Hardrock” Bill Smith is credited with the discovery of three veins of gold located approximately four miles south of the Canadian National Railway (CN) line on the southwest shore of Kenogamisis Lake in 1931. The first mine developed near the Project site was the Little Long Lac Mine, followed by the Hardrock Mine at Discovery Point, and the MacLeod-Cockshutt Gold Mine (Figure 2-1).

The Little Long Lac Mine was situated along the south shore of the Kenogamisis Lake narrows, immediately west of the Michael Power Boulevard bridge. Construction began in March 1933 and by December 1934 the first gold bar was produced. The mine was operational until 1953, at which point salvage operations began. The Little Long Lac Mine produced a total of 605,499 ounces of gold and 52,750 ounces of silver during operation (Speed and Craig, 1992). The Little Long Lac mine operated from 1934 to 1953 as an underground mine. Salvage of equipment and mill clean-up was reported to have occurred between 1954 and 1956.

Plate 2-1: Aerial view looking northeast across Barton Bay at the Little Long Lac Gold Mine, c1937.

The Hardrock Mine was situated on and adjacent to Discovery Point. The first shaft was sunk in 1935 near the location of the discovery, aptly named Discovery Point. In 1938 the first gold bar was poured and by 1951 the mine had produced 269,081 ounces of gold and 9,009 ounces of silver during operation (Premier 2015). The mine was closed in 1951 after less than 20 years in operation with the land, equipment, and plant sold to the Mosher-Long Lac Mines. Subsequent
remediation at the plant site was completed from 1997 to 1999 and rehabilitation work was completed on the tailings in 1997.

Plate 2-2: Aerial view looking north, along the shoreline of Kenogamisis Lake at the Hard Rock Gold Mine (Discovery Point) and townsite, c1938.

The MacLeod-Cockshutt Mine was situated in the vicinity of what is now the intersection of Highway 11 and Hardrock Mine Road. From 1938 to 1968 the mine was known as MacLeod-Cockshutt Mine, later becoming the Mosher-Long Lac Mine from 1951 to 1966, and finally the MacLeod-Mosher Mine from 1968 to 1970. For the purposes of this report the mine is referred to as the MacLeod-Mosher Mine. The first shaft was sunk in 1934, and the first gold bar was poured four years later. The mine was closed in 1970, giving it the longest and most prolific production record in the region. The MacLeod-Mosher Mine produced a total of 1,877,245 ounces of gold and 142,789 ounces of silver during operation and represented the most prolific mine in the area (Premier 2015). Remedial work at the plant site was completed between 1997 and 1999 and remedial work on the tailings was completed from 1998 to 1999.

Plate 2-3: Aerial view looking northwest at the MacLeod Cockshutt Gold Mine c1937.
Environmental Setting
January 2016

2.2.2 Forestry

The Municipality of Greenstone has a strong history in the forestry sector, with roots back to the early 1800s when the Long Lac settlement was established as a Northwest Trading Company Post. By 1948, the Greenstone area had become a regional forestry centre which, up until recently, supported four mills. As the mines closed down, Geraldton came to depend on the forest products industry as the main resource industry.

2.2.3 Long Lake Diversion Project

The Kenogamisis River used to flow northwest to the Albany River which discharged into Hudson Bay prior to the late 1930s. The Long Lake Diversion project, which was completed in 1939, transferred water from the Kenogamisis River into the Aguasabon River, which discharges into Lake Superior. The Kenogamisis Control Dam was constructed north of Long Lake to redirect the Kenogamisis River water into Long Lake. At the south end of the lake, a diversion channel was excavated through the watershed boundary. The diversion has shifted an average flow of 39 m³/s and a drainage basin of almost 4,400 km² from James Bay to the Great Lakes Basin. The diversion project was completed in 1948 when the Hayes Lake Dam and Aguasabon Hydro Generation station were built just upstream of the Aguasabon River at Lake Superior. The assets were transferred to Ontario Power Generation in 1999. Major goals of the Long Lake diversion project were to provide water for local and Great Lakes area hydroelectric generation and to facilitate inter-basin pulpwood transportation (Peet and Day 1980).

2.3 OVERVIEW OF CURRENT LAND USE

The Project is located on a brownfield site as well as relatively undisturbed land. The lands surrounding the PDA are typical of rural northern Ontario. Existing land uses in and around the Project include urban, rural and recreational uses as described below, and shown on Figure 2-1.

The local landscape continues to show evidence of historical land use in the area, including the presence of historical tailings and mine shafts from old mining activity, two sawdust piles at the end of Lahtis Road from old logging activity, and various trails that may be decommissioned mining or forestry roads. The historical MacLeod-Mosher Mining Headframe is located south of the intersection of Highway 11 and Michael Power Boulevard. The headframe itself is out of commission and has been restored as a local tourist attraction.

Urban land uses are primarily concentrated in the community of Geraldton, the largest population centre in the Municipality of Greenstone. There are also five townsites in the Geraldton area: Little Long Lac, Rosedale Point, MacLeod Townsite, Hardrock Townsite and Geraldton North. MacLeod and Hardrock Townsites, located within the PDA, were both established and owned by previous mining companies to house select management and employees who required frequent and unpredictable access to the mine sites. The MacLeod Townsite was associated with the former MacLeod-Mosher mine, is located in the northwest
Environmental Setting
January 2016

quadrant of the intersection at Highway 11 and Michael Power Boulevard, and includes 37 houses, five vacant lots, one commercial establishment, and a public park on a small road network. The Hardrock Townsite was associated with the former Hardrock mine, and is located south of Highway 11, on the shore of Kenogamisis Lake. The Townsite includes 12 houses and 11 vacant lots.

Most of the commercial activity in the Geraldton area is located north of the PDA; however, Dan’s General Store (Husky Gas Station) is located at the intersection of Highway 11 and Michael Power Boulevard in the MacLeod Townsite.

The Discover Geraldton Interpretive Centre is located in the northeast quadrant of the intersection at Highway 11 and Michael Power Boulevard. The facility focuses on the history of the Geraldton area, including the fur trading industry, the mining industry, and the area’s firefighting legacy.

The Kenogamisis Golf Club is located just north of Highway 11 and is the only golf course in the Municipality of Greenstone. The golf course has 18 holes, which were designed by Stanley Thompson (front nine, built in 1938) located west of Michael Power Boulevard, and Les Furber (back nine, built in 2000) located east of Michael Power Boulevard. The back nine holes are constructed on historical tailings. GGM currently owns the golf course property and leases it to the Municipality of Greenstone.

MacLeod Provincial Park is located approximately 350 m to the east of the PDA and is designated as a Recreational Class Park offering opportunities for camping, hiking, fishing, swimming, boating, canoeing, biking, picnicking and bird-watching.

Provincial infrastructure in the PDA includes Highway 11 and the MTO patrol yard, Hydro One transmission and distribution power lines and associated substation, and an OPP station (Greenstone detachment).

The area contains forests, wetlands, wildlife and fish habitat common throughout similar regions in northern Ontario. Natural areas are interspersed with existing disturbances from townsites and related infrastructure, and from mining and forestry activities. The Project is adjacent to Kenogamisis Lake to the north, east and south. Flows are regulated at the Kenogamisis Lake Dam, at the outlet of the Lake. There are also several smaller streams and lakes within and adjacent to the PDA. Kenogamisis and Goldfield Lakes are popular for fishing.

Outdoor recreation is popular in and near the PDA including hunting, fishing, boating, swimming, hiking and snowmobiling. These activities are supported by canoe routes and boat launches, hiking trails, cross-country skiing trails and a network of snowmobiling trails. Commercially-based resource uses in the area include trapping, guide outfitting, bait harvesting, and forestry activities. The Project is also located in the traditional territories of a number of Aboriginal communities.
Overall, the area is typical of rural northern Ontario with some settled areas nearby, and presents a balance of existing disturbance from local communities and previous land uses, and generally common and abundant natural landscape features. Local conditions are representative of an area that has been historically affected by industrial activities.

### 2.4 Environmentally Sensitive Areas

The MacLeod Provincial Park is located 350 m east of the PDA. There are no other provincially or federally protected areas such as national parks, protected areas, ecological reserves or conservation reserves near the Project. There are no Areas of Natural and Scientific Interest, or Provincially Significant Wetlands within or near to the Project site. One sensitive, but not provincially designated as rare, fen community was identified immediately adjacent to the PDA. No plant species at risk or species of conservation concern were identified in the PDA.

### 2.5 Land Tenure

Land tenure in the Project area includes a mix of patent and Crown lands. About one-quarter of the lands in the PDA is held under patents (e.g., privately owned). Patent lands in the area are concentrated in a nearly continuous band that includes the south end of Geraldton, the Townsites of Little Long Lac, Rosedale Point, MacLeod and Hardrock, and surrounding areas. The area outside this band consists mainly of Crown land, with a few isolated parcels of patent land, including a parcel on the north shore of the Southwest Arm of Kenogamisis Lake, which is occupied by a private hunting camp. In addition to this patent land, the MNRF has identified two land use permits (LUPs) for boathouse structures with lake access on the north shore of Kenogamisis Lake and a LUP for a boat cache on Marron Lake.

Project components will be located within the existing 4,148 ha of land owned by GGM and other owned or controlled properties contiguous with the GGM-owned lands that are currently within the claims to lease process (Figure 2-2).

The patented claims, leases and licences of occupation are subject to terms under a number of agreements and will be obtained prior to Project development.
Figure No. 2-2

Legend

- Open Pit - Full Extent
- Process Plant Area
- Tailings Management Facility
- Waste Rock Area
- Contour Line (10 m intervals)
- Highway
- Major Road
- Local Road
- Watercourse - Permanent
- Watercourse - Infrequent
- Waterbody

Mining Tenures and Claims Status

- Premier Gold Staked Mining Claims
- Premier Gold 100% Surface and Mineral Rights
- Premier Gold Leased Claim Mineral Rights
- Claim Pending

Notes

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base features produced under license with the Ontario Ministry of Natural Resources & Forestry for Ontario, 2015.

Client/Project

Greenstone Gold Mines GP Inc. (GGM)

Hardrock Project

Client/Project

January 2016

Land Tenure
2.6 SUMMARY OF EXISTING PHYSICAL ENVIRONMENT

An overview of the physical environment is provided in the sections below. Detailed information is provided in the series of baseline reports that have been prepared to document the existing conditions in support of the Draft EIS/EA (Appendix E).

2.6.1 Atmospheric Conditions

The Project area has a climate typical of Northern Ontario. The nearest permanent weather monitoring station is located approximately 14 kilometres north of the Project at the Greenstone Regional Airport which services Geraldton and surrounding area. Weather statistics for the period 1981 to 2010 indicates that the daily average temperature for the area varies from -18.6 to 17.2°C with an annual average temperature of 0.6°C. The annual average total precipitation for the area is about 764.6 mm, including a mean annual rainfall of 556.1 mm and the mean annual snowfall of 242.6 cm. The annual average relative humidity in the morning is about 83.6%. The annual average wind speed for the area is 11.2 km/h and the most frequent wind direction, on an annual basis, is from the west. In the summer, winds blow most frequently from the west and south, while in the fall to winter, the most frequent direction is from the west.

Air quality and noise conditions are typical of a rural area located near a highway and close to existing settlement areas, with minimal air quality concerns and noise levels consistent with low levels of ‘urban hum’ from the highway.

2.6.2 Physiography, Geology and Soils

The topography of the PDA and surrounding area is relatively flat to gently rolling with local relief up to 20 m above the surrounding area that is attributed to glacial deposits and bedrock topographical highs. There are no distinct topographic features that stand out in relief. Ground surface slopes from topographic high areas dominated by bedrock outcrops to low lying areas characterized by swamps and ponds with overall poor drainage throughout the area. Ground elevations range from lows of about 335 m above mean sea level along the shoreline of Kenogamisis Lake and Barton Bay and increases to 375 m above mean sea level in the southwest.

The PDA is located within the Beardmore-Geraldton Greenstone Belt, which is part of the Wabigoon Subprovince of the Archean Superior Province. The Superior Province makes up approximately 70 percent of the Canadian Shield in Ontario, and forms the core of the North American continent. The southern Superior Province (to latitude 52°N) is a major source of mineral wealth, hosting active gold and base metal mining camps in the Timmins–Kirkland Lake and Red Lake areas. Owing to its potential for these and other commodities, the Superior Province attracts mineral exploration in both established and frontier regions (Percival and Easton 2007).
Surficial geology comprising till and glaciofluvial and glaciolacustrine sand and silt trend in a generally northeast-southwest direction and overlay bedrock. Thin sequences (1 m to 2 m) of peat and muck occur within low lying areas around lakes and stream valleys. The property lies along the southern boundary of the Bankfield-Tombill Fault.

The range of soils in the PDA is typical of the boreal forest region overlying the pre-Cambrian shield in Northern Ontario. The prevalent soil types are organic muck (comprising about 36% of the total area) and well-drained brunisols over thin bedrock (comprising about 35% of the area), with poorly drained gleysols accounting for 13% of the area. The remaining 16% of the PDA is either developed land or water.

2.6.3 Hydrology and Water Quality

The PDA is located in the Kenogamisis River watershed, adjacent to Kenogamisis Lake. The lake is long, narrow and shallow and consists of four main basins referred to as the Southwest Arm, Barton Bay Basin, the Central Basin (sometimes called MacLeod Basin), and Outlet Basin (sometimes called the Northeast Arm). The dominant inflow to Kenogamisis Lake is from the Kenogamisis River into the Southwest Arm. Water flows through the Southwest Arm into the Central Basin. After mixing with water from Barton Bay in the Central Basin, water flows beneath the bridge over Highway 11 into Outlet Basin. Flows are regulated at the Kenogamisis Lake Dam, at the outlet of the lake on the Outlet Basin and discharge to the lower Kenogamisis River.

Two main subwatersheds are located in the PDA. The Southwest Arm Tributary is a second order tributary that originates in a wetland that is crossed by Lahtis Road and drains eastward for a distance of approximately 3.3 km before discharging into Southwest Arm. Goldfield Creek is a larger watercourse originating from Goldfield Lake and drains in an easterly direction, discharging to the Southwest Arm. Goldfield Creek Tributary (a smaller tributary to Goldfield Creek) drains a wetland area and Lake A-321 to the south of Goldfield Lake and merges with Goldfield Creek, just upstream of its outlet to the Southwest Arm. Other areas in the PDA drain towards Mosher Lake, Barton Bay and the Central Basin of Kenogamisis Lake through a series of smaller unnamed watercourses.

Waters of Kenogamisis Lake and the other creeks and lakes sampled were generally moderately hard, circumneutral in pH, with relatively low total dissolved solids concentrations and low total suspended solids concentrations. Nutrient levels tended to be low, except at stations in Barton Bay interpreted to be affected by municipal sewage treatment plant discharges. Seasonal variations are evident with many parameters having their lowest concentrations during spring freshet and increased gradually to a maximum during winter. Water quality typically met provincial and federal water quality guidelines with arsenic and iron representing the main parameters that were elevated above water quality guidelines in Kenogamisis Lake and several surrounding creeks and lakes.
Arsenic represents one of the main parameters of potential concern (PoPC) with concentrations generally highest in Barton Bay and the Central Basin of Kenogamisis Lake. While arsenic concentrations were slightly elevated in surface waters considered to be typical of background conditions, suggesting naturally elevated arsenic concentrations, the primary source of elevated arsenic concentrations is interpreted to be related to historical mining activity in the area. A review of historical data indicates that water quality has improved over time in Kenogamisis Lake, as indicated by a reduction in the number of parameters that exceed water quality guidelines; however, arsenic concentrations in Kenogamisis Lake have remained relatively consistent over the past 40 years. While arsenic concentrations remain elevated in surface waters of Kenogamisis Lake, no evidence of effects to aquatic biota were identified in the metal bioavailability study completed as part of this Project.

2.6.4 Groundwater

Groundwater flow near the Project site tends to follow topography, generally flowing east towards Kenogamisis Lake, with recharge at higher elevations and discharge in the low-lying creeks, rivers, wetlands, and lakes. Groundwater is generally located 1 m to 2 m below ground surface.

Groundwater flow is controlled by topography resulting in localized flow zones. Groundwater flow in area of the northern portion of the PDA is toward Barton Bay, Central Basin and the Southwest Arm. Groundwater flow in the southern portion of the PDA is controlled by northeast to southwest trending groundwater flow divides. Groundwater directed to the west of the groundwater flow divide discharges to wetlands, Goldfield Creek, and the Southwest Arm Tributary. Groundwater directed to the east of the groundwater flow divide discharges to the Southwest Arm of Kenogamisis Lake. Groundwater recharges in areas of topographic highs and discharges in the topographic lows associated with streams and wetlands.

A review of background groundwater quality indicates that most parameters meet drinking water quality guidelines with the exception of parameters that are typical of groundwater in Ontario that are reflective of the natural mineralization and geochemical processes in the area. Groundwater that has been affected by historical mining operations, particularly associated with the historical MacLeod and Hardrock tailings was characterized as having elevated concentrations of arsenic, cobalt, nickel, zinc, cadmium, cyanide, aluminum, and selenium relative to background.

2.6.5 Loadings to Kenogamisis Lake

Historical mining activities have contributed to the degradation of groundwater and surface water quality within the area of the PDA. An assessment of arsenic loading to Kenogamisis Lake was completed using a mass balance approach, which provides an accounting of the total arsenic loading on both an individual basin and overall lake perspective. The mass balance calculations indicate that while a small component of flow, the discharge of groundwater from
Environmental Setting
January 2016

historical tailings represents approximately 60% of the total arsenic load leaving the Outlet Basin, and about 55% of the total load leaving Kenogamisis Lake at the control dam. By the time water from Barton Basin mixes with water from the Central Basin and Southwest Arm, mean arsenic concentrations are at 9 µg/L, just above the Interim Provincial Water Quality Objective of 5 µg/L, with concentrations remaining similar through the Outlet Basin.

2.7 SUMMARY OF EXISTING NATURAL ENVIRONMENT

An overview of the natural environment is provided in the sections below. Detailed information is provided in the series of baseline reports that have been prepared to document the existing conditions in support of the Draft EIS/EA (Appendix E).

2.7.1 Vegetation and Wetlands

The PDA is located in the Central Plateau, along the southern boundary section of the Boreal Forest Region, in northern Ontario (Rowe 1972). Typical forest cover is a mix between deciduous and upland coniferous forest cover as well as wetland coniferous swamp; vegetation communities are predominantly coniferous with deciduous associates. White and black spruce, tamarack, balsam fir and jack pine are common throughout the region with frequent occurrences of deciduous vegetation communities and species, including white birch, trembling aspen and balsam poplar. Wetland vegetation community types occur throughout the PDA and surrounding area and are common to the Boreal Forest Region. Wetland ecosites include swamp, marsh, bog and fen communities. Many of these wetland ecosites contain a shallow open water component.

The PDA has experienced disturbance from both mining and logging practices. These anthropogenic disturbances have resulted in a variety of vegetation communities occurring in the PDA, ranging from open disturbed sites showing early successional growth to mature naturalized deciduous and coniferous forest communities.

2.7.2 Fish and Wildlife

Wildlife observed in the area includes various mammals, birds, waterfowl, reptiles and amphibians, which are generally common to the Boreal Region, and found in relative abundance throughout. The PDA and surrounding area supports mammal communities of moose, beaver, wolf, red fox, muskrat, bats, ermine, lynx, mink, marten, fisher, otter, and coyote. In terms of amphibians and reptiles, frogs, toads, salamanders, snakes, and turtles were observed in the PDA. One hundred and twenty-nine species of birds were recorded during the breeding season, of which, 117 were considered to breed in the area surrounding the PDA. Wildlife species at risk and species of conservation concern have also been observed in the area, including three birds, two bats and one butterfly.
Environmental Setting
January 2016

The watershed supports numerous game and sustenance fish species, as well as other small bodied fish species, with greater diversity and abundance in larger lakes and streams. Local lakes provide coolwater habitat, including spawning habitat for Northern Pike and Yellow Perch. There is important spawning and feeding habitat for species like Walleye and Lake Whitefish where the Kenogamisis River and Magnet Creek flow into Kenogamisis Lake. Despite good cover, fish abundance and species diversity were generally low in local streams. Fish species found in Kenogamisis and Goldfield Lakes included Walleye, Lake Whitefish, Northern Pike, Yellow Perch and Burbot. Spottail Shiner, Trout Perch and Blacknose Shiner were found in abundance, and Northern Pike and Yellow Perch were present in deeper water. None of the fish species identified were listed as federal or provincial species at risk.

Sediment quality data included particle size, total organic carbon and metals. Results were compared to provincial guidelines for lowest effect level and severe effect level (SEL). In general, sediment in small inland waterbodies contain large amounts of organic material (> SEL) in the sediment whereas levels are lower in lake sediments. Sediment reduced to moderately reduced (anaerobic) and largely composed of fine particle sizes. The arsenic SEL was exceeded at most stations and showed a spatial trend similar to water quality that reflected historic mining activities (Barton Bay mean 805 mg/kg > Central Basin mean 159 mg/kg > Outlet Basin mean 27 mg/kg > Southwest Arm mean 21 mg/kg). In Barton Bay, arsenic, chromium, copper, iron, manganese, mercury, nickel and zinc were elevated compared to background and, in the Central Basin elevated metals are similar except for chromium and manganese.

2.8 SUMMARY OF EXISTING SOCIO-ECONOMIC ENVIRONMENT

An overview of the socio-economic environment is provided in the sections below. Detailed information is provided in the series of baseline reports that have been prepared to document the existing conditions in support of the Draft EIS/EA (Appendix E).

2.8.1 Designated Land Use

The PDA is located mainly within the Municipality of Greenstone, in the Ward of Geraldton. A small area of 1.5 ha, or less than 1% of the PDA, is located within the Thunder Bay North District Unorganized Territory.

The Municipality of Greenstone is a single-tier municipality. The Municipality of Greenstone Official Plan, adopted by the municipality in 2010 but subject to a decision from MMAH, establishes two categories of settlement areas within the PDA and surrounding area: urban settlement areas and rural areas. Two urban settlement areas, MacLeod Townsite and Hardrock Townsite, are within the boundary of the PDA, and are comprised of residential and commercial districts. Other urban settlement areas near the PDA include Geraldton, Little Long Lac, and Rosedale Point (Figure 2-1). The remainder of the PDA is designated as rural area, with a portion
Environmental Setting
January 2016

of land near the Hardrock Townsite mapped as lakefront district within the rural area designation.

Lands that are located in the Thunder Bay North District Unorganized Territory fall under land use policies administered by the Ministry of Municipal Affairs and Housing (MMAH), the approving authority for any decisions that are under the Planning Act, 1990 in this area.

Land use direction for Crown land within the PDA is guided by the land use policy for General Use Area G2697 (MNR 2005). Permitted uses include a variety of commercial uses, land and resource use activities and recreation activities and facilities.

2.8.2 Community Services and Infrastructure

The Ward of Geraldton, centrally located in the Municipality of Greenstone, is the service support centre for the surrounding region including government services (MNRF/Regional Fire Management), Medical Services (District Hospital), financial services and retail.

According to a 2011 housing analysis of the District of Thunder Bay, population decline in the Municipality of Greenstone has led to a surplus of housing in some communities. Temporary accommodations and operators are typically small in scale, such as bed-and-breakfasts, and many are geared toward tourism associated with hunting and fishing (e.g., fly-in outfitters).

Police service in the Municipality of Greenstone is provided by the Ontario Provincial Police Greenstone Detachment out of Geraldton. In addition to servicing the surrounding communities, the Greenstone Detachment provides support to the Aboriginal Policing Services in Greenstone as requested. The Anishinaabek Police Service provides policing services to 16 First Nations communities across Ontario which includes detachments in Aroland First Nation and Ginoogaming First Nation.

The Greenstone Fire Department, with fire stations are located in Beardmore, Geraldton, Longlac, Nakina, Caramat and Jellicoe, are staffed by volunteer firefighters.

The Geraldton District Hospital provides health services to the residents of Greenstone and the surrounding Aboriginal communities. The NorWest Community Health Centres in Longlac provides primary care services and health promotion programs to that community, Caramat, the Long Lake #58 First Nation and Ginoogaming First Nation. Physicians from the Geraldton Medical Group provide scheduled services for the Nakina Clinic which services the far north and surrounding Aboriginal communities.

The Municipality of Greenstone has four public elementary schools (all English), four private elementary schools (including two English/French and one French), and two public high schools (one French), as well as First Nations schools in nearby communities.
Main roads near the Project site include Highway 11, Michael Power Boulevard, Goldfield Road, Lahtis Road, Hardrock Road and Old Arena Road. The closest airport to the Project site is the Greenstone Regional Airport in Geraldton, which is owned and operated by the Municipality of Greenstone.

Geraldton obtains its drinking water from Cecile Lake which is located about 2 km north of the town. The potable water supply for MacLeod Provincial Park is sourced from a well classified as groundwater under the direct influence of surface water. There is a wastewater treatment facility in Geraldton that has been identified as experiencing maximum flows exceeding design capacity, with raw sewage bypassing events into Kenogamisis Lake and Hardrock Creek. The Geraldton landfill site is located along the north about 3 km southeast of Geraldton, and has recently undergone expansion while the Municipality of Greenstone is in the process of obtaining approval for a new landfill site.

As previously mentioned in Section 2.3, other key infrastructure in the PDA includes:

- Geraldton Detachment Office for the OPP - located on Highway 11 just to the west of its intersection with Michael Power Boulevard;
- A substation owned by Hydro One is located in the northwest quadrant of the intersection between Michael Power Boulevard and Sunset Drive. The site has recently been expanded to the north, with the new area serving as a storage area for materials;
- A 115 kV hydro transmission corridor is located west of the substation, with 44 kV distribution lines leaving the substation and servicing the communities of Geraldton to the north and Longlac to the east;
- A Ministry of Transportation patrol yard is located at the eastern edge of the PDA. The patrol yard is a facility for the storage of equipment and materials that are used for highway maintenance.

Overall, the Project is located relatively close to existing municipal and provincial services, including water and wastewater, waste, transportation, power, and emergency services.

2.8.3 Land and Resource Use

The most extensive local land and resource uses are forestry, tourism and consumptive recreation such as hunting, trapping and fishing.

The main large game species hunted are moose and black bear, but game birds, waterfowl and hare are also hunted. The region plays host to numerous lakes supporting species popular with anglers, including Walleye and Northern Pike. Kenogamisis Lake itself is a popular destination for sport fishing and is the location for the annual Geraldton Walleye Classic.
HARDROCK PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT / ENVIRONMENTAL ASSESSMENT

Environmental Setting
January 2016

Key public recreational areas include MacLeod Provincial Park and the Kenogamisis Golf Club, and informal recreation areas including Crown land access points to Kenogamisis Lake, canoe routes and boat launches, hiking trails, cross-country skiing trails and a network of snowmobiling trails.

Commercially-based land and resource activities include trapping, baitfish harvesting, guide outfitting, forestry and mine exploration. The Kenogamisis Lake Resort, located approximately 4 km east of the PDA, is a guide outfitter offering hunting, fishing, and swimming opportunities and private cabin accommodations. There are also a number of active and inactive aggregate mining areas in the region.

2.8.4 Regional Economic Sector Overview

The Greenstone Economic Development Corporation (GEDC) has identified mineral exploration and mining as a key component of anticipated economic growth in the Greenstone region. There are currently no mines operating within Greenstone (MNDM 2014). However, the GEDC expected increased economic growth and employment as a result of mining activity in the region. At the present time, mineral exploration activities are currently ongoing in the Municipality of Greenstone, including the Bankfield West area and the Ishkoday property.

More than 80 exploration projects were being conducted in northwest Ontario during 2012 (Bahram et al. 2012). As of 2014, there were five active mines and a quarry operation in northwest Ontario (MDNM 2014), all of which were located outside of Greenstone. Proposed mining and mineral exploration projects in the District of Thunder Bay is limited to exploration at Junior Lake, 104 km northeast of the proposed Project (Landore Resources Limited). The development of a copper mine at Marathon by Stillwater Canada Ltd., located 108 km south of the Project, was put on hold in 2014. The closest active mine to the Project is the Hemlo Gold Mine, located 132 km from the Project.

Forestry has traditionally been an important component of the Greenstone economy. However, the industry has recently experienced a major downturn, with all four mills in the Municipality closing, beginning in 2007 (GEDC 2010). The decline of the forestry industry resulted in job losses for more than 700 residents of Greenstone in 2010. The local and regional forestry industry has been seeking government and private investment in the sector. In Greenstone, Buchanan Forest Products now operates the Longlac Lumber mill.

Construction was a major industry for Greenstone in 2010 (GEDC 2010). Construction employment has increased as a result of infrastructure projects and mineral exploration. The GEDC expects that increased mineral exploration will lead to increased demand for construction workers as mining projects become operational. In addition to Project-related construction demand, the GEDC anticipates that construction employment will increase as a result of associated infrastructure development (GEDC 2010).
The GEDC lists tourism as one of five key growth sectors in the Greenstone region (GEDC 2014). Outdoor recreation activities, including fishing, hunting and camping, are the main tourism products promoted for Greenstone and the surrounding area. In 2015, the Greenstone Business Directory listed 28 tourism operators, most of which were based on outdoor activities such as fishing, hunting and camping (GEDC 2015).

Tourism planning for the Municipality of Greenstone incorporates resource development in the area, particularly mining development, as potential revenue generators. For example, plans to expand Greenstone’s range and quality of tourism products have included continuing to position the area as a hospitality provider in support of the mining exploration sector (City of Thunder Bay and NOSTA 2008). The history of the area, including the historical importance of the mining industry, is another component of the local tourism sector as evidenced by the Discover Geraldton Interpretive Centre and the historical MacLeod-Cockshutt Mining Headframe that has been restored as a landmark representing the mining history of the area.

2.9 REFERENCES


Environmental Setting
January 2016

