



**MUNICIPAL
ENTERPRISES LTD**

**MUNICIPAL ENTERPRISES LIMITED
IRISH COVE QUARRY EXPANSION,
IRISH COVE, RICHMOND COUNTY, NS**

**Registration Document for a Class 1 Undertaking Under Section 9 (1)
of the NS Environment Assessment Regulations**

January 2015

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- Existing Industrial Waste Permit Approval
- Watercourse Alteration Reports
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Appendix E Cultural Resource Management Report (CRM, 2013)

Appendix F Public Consultation Documentation

1.0 INTRODUCTION

Municipal Enterprises Limited (herein after referred to as “Municipal”) of Bedford, Nova Scotia is proposing to expand an existing quarry located at 195 Irish Cove Road, Irish Cove, Richmond County, Nova Scotia. An approval to expand the quarry is required under the Nova Scotia Environmental Assessment Regulations. The registration of this Environmental Assessment is in response to Schedule A of the Environmental Assessment Regulations, Undertaking B.2., “*A pit or quarry that is larger than 4 ha. in area for extracting building or construction stone.*”

Municipal is a private Canadian company. It is incorporated under the laws of Nova Scotia and registered to do business in Nova Scotia under the Nova Scotia Corporations Registration Act. Municipal’s Registry of Joint Stock Certificate is attached in **Appendix A** “Property Information.” It is important to note that Municipal Enterprises Limited is the parent company of Dexter Construction Company Limited, which is referred to within the appendices.

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Proponent Contact:

Gary Rudolph, P. Eng.
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Consultant Contact:

Mr. J. H. Fraser, M. A. Sc., P. Geo.
H2O GEO Environmental Services Inc.
Phone: 902-443-4227 (Office); 902-497-5597 (Cell)

It is noted that the existing quarry operates under an existing “Industrial Waste Permit Approval # 2012-082777, as attached to a letter dated August 16, 2013, received by Mr. Gary Rudolph (Municipal Enterprises Limited) from Mr. Terry MacPherson; District Manager, Nova Scotia Environment. This letter and Approval (NSE File # 92100-30-SYD-2012-082777) is also attached in **Appendix A** “Property Information”.

2.0 THE UNDERTAKING

2.1 NAME

Municipal proposes to expand the existing Irish Cove quarry for the production of aggregate, primarily used in the road and local construction industry. The proposed undertaking will be referred to in this document as the quarry and encompasses an area of 16.3 hectares. A survey plan showing the dimensions of the existing and proposed quarry is included in Appendix A.

2.2 Location

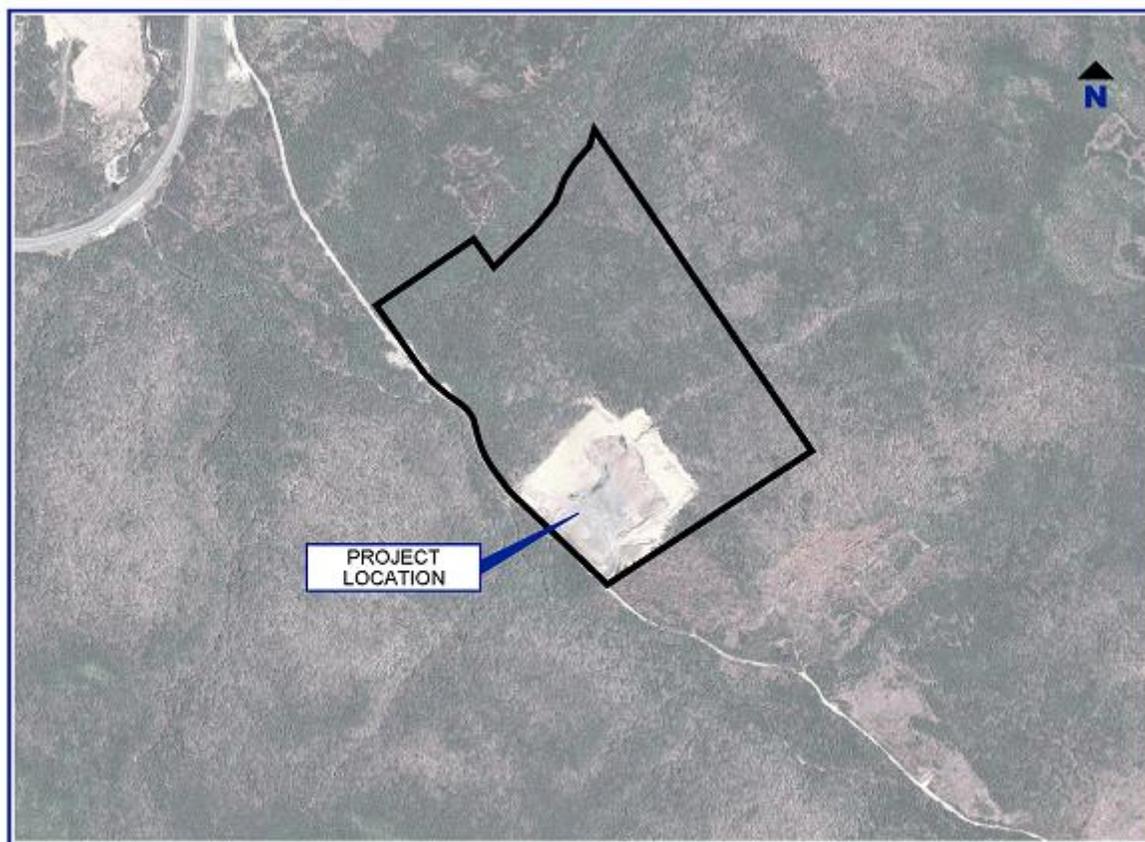
The site is located at 195 Irish Cove Road, in Irish Cove, Nova Scotia (PID #'s 75075309 & 75204032) in Richmond County, Nova Scotia, 1:50000 NTS 11F/15, 5075672 Northing, 681557 Easting, UTM Zone 20, Air Photo 306_207, 06 July 2008 (**Figures 1 & 2 (below) and Drawing 1, Appendix B**). The site is positioned within an un-zoned area along the north-east side of Irish Cove Road. The property that is being expanded has previously been developed as a result of quarrying and construction material processing activities.

The property is wholly owned by Municipal Enterprises Limited, and is presently un-zoned. The quarry property encompasses a total of approximately 29.5 hectares; however it is important to note that this EA document encompasses an area of 16.3 hectares.

Figure 1 - Project Location



Figure 2 – Site Location and Adjacent Land Uses



3.0 SCOPE OF THE UNDERTAKING

As noted previously, Municipal intends to expand the existing Irish Cove quarry for the continuing purpose of extracting and supplying aggregate for the road and local construction industry. The existing quarry has been in operation for many years and encompasses an area of approximately 3.98 ha., of which 3.7 ha has been actively developed. This EA covers an area of 16.3 hectares and includes this existing operational area. The existing quarry face is between approximately 18 and 27 meters (m) in height and the disturbed area includes on-site related facilities including a scale house, sedimentation infrastructure, as well as a portable asphalt plant, crushing, washing and stockpiling areas. During past operations, Municipal has extracted an average of approximately 100,000 to 200,000 tonnes of aggregate per year from the quarry, however this quantity was related to significant contracts in the local geographic area and is unlikely to be repeated in future years. There are no off-site projects related support facilities, other than Irish Cove Road, Highway 4 as well as other related transportation corridors used to transport the product to local destinations.

It is Municipal's intent to continue quarry operations on the property, using existing infrastructure. It is anticipated that future operations will involve the extraction of approximately 50,000 tonnes/year for the foreseeable future. However, the annual quantity will vary depending on local demand and associated project requirements.

3.1 PURPOSE/NEED FOR THE UNDERTAKING

Municipal proposes to expand the existing Irish Cove quarry for the production of aggregate, primarily used in the road and local construction industry. The primary benefit will be to the people of Nova Scotia via the continued construction and maintenance of the Provincial highway system.

3.2 CONSIDERATION OF ALTERNATIVES

Municipal operates rock quarries throughout Nova Scotia and Atlantic Canada and uses modern industry standard methodologies in all phases of the extraction, processing and delivery processes. Alternative processes are always being considered in terms of their efficiency, cost effectiveness and environmental mitigation advantages. Continuing operations of the Irish Cove quarry expansion will be assessed on an ongoing basis to ensure that the best available techniques are being utilized in all phases of day to day operations.

3.3 Scope of the Environmental Assessment

The scope of the environmental assessment is in keeping with the Nova Scotia Environment document entitled "Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia" as well as Municipal's experience with respect to similar projects over the past several decades. The scope also takes into consideration that the quarry is, at present, operational, and subject to an existing Industrial Waste Permit Approval. The following sections of this document outline the key "Valued Environmental Components" addressed by the EA document, and presents an evaluation and summary of the benefits and potential drawbacks to the environment during all phases of the proposed undertaking.

4.0 PUBLIC INVOLVEMENT

4.1 Methods of Involvement

Municipal has engaged various public entities, as outlined below, and as the EA requirements do not include a direct public involvement program, public notification to date has focussed on notifying local officials of Municipal's intent to file an EA application to expand the existing Irish Cove quarry. In this regard, the following persons have been briefed regarding the intent of this EA document:

Mr. Michel P. Samson; MLA Richmond

Ms. Gail Johnson, Councillor, District # 10

Chief Wilbert Marshall, Potlotek First Nation (Chapel Island)

Band Manager, Mr. Lindsay Marshall, Potlotek First Nation (Chapel Island)

Mr. Roger Hunka, Native Council of Nova Scotia

Twila Gaudet, KMKNO

Heather MacLeod-Leslie, KMKNO

Beata Dera, Office of Aboriginal Affairs

With respect to the First Nations Community, Municipal has followed the Proponent's Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia. In this regard Municipal has advised Chief Wilbert Marshall of the Potlotek First Nation of Municipal's intent to file the Registration Document for a Class 1 Undertaking Under Section 9 (1) of the NS Environmental Assessment Regulations in a letter dated September 8, 2014. This letter includes all relevant information including:

- the proponents' name and representatives,
- the project location,
- the type of work to be carried out,
- any potential short and long term impacts,
- project and regulatory timelines,
- an offer to provide all relevant reports, studies and reviews, and
- an offer to meet and discuss the project, with possible meeting dates.

Municipal also copied this letter to Twila Gaudet and Heather MacLeod-Leslie of the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), Mr. Roger Hunka of the Native Council of Nova Scotia and Beata Dera of the Office of Aboriginal Affairs. This letter is included in **Appendix F**. Municipal has continued the liaison process with the First Nations representatives, including the provision (via email on October 17th, 2014) of the draft EA document as well as follow up meetings (specifically the Office of Aboriginal Affairs, Nov. 17th, 2014; and the Native Council of Nova Scotia, Nov. 20th, 2014), and will provide any responses received to NSE. No response was forthcoming from either the Potlotek First Nation or the KMKNO, regarding our invitation to meet and discuss the contents of the draft EA document.

4.2 Public Concerns

No public concerns regarding the project have been received to date. Municipal will document any concerns and provide these to NSE.

4.3 Future Steps

The public will be notified of the EA Registration via an advertisement in the Chronicle Herald and the Cape Breton Post in January, 2015. A copy of the newspaper advertisement is included in **Appendix F**. During the development of the draft, Municipal has been in contact with the Potlotek First Nations, KMKNO, Office of Aboriginal Affairs and the Native Council of Nova Scotia. Follow up telephone discussions and meetings were undertaken, as requested, during the draft review phase and any comments or concerns noted and addressed in this final EA document. Nova Scotia MLA, Mr. Michel Samson; and Councillor Gail Johnson have also been contacted, advising of the upcoming newspaper advertisements and indicating that the EA document is available for review and the associated viewing locations.

5.0 DESCRIPTION OF THE UNDERTAKING

5.1 Human Uses of the Environment

5.1.1 Mi'Kmaq

The Bras d'Or Lake, its channels and surrounding land areas are included in territory traditionally occupied by the Mi'kmaq. Presently many of the Mi'kmaq communities are established around the Lake, including Chapel Island, Wagmatcook, Whycogamah, Eskasoni

and Potlotek, reflecting the many factors, but including long-standing use by the Mi'kmaq of the area. Mi'kmaq would have used all areas around the inland sea to some degree, including the upland area such as the East Bay Hills. Many of the traditional place names in Richmond County and CBRM are derived from Mi'kmaq names. The land within the study area was once part of the greater Mi'kmaq territory Unama'kik (Land of Fog) and Irish Cove is known as Kulpa'mkitk (flowing around) (Pacifique from CRM 2013). The shores of the Bras d'Or Lakes would have been highly suitable areas for habitation, and many of the present-day Mi'kmaq communities are located there.

Mi'kmaq living within and outside communities in eastern Cape Breton, are likely to share some of the same activities in relation to natural resources in the study as the general non-Mi'kmaq population, such as hunting and fishing and outdoor recreation, but as well will have culturally significant activities including ceremonial recreational use, hunting and fishing, gathering of ceremonial foods, etc. The project site is relatively close to several Mi'kmaq communities on Cape Breton Island. Chapel Island is the closest Mi'kmaq community, located about 15 km southwest, and is part of the Chapel Island First Nation (also known as Potlotek First Nation). Other Mi'kmaq communities which are relatively close (within about 65 km) include: Eskasoni (across Bras d'Or Lake in Eskasoni), part of the Eskasoni First Nation; Margaree and Wagmatcook communities in the Wagmatcook First Nation; Whycocomagh of the Waycobah First Nation; Caribou Marsh, and two Membertou communities of the Membertou First Nation (near and around Sydney); and Malagawatch (near Marble Mountain and West Alba), which is administered by the five First Nations in the area (Chapel Island, Eskasoni, Wagmatcook, Waycobah and Membertou).

Two tribal councils exist in Nova Scotia: the Confederacy of Mainland Mi'kmaq (CMM) and Union of Nova Scotia Indians (UNSI). CMM is a not-for-profit organization incorporated in 1986, whose mission is to promote and assist Mi'kmaq communities. The UNSI, created in 1969, was formed to provide a cohesive political voice for Mi'kmaq people. Chapel Island (Potlotek), Eskasoni, Membertou, Wagmatcook and Waycobah First Nations are all members of the UNSI. The Native Council of Nova Scotia (NCNS)—a self-governing agency located in Truro—represents the approximately 35% of Mi'kmaq living outside of reserve land. The goal of NCNS is to operate and administer a strong and effective Aboriginal Peoples representative organization that serves advocates and represents their community.

The Mi'kmaq Rights Initiative (Kwilmu'kw Maw-klusuaqn Negotiation Office; KMKNO) based in Millbrook, is the only mandated organization to coordinate Crown to Mi'kmaq Consultation on behalf of the Mi'kmaq of Nova Scotia. The mission of KMK—which means “we are seeking consensus”—is “to address the historic and current imbalances in the relationship between Mi'kmaq and non-Mi'kmaq people in Nova Scotia and secure the basis for an improved quality of Mi'kmaq life.” KMKNO forms a point of contact and liaison between the Mi'kmaq of Nova Scotia, the province and the Government of Canada. The Atlantic First Nations Environmental Network (AFNEN) is an environmental organization of Mi'kmaq communities and organizations. Both CMM and UNSI are members, and the Mi'kmaq Confederacy of PEI in Charlottetown is currently the acting coordinator. The AFNEN includes a representative from each Mi'kmaq organization and community interested in environmental issues. The Network meets regularly during the year through meetings, conferences, and the Internet to discuss environmental matters or concerns.

Several Mi'kmaq ceremonial or cultural uses have been identified for the area including deer hunting, rabbit hunting, fishing (trout, eel, cod and smelt) along the Bras d'Or Lake coast, smelt

fishing in the Irish Cove Brook, and sweet grass gathering (Membertou Geomatics Solutions, 2012)¹. The proximity of the study area to the Potlotek First Nation and the long tradition of snowshoeing along intermittent stream beds and into uplands for winter hunting, and to lakes and ponds for winter fishing, suggests that the vicinity of the quarry was used for these purposes (T. Gaudet, KMKNO personal communication, 2014).

5.1.2 Population and Economy

The Irish Cove quarry is located in Richmond County, near the municipal boundary with Cape Breton Regional Municipality on the north, and land in the area as well as economic effects of the quarry would include both areas. The population density around the project site is likely similar to the averages for Richmond County, which is lower than average for Nova Scotia (7.5 and 17.4 per km², respectively); however, Cape Breton Regional Municipality (CBRM) has a higher than average density (41.1 per km²; Statistics Canada 2011a), though this is mainly concentrated in Sydney and adjacent urban areas located to the northeast. In Richmond County, the percentage of people employed² (46%) and average salaries (\$31,233) are a bit lower than the averages for Nova Scotia (57% and \$35,478, respectively; Statistics Canada, 2011a). The top three industries for employment (in terms of number of people in that industry) for Richmond County are health/social care, manufacturing, and the retail trade, while the top three for CBRM are the social/health care, retail trade and educational services. For comparison, the top three industries in Nova Scotia are retail trade, health/social care and public administration (Statistics Canada, 2011a).

5.1.3 Water Supply and Residential Wells

The site is not located in or near any water supply areas for Richmond County or Cape Breton Regional Municipality. Residences and businesses in the area rely on groundwater wells, both drilled and dug. The small area occupied by the quarry, as well as the distance from the nearest residences (~1 km), suggest that the quarry will not influence residential wells.

5.1.4 Land Use

Land in the vicinity of the quarry is a mix of rural residential/commercial use, and lands set aside for conservation purposes. Highway 4 in the area forms a corridor for rural residential and commercial development zoned for R2 and RC-1 (low and medium density), with buildings/residences concentrated toward the lakefront. A small number of the homes are used as vacation homes or rentals (K. Cullen and M. MacNeil, personal communications, 2014) and a few properties are used as private woodlots (C. MacIntyre, personal communication, 2014).

Richmond County has 18 farms with most (six) growing various crops, some (four) raising cattle, and a few (two each) raising sheep/goats, raising other animals or operating as a greenhouse/nursery. There are no farms in the general vicinity of the quarry (Statistics Canada, 2011b).

¹ A Mi'kmaq Ecological Knowledge Study (MEKS) was conducted by Membertou Geomatics Solutions in 2012 for the East Bay Hills Wind Project (CBCL 2007).

² The percentages of people employed include those people who on the census reported being aged 15 years or older, identified as being part of the labour force and also reported being employed. This is a proportion of the total population aged 15 years and older, which include the employed, the unemployed and those not in the labour force.

About half the land in the area is privately owned and there is a significant concentration of Crown ownership. Land in the area has also been set aside for conservation purposes, in particular on undisturbed tracts of Crown Land, and in coastal areas.

5.1.5 Hunting and Trapping

The quarry site is expected to support wildlife species characteristic of Richmond County and Cape Breton Regional Municipality (CBRM), with a possibility of occurrence of some of the more uncommon species due to the proximity to the protected wilderness areas to the east and north. No trappers or trap lines were identified for the site; however species occurring at the site are among those generally occurring in the area, which have large ranges and could be trapped and hunted elsewhere. Predominant fur-bearing species reported in trapping catches for Richmond County and CBRM include muskrat, coyote, beaver, weasel, squirrel, fox, mink, otter, raccoon, and lynx. Richmond County reported the second highest catch provincially for lynx and the fourth highest catch for otter for the period between 2007-2012. CBRM reported the third highest catch provincially for lynx and fox between 2007-2012. Upland game species (e.g. Snowshoe Hare, Ruffed Grouse and Ring-necked Pheasant) are harvested in Richmond County and CBRM, but do not constitute a significant proportion of the total numbers harvested in Nova Scotia. Between 2007-2012, CBRM ranked ninth provincially for the harvest of Snowshoe Hare and Ruffed Grouse, and ranked thirteenth for the harvest of Ring-necked Pheasant. Richmond County ranked eleventh provincially for the harvest of Snowshoe Hare and Ring-necked Pheasant, and thirteenth for the harvest of Ruffed Grouse. White-tailed Deer occur in the area—however the harvest in Richmond County and CBRM is relatively low, each representing only 1.2% of the provincial harvest between 2007-2012. Black Bear harvest values are not available for each county/municipality, hence there are no numbers available for either Richmond County or CBRM. However, Richmond County and CBRM are expected to follow the increasing trend for the species in the Province.

5.1.6 Recreational, Commercial and Mi'kmaq Fishing

Fishing provides an important resource and pastime for residents of Richmond County and CBRM. The quarry is in Provincial Recreational Fishing Area 1, and supports recreational fishing (Brook, Brown & Rainbow Trout) in inland surface waters and the Bras d'Or Lakes, from April 1 to September 30 and in tidal waters from April 15 to September 30 (Nova Scotia Anglers' Handbook and 2014 Summary of Regulations). Irish Cove Brook in the vicinity of the former limestone quarry (west of Highway 4) is considered to have recreational fishing potential and was the subject of restoration activities in 2010-2012 (Nova Scotia Salmon Association-NSLC Adopt A Stream Program, 2012). Speckled (Brook) Trout and Rainbow Smelt are commonly fished in local tributaries (E. MacIntyre, NSDNR, personal communication, 2014) and cod (Atlantic and Greenland Cod), Atlantic Mackerel, trout (brook, brown & rainbow) as well as shellfish (mussels, quahogs, & clams) are fished in Bras d'Or Lake (G. Timmons, Conservation and Protection DFO, personal communication 2014). Commercial licenses are issued for Oyster and Lobster in Bras d'Or Lake and there may be an elver fishery in tributaries that drain into the lake, particularly Hay Cove tributaries, which are north of Irish Cove (G. Timmons, Conservation and Protection DFO, personal communication 2014). There are no aquaculture sites around Irish Cove; however, American Oyster aquaculture operations are cultivated in the Bras d'Or Lakes both in St. Peters Inlet and to the northeast in East Bay.

Mi'Kmaq communal fishing licenses are used by the Chapel Island Band for food, social and ceremonial uses. In the vicinity of Irish Cove, Mi'Kmaq fish for trout, eel, cod and smelt along

the Bras d'Or Lake coast, and for smelt in Irish Cove Brook (Membertou Geomatics Solutions, 2012). Mi'Kmaq communities in the area (e.g. Eskasoni) also operate shellfish aquaculture leases.

5.1.7 Archaeological and Paleontological Resources

The area occupied by the quarry is not suitable for agriculture and was not settled by Europeans, although the site was logged, and the valley of Irish Cove Brook was used as a travel route along Irish Cove Road. The early road detoured to run parallel to the unnamed stream along the northwest side of the proposed quarry expansion, running (and still visible) along the ridge above the gorge to the northeast to a suitable ford of the stream (CRM 2013). Use by Mi'Kmaq is probable but, with the exception of a screening of the site done for the quarry (CRM 2013 – **Appendix E**), no studies have been done in the area. The nearest pre-contact artifact which has been found in the general area was on the shore of Loch Lomond, 8.6 km east (S. Weseloh-Mckeane, Coordinator, Special Places, personnel communication, 2013; CRM 2013). CRM (2013) determined, based on topography and other features of the Irish Cove Quarry site, that the expansion area would have low potential for either Native (both pre-Contact and historic) or Euro-Canadian archaeological resources.

5.1.8 Parks and Protected Areas

Several conservation and recreational areas have been designated in the vicinity of Irish Cove, and are important for public use, recreation and nature appreciation, and conservation.

Irish Cove Nature Reserve— The Provincially managed Irish Cove Nature Reserve, which occupies about 162 hectares immediately west of and across Irish Cove Brook from the quarry, protects a mature old hardwood forest (Red Spruce, Eastern Hemlock & White Pine). The Reserve presently does not have legal status, but is expected to be formally designated under the Nova Scotia Special Places Protection Act. The Reserve originated as a significant old forest area designated under early Nova Scotia Forest Policy, and contains a Biodiversity Monitoring Plot, established in the 1990's under the United Nations Man and the Biosphere Reserve Program (CBCL 2007). The site contains a biodiversity monitoring site for long-term ecological monitoring and research; is used as a long-term ecological research area for Cape Breton University; and contains an International Biological Program (IBP) site. In addition to its significance for mature old hardwood forest, the reserve contains an eagle nesting area and several rare plants, including Dwarf Rattlesnake Plantain (*Goodyera repens*), lesser wintergreen (*Pyrola minor*) and several uncommon lichens (CBCL 2007). Reports have been produced over the years concerning biodiversity plots for birds, plants, invertebrates, lichens, etc. serving as benchmark ecosystem monitoring studies for the area (T. Power, NSDNR, personal communication, 2014). A buffer area encompassing the site was set up as a Significant Ecological Site (SES) under the federal Ecological Monitoring and Assessment Network (EMAN) initiative. However, it had no formal legal status and the EMAN program has been discontinued, although the site is still listed as a significant feature in the Nova Scotia Significant Habitats Database. See **Appendix D** for additional details as contained in Biophysical Assessment Report; *Envirosphere*, 2014.

Irish Cove Provincial Park—Located ~ 3km northwest of the quarry along Highway 4 is a small picnic park overlooking Bras d'Or Lake. The park is well used by locals and tourists for scenic/wildlife viewing, picnicking or to walk along a short trail (D. Cash, K. Cullen, C. MacIntyre, and M. MacNeil, personal communications, 2014).

Irish Vale Significant Ecological Site (SES)—Located 4 km north of the quarry site along the Bras d’Or Lake coastline, this site encompasses a sandbar off the shoreline occupied by Common and Arctic Terns, the latter which are relatively uncommon in Nova Scotia (T. Power, NS DNR, pers. comm. 2014; ACCDC, 2013).

The Bras d’Or Lakes Biosphere Reserve (BLBR)— The quarry site is also in the buffer zone³ for the Bras d’Or Lakes Biosphere Reserve⁴. The UNESCO designated Reserve encompasses 3,566 km square kilometres and is a means of recognizing and protecting the Bras d’Or Lakes, which is significant both ecologically and to use by the Mi’Kmaq, and its cultural, commercial and historical importance to the non-native population.

Other Parks and Protected Areas—Highway 4 is an important tourist and commercial route and supports various tourist and recreational destinations. Parks and recreational areas relatively close to the site include: Battery Provincial Park (~25 km southwest near St Peter’s); Point Michaud Beach (~26 km south); Ben Eoin (~25 km northeast); and Louisburg National Park Game Sanctuary (~40 km east).

5.1.9 Recreational/Cultural Activities

Residents in the vicinity of the quarry use Highway 4 and some of the small side roads, and in particular the former limestone quarry grounds, for walking, jogging, and bicycling (D. Cash, K. Cullen, E. Kublek, C. MacIntyre and M. MacNeil, Irish Cove, personal communications, 2014). The old coastal road is not presently used for through vehicle traffic as the bridge on Irish Cove Road is out of service. Side roads have no through traffic although they are serviceable, and can be used for walking, biking and RV traffic. Locals also use the Bras d’Or Lakes for boating, swimming and shoreline recreation, although access to the shore is limited in some cases. Irish Cove Provincial Park, a small roadside picnic park located along Highway 4 not far from the quarry, is used by visitors and residents because of its scenic view of Bras d’Or Lake, walking trail, and picnic area.

Lakes both to the east (e.g. Loch Lomond or Lake Uist) or coastal waters of Bras d’Or Lake are used for recreation by visitors and residents. In the Loch Lomond area, east of the quarry site, a canoe route has been established that runs down Grand River. Nova Scotia Coastal Water Trails has a route running along the East Bras d’Or Lake, with access points at Chapel Island, Irish Cove, Big Pond, Ben Eoin, East Bay Causeway and Castle Bay. Sea kayakers can also use coastal areas to access the lake and subsequently the Atlantic coast. An annual international sailing race (*Race the Cape*), which passes through coastal Cape Breton and the Bras d’Or Lakes, includes the Red Islands Cup Yacht Race from Ben Eoin to St. Peter’s, passing near Red Islands located southeast of the study site.

³ Lands in watersheds draining into the Bras d’Or Lakes are considered to be buffer areas, and deserve special consideration and protection.

⁴ A “Biosphere Reserve” is an international designation of recognition from UNESCO (the United Nations Educational, Scientific, and Cultural Organization) under the Man and the Biosphere (MAB) Program, for an area in the world which is deemed to demonstrate a “balanced relationship between humans and the biosphere.” <http://blbra.ca> Biosphere reserves typically consist of three main components: a core zone (protected area for conservation of biological diversity); a buffer zone (area surrounding the core zone where environmental research, recreation and tourism can occur); and a transition zone (an area where local communities manage resources such as farming, fishing, etc.).

5.1.10 Residential Use

Irish Cove is a former farming, fishing and logging community, which is presently largely residential. There are no services in the community, many of the homes are for sale and a few of the residents rent out homes for summer cottages (K. Cullen and M. MacNeil, personal communications, 2014). Former hay fields are marginally and periodically maintained. Some landowners derive some income from logging on the slopes and uplands near the site (C. MacIntyre, personal communication, 2014). The closest main service centre is St. Peter's to the southwest. Approximately 20 single-family residences occur in Irish Cove (none within an 800 m radius of the Quarry). The majority of residents have noticed no impact from the existing quarry activities, though one mentioned that ground tremors could be felt during blasting operations at the quarry; and another resident noted that truck traffic on Irish Cove Road has impeded local access to lands, including a woodlot on the road (E. Kublek and C. MacIntyre, personal communications, 2014).

5.1.11 Commercial/Industrial Development

There are no commercial operations or activities in Irish Cove, within a few kilometres of the quarry. Residents in Irish Cove are generally employed elsewhere, and local revenues come from rental of coastal cottages and mobile homes to tourists. Although there are no other quarries in the vicinity, six properties within 5 km of the quarry are owned by four construction/aggregate companies, which could potentially develop them in future. A limestone quarry formerly operated at the mouth of Irish Cove Brook but was decommissioned in the early 1990s, and restoration work was done in the early 2000s, including stream restoration work on Irish Cove Brook (Hopper and Bonner 2004).

5.1.12 Tourism and Viewscape

The Irish Cove area of the Cape Breton Island is an important one for visitors, in particular as a travel route to access eastern parts of the Island and the Sydney area from the south. Highway 4 (Shore Drive) is one of the trunk highways in the Irish Cove area providing scenic views of the Bras d'Or Lake. Tourist attractions along Highway 4 include the Battery Provincial Park, St. Peter's Canal, Nicolas Denys Museum and the Wallace MacAskill Museum. Big Pond and the Rita MacNeil Tea House are located enroute to Sydney to the north. Irish Cove Provincial Park with its scenic view and picnic areas is an important feature servicing the tourist industry. Travellers are likely to pass through Irish Cove on their way to and from other Cape Breton destinations such as Sydney and Louisbourg.

The quarry will probably not be noticed by visitors to the area, either on foot or in vehicles. Although the quarry can be seen from one location on Highway 4 at MacLeod's Hill, it is unlikely to be noticed by road travellers as it is at the point where the Highway drops and turns sharply and there are scenic views. The quarry is about 1 km from the road at this point. For hikers (if any) using Irish Cove Road, the active quarry is not visible from the road, and a berm has been installed on the border of the working quarry along Irish Cove Road which blocks sightlines of the quarry, as well as noise transmission, from the road and extending into the floor of the valley.

5.1.13 Transportation

Highway 4 is a major travel route across the province including tourist and regional commercial traffic, and is the main travel route along the eastern side of Bras d'Or Lake, connecting all the major urban centres on the eastern half of Cape Breton Island, including Port Hawkesbury, St. Peters, Sydney and Glace Bay. Traffic levels are likely to be moderate, and seasonal, reflecting the higher traffic volumes associated with tourists in summer, but there is a low level of traffic contributed by locals. There is no traffic on Irish Cove Road, other than associated with the quarry. The existing quarry traffic was noted as an impediment to accessing one resident's private woodlot on Irish Cove Road in the past (C. MacIntyre, personal communication, 2014). When in operation, the quarry will contribute truck traffic in the vicinity of the site, typically in the summer and fall, extending from the quarry as far south as the St. Peter's area and Sydney area in the north. The configuration of the Irish Cove Bypass includes a sharp curve and a hill at the intersection of Irish Cove Road. Highway 4 bends sharply at MacLeod's Hill, a bedrock promontory south of Irish Cove and descends steeply to the valley floor of Irish Cove Brook⁵ near the Irish Cove Road access to the quarry. Safety concerns arise when quarry traffic is entering and exiting Irish Cove Road onto Highway 4, as there are no turn lanes and the highway is a single lane each direction. Accelerating or decelerating trucks interfere with traffic flow and force traffic to slow down or to pass, possibly inappropriately.

5.2 Existing Quarry Operations

The existing quarry operations involve blasting, crushing, washing, stockpiling of aggregate and associated trucking on an as required basis. In addition, a portable asphalt plant is occasionally situated on the property. The quarry has operated in accordance with an existing "Industrial Waste Permit Approval #2012-082777, as attached to a letter dated August 16, 2013, received by Mr. Gary Rudolph (Municipal Enterprises Limited) from Mr. Terry MacPherson; District Manager, Nova Scotia Environment. This letter and Approval (NSE File # 92100-30-SYD-2012-082777) is also attached in **Appendix A**. The quarry also operates in accordance with the Nova Scotia Pit and Quarry Guidelines. These Guidelines apply to all pit and quarry operations in the Province and provide separation distances for operations, including blasting, liquid effluent discharge limits, suspended particulate matter limits, sound level limits and requirements for a reclamation plan and security bond. Municipal is committed to the utilization of Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust and water quality and will operate in accordance with applicable Federal and Provincial legislation and standards.

It is noted that the quarry was the site of a Watercourse Alteration Permit as part of the initial approval process. The details of this approval, including Water Approval No. 2012-084182; the Work Completion Form; and the associated Diversion Study, are included in **Appendix A**, "Property Information".

Blasting, crushing, washing and trucking have occurred on an as required basis, however it is noted that blasting has occurred on an average of 2-3 times per year. Surface water management at the site involves the following: "Site runoff resulting from precipitation events and spring runoff that does not permeate through the gravelled quarry floor is directed towards a

⁵ The section of Highway 4 from MacLeods Hill to Irish Cove is known as the Irish Cove Bypass, constructed in the 1970s (Hopper and Bonner 2004).

constructed drainage trench established in the NE corner of the site. The drainage trench is rock lined and temporarily retains surface water prior to controlled release to a rock spillway, at which point any surface water is directed under Irish Cove Road via culverts and offsite. Effort is made to direct offsite surface water around the quarry through the use of strategically placed berms and drainage ditches. Current and expected future monitoring requirements include sampling the site discharge at the request of NSE (IA Permit) for TSS and pH. The results of the surface water monitoring, and regular inspection of the drainage controls will be used to verify if/when site drainage controls need to be upgraded.

Municipal has also initiated surface water sample collection in May 2014, (which is on-going) involving grab sampling for hydrogen ion concentration (pH) and, Total Suspended Solids (TSS) at both an Upstream and Downstream location, the results of which are outlined in **Table 1**.

TABLE 1 – IRISH COVE SURFACE WATER SAMPLING RESULTS (2014)				
Sampling Date	UPSTREAM		DOWNSTREAM	
	pH (units)	TSS (mg/L)	pH (units)	TSS (mg/L)
22-May-14	6.52	ND	6.57	ND
19-June-14	6.38	ND	6.43	2.0
18-July-14	7.34	ND	7.38	ND
26-Aug.-14	7.57	ND	7.38	ND
30-Sept.-14	7.15	ND	7.27	ND

Site Discharge Limits – Irish Cove Ind. Waste Discharge Permit App. # 2012-082777:

- 1 – pH Grab Sample 5-9 units/pH Monthly Mean 6-9 units
- 2 – TSS Short Term Increase 25 mg/L/Long Term Increase 5mg/L

In addition to the above noted data, Municipal also arranged for the collection and analysis of a rock sample for sulphur content to determine if the material was sulphide bearing. The results of this analysis yielded a sulphur concentration of 0.002 % (0.05 kg H₂SO₄/tonne), which is well below the minimum (0.4 % S; 12.51 kg H₂SO₄/tonne) defined by NSE as sulphide bearing material and is therefore not acid producing. The laboratory results of this sample, and an associated lab duplicate, are included in **Appendix C**.

5.3 Future Quarry Operations

Municipal proposes to expand the Irish Cove quarry for the extraction, storage and removal of aggregate, primarily used in the road and local construction industry. This EA is focussing on current needs, but also future needs; therefore are requesting the EA approval for 16.3 hectares. The active footprint, including all related operational, storage and surface water control facilities, of the quarry will also be approximately 16.3 ha.

Although totally dependent on local market conditions, it is anticipated, at this time, that future development will involve the production of approximately 50,000 tonnes of aggregate per year, for a period of approximately 20 years. The rock face would be constructed in a northerly direction from the existing face (**Drawing # 2, Appendix B**). **Drawing # 2, Appendix B** identifies the total 12.3 hectare expansion area. With an expansion area of 12.3 hectares, it is anticipated that a total tonnage of approximately 1,000,000 tonnes is available which, based on an average annual tonnage removed of 50,000 tonnes, represents a project life of

approximately 20 years. It is further noted however, that the total proven resource of the quarry is estimated at 6,200,000 tonnes and has a total potential life of approximately 120 years. For operational purposes it is important to understand that quarry operations will generally coincide with the road construction season; therefore it would be reasonable to anticipate seasonal operations within a similar timeframe (April – December). The quarry will likely operate 24 hours per day when in operation and may operate for as many as 32 weeks per year, or as little as 0 weeks per year, depending on local demand and project requirements. Municipal is committed to the utilization of Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust and water quality and will operate in accordance with applicable Federal and Provincial legislation and standards.

Aggregate production would commence with drilling and blasting and is consistent with current operations. A qualified blasting contractor would conduct this work. The blasting contractor would be responsible for blast designs and methods in accordance with the General Blasting Regulations contained in the Nova Scotia Occupational Health and Safety Act, 1996. Blasting would also be conducted in accordance with the Pit and Quarry Guidelines. Blasting and noise level guidelines respecting the time of day/day of the week will be followed and blast monitoring will be conducted for every blast event and submitted to NSE upon request. The existing Industrial Approval stipulates blasting control and monitoring requirements.

It is anticipated that aggregate excavation will not take place below the deep bedrock water table. A minimal amount of unconsolidated material and upper fractured bedrock water may be encountered as in previous operations, however this water, if encountered, will be directed to the existing surface water and sedimentation control system for treatment and controlled release.

The blasted rock will be excavated with an on-site excavator and processed by on-site portable crushing equipment. The various aggregate products will be stockpiled in designated areas within the quarry. Material, within the quarry, will be hauled and moved with a front end loader. Products will be transported from the quarry via tandem and tractor trailer trucks along Irish Cove Road to Highway 4, a distance of approximately 1.2 km. The number of trucks hauling aggregate will be determined on a job by job basis, but currently averages approximately 2500 per year. The existing quarry currently employs one to two seasonal employees; however additional employees are on-site during aggregate production. These employment numbers are expected to remain consistent throughout the on-going operation. Drilling, blasting and trucking will require additional resources; however these activities are generally subcontracted on a job by job basis.

6.0 ENVIRONMENTAL IMPACTS, SIGNIFICANCE, AND MITIGATION

6.1 Assessment Approach and Methods

Information for the assessment was obtained from consultants' personal knowledge, from reviews of available information, and knowledge of the purpose and proposed design of the project. The environmental assessment follows *Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia* (NSE September 2009) and uses assessment methodology typical for environmental assessment screenings of this kind. For this

assessment a list of valued environmental components (VECs)⁶, and project activities and outcomes for the expansion of the existing quarry were developed, and the potential for interactions of these activities with VECs was identified. Where interactions were identified and significant impacts were likely to occur, mitigating actions or activities have been suggested which will avoid the impact or reduce it to acceptable levels, before the project proceeds. The process ensures that all potentially significant impacts on VECs are identified and all potential impacts on them have been considered, and sufficient mitigation planned.

6.2 Valued Environmental Components

The list of Valued Environmental Components considered for the assessment, and interactions with project components, are presented in **Table 2**. The environmental effects and potential impacts of the project along with their significance and suggested mitigations are outlined in the following sub-sections and are summarized in **Table 3**, included at the conclusion of this Section. In addition, “A Summary of Impacts and Mitigation on Valued Environmental Components” is presented as **Table 4**, also included at the conclusion of this Section.

Biophysical	Socioeconomic
Air Quality & Noise	Mi'Kmaq
Hydrogeology	Archaeological, Cultural and Historical
Hydrology	Recreation, Tourism & Viewscape
Water Quality	Forest, Hunting and Trapping
Freshwater Aquatic Environments & Wetlands	Land Use & Value
Natural Areas & Wilderness	Residential, Industrial & Agricultural Use
Fish & Fish Habitat	Recreational, Commercial & Mi'Kmaq Fishing
Flora & Fauna Species & Habitat	Transportation
Species at Risk	Water Supply & Residential Wells
	Parks & Protected Areas

6.3 Socioeconomic Impacts

6.3.1 Mi'Kmaq

The Mi'Kmaq maintain a general interest in all lands in Nova Scotia, and claim they have never surrendered, ceded or sold the Aboriginal title, and claim all of Nova Scotia, and as co-owners of the land and its resources, expect that any potential impacts to rights and title are addressed (T. Gaudet, KMKNO, personal communication, 2014). Mi'Kmaq occupied much of Nova Scotia prior to European contact and the Bras d'Or Lakes and surrounding lands were used to varying degrees for habitation, hunting and fishing. In more recent times, treaties made with the British and continued through Canadian law have maintained their rights. Irish Cove Brook and its valley, on which the quarry is located, likely has cultural historical significance for the Mi'Kmaq

⁶ Valued Environmental Components (VECs) are features or things in the environment, which are important either ecologically, socially, economically or culturally. The environmental assessment addresses potential impacts of the project on each VEC identified. To do so involves identifying all the activities or outcomes of the project which interact with each VEC, and then determining and rating the magnitude of the impact in a standard way, in this case in a manner guided by standard approaches which have been developed for environmental assessments.

for its use as a travel route and for hunting and fishing. and no artifacts indicating prehistoric or historical use were identified at the site or in nearby areas. The quarry site mostly has features such as steep slopes which would have been unsuitable for permanent habitation (CRM 2013 - **Appendix E**), although level areas of the property may have been used for various purposes from time to time, which may have been more suitable. No excavations or detailed searches for artefacts at the site have been undertaken (CRM 2013; T. Gaudet, KMKNO, personal communication, 2014).

Quarry operations interact to a limited degree based on the area of land affected, with any use of natural resources through hunting or fishing, either recreationally or for subsistence, through modifications of the headwaters of Irish Cove Brook, although no effect of the quarry is expected to be large. The Proponent has contacted Potlotek First Nation and no concerns regarding the quarry expansion have been put forward to date. The land area affected is small in relation to the available wildlife habitat in the area, and there are no likely cumulative effects of other activities in the area, and consequently none of these effects are considered significant.

It is noted that a Mi'Kmaq Ecological Knowledge Study (MEKS) has been conducted in the immediate area of the proposed quarry expansion. This study, published in Dec., 2012 and conducted by Membertou Geomatics Solutions, on behalf of Cape Breton Hydro Inc. was completed in association with the proposed East Bay Hills Wind Farm. This report concluded that the study identified Mi'Kmaq Traditional Use Activities were occurring in various locations throughout the study area. The study recommended that, based on the information gathered and presented in the report, that there was some potential for the project to affect Mi'Kmaq traditional use, specifically trout fishing in the area. The report went on to state that, although the possible effects of the project could be minimal, considering the number of traditional use activities and the overall size of the proposed project, it is recommended that the proponent communicate with the Assembly of Nova Scotia Mi'Kmaq Chiefs to discuss future steps, if required, with regards to Mi'Kmaq use in this area.

6.3.2 Recreational Activities

Recreational use of the environment in the vicinity of the site consists principally of walking, cycling and home-based recreation in Irish Cove; use of the Provincial Picnic Park on MacLeods Hill, ATV use, hunting, fishing, boating and nature appreciation along Irish Cove Road. Operations at the quarry would be cyclic, likely occupying mainly the summer construction season, and the facilities are well maintained, including Irish Cove Road, which improves access inland to the site and adjoining forest areas. Although the operations could likely be heard and residents would experience truck traffic and other effects of quarry operations, the impacts on these activities are expected to be negligible.

6.3.3 Tourism and Viewscape

The quarry would have little influence on tourism and viewscape at Irish Cove. The property is located some distance (approximately 1.2 km) from any of the major roads in the area; is not visible from the Irish Cove community; and is poorly visible from Highway 4. Truck and equipment traffic accessing and exiting from Irish Cove Road onto Highway 4 would be occasional and would likely be only a minor impediment to tourist vehicle traffic in the area. The Quarry has good sightlines and is well maintained and not particularly noticeable from the Highway. Noise levels from the quarry reaching summer cottages on the coast would be

probably less than noise generated by the intervening Highway 4. Overall the impacts on viewscape and tourism would be expected to be negligible.

6.3.4 Recreational, Commercial and Mi'Kmaq Fishing

Fishing by local residents including from Mi'Kmaq communities in the area may occur from time to time in Irish Cove Brook, as in many rivers flowing into the Bras d'Or Lakes, as well as in the Bras d'Or Lakes themselves. The Irish Cove Quarry will not change flow regime or water quality in Irish Cove Brook, and its influence on the Brook and the Bras d'Or Lake in the area will be minimal. Water quality of the runoff from the quarry is good for salmonids, including low turbidity and neutral pH, which would lead to good quality of waters downstream for fish. Overall a negligible impact of the quarry on fishing is expected.

6.3.5 Archaeological/Cultural/Historical

The land proposed for the quarry expansion has low potential for pre-contact and/or early historic native or European archaeological resources. The site was not settled by Europeans and, with the exception of fragments of the Old Irish Cove Road, has no on-site structures which could have cultural significance. The section of the old road is on the west boundary of the site, near the major unnamed stream, and will not be reached by the quarry expansion. Consequently the project will not have an impact on cultural/ historical/ archaeological features.

6.3.6 Land Use and Value

Forestry is the major land use at the site, and the proposed quarry expansion area, as well as adjacent lands, have been logged in the past. The land on the site is not suitable for agriculture or subsurface mining, and aggregate production and wind energy extraction are among the only potential commercial uses of the area. Areas containing remnant forest will be preserved if possible to assist in maintaining forest ecosystems containing rare plants at the site, and to provide a buffer of adjacent areas from quarry activities. Quarry activities are not expected to impact existing uses of nearby areas for conservation and scientific use. Values for residential properties in Irish Cove will likely be only minimally affected by the presence of the quarry. Quarries, such as the current aggregate quarry, and the limestone quarry which operated in Irish Cove in past had little impact on the local residential and farm community, while providing economic development.

6.3.7 Transportation

The quarry generates a low level of truck traffic on the highways in the area, but activity levels are not expected to increase significantly, and consequently the quarry is not expected to change the existing traffic volumes significantly. Movement of vehicles from the quarry has been carried out safely for over four years and the Proponent will monitor future traffic movements and adjust activities, if necessary. Although Highway 4 (Shore Drive) is one of the main access routes from western Nova Scotia to Cape Breton, traffic volumes are not likely to be high enough to normally cause congestion. The highway in the area has a high frequency of curves, which interfere with traffic flow and influence safety. Because of the position of the intersection of Irish Cove Road with Highway 4 (on a sharp curve and a steep hill), trucks and equipment moving to and from the quarry site have the potential to slow traffic and increase the risk of vehicle interactions. Traffic and signage needs will be monitored and discussions will be held with local TIR staff to determine the best location for signs and associated traffic control.

Suitable safety awareness training for truckers and equipment operators, as well as the Irish Cove community, would help avoid dangerous situations at the intersection. Overall the impact of the project on transportation is expected to be minimal.

6.3.8 Residential Use

Quarry activities can interfere with normal use and enjoyment of nearby residential properties by creating background noise and through truck and equipment traffic, which some residents may find objectionable. The property is located some distance (approximately 1.2 km) from any of the major roads in the area, is not visible from the Irish Cove community, and is poorly visible from Highway 4, which largely separates the community from the quarry. Traffic noise on Hwy 4 would likely exceed any coming from the quarry for homes located towards the coast; and sound from the quarry would be blocked by the high hills in back of homes on the east side of the highway. Activities at the quarry would be limited in time seasonally (approximately March to November) and during the day, although nighttime operations, but not blasting, will be required under some circumstances. Traffic volumes from the site would be moderate, and high frequency of truck traffic would be an irregular occurrence, depending on the supply requirements for particular projects. Dust from the operations is unlikely to reach residential areas, and dust generation will be comparatively low due to shielding of winds by the higher elevation forested areas around the site. Quarry activities are not expected to impact residential wells as they are located at a significant distance from the site. Most operations at the site occur during daylight hours, and on rare circumstances when they are undertaken at night, will involve minimal additional lighting and noise, which is unlikely to be a serious disturbance to local residents. The quarry will include signage with phone numbers and contact persons should any members of the community wish to register complaints or concerns. A complaint resolution procedure will be put in place by Municipal Enterprises Ltd. to address complaints or concerns. It is expected that at some point in the future, the rock formation used by the quarry will run out and the properties may be available for other uses.

6.3.9 Commercial/Industrial Use

There are no commercial operations in the Irish Cove area apart from cottage and cabin rentals. The East Bay Hills Wind Project if constructed will occupy the hills area northeast of Irish Cove. Blasting at the quarry site will not have sufficient energy to reach through the bedrock to the nearest turbine site (830 m) at the proposed wind project. The quarry is unlikely to impact cabin and tourist rentals on the coast of Bras d'Or Lakes and there are no other local aggregate producers locally with which the quarry would compete, although product from the quarry could be supplied to projects far afield. Overall the quarry will help to support local trucking operations and supply requirements for aggregate and other product in the vicinity of Irish Cove.

6.3.10 Water Supplies and Residential Wells

Residents of Irish Cove use wells for water supply, but there are no public drinking water supplies in the area. Quarry activities are not expected to impact residential wells as they are located at a sufficient distance (i.e. all more than 800 m) to avoid impacts from quarry operations, in particular the occasional blasting which takes place. Groundwater recharge is of high quality (low conductivity and dissolved solids and neutral in pH). Best management practices for operations will be undertaken to eliminate the potential for any contamination of aquifers at the site. Local land users and area residents will be notified initially of the project by newspaper ads, and it is expected that quality of the water leaving the site will be monitored

under the industrial approval for the project. Overall, activities at the quarry are not expected to impact wells in the area.

6.3.11 Parks and Protected Areas

One Provincial roadside picnic park and several areas protected for ecological preservation, research, and monitoring, occur in the vicinity of the quarry. The Irish Cove Provincial Picnic Park is unlikely to be influenced by the presence of the Irish Cove Quarry, separated from it by about 2.3 km and with no sightlines. Travellers to and from the park are not likely to see the quarry, although it is marginally visible from the highway east of MacLeod's Hill, and individuals climbing this promontory can see the quarry at present and will be able to see the expanded quarry in the future.

The Irish Cove Quarry expansion will have a small footprint (approximately 16.3 ha., in total, including the existing quarry) and is on private land, and will not reduce the area of protected and designated areas which are located in the vicinity of the quarry. The project will only reduce by approximately 3% the area of natural forest within a 1 km radius. The quarry and the proposed expansion could potentially affect an additional 300 m of the northeast slope of the valley, although there will be a 15 m buffer on the southeast side, adjacent to Crown Land, and a 30 m buffer around all other active sides of the quarry. Changes in physical conditions which could occur at the site are relatively small, but include alteration of microclimate (temperature, precipitation, incidence of mist & fog, air circulation); increased levels of dust and vehicle emissions; changes in runoff patterns etc. Effects on biological conditions are also expected to be small, involving effects on movements of animals, dispersal of plants, changes in connectivity between habitats, and local travel routes and habitats and territories of wildlife in the area. Ecological integrity of the area as a whole, will also be affected by the expansion, although the area has experienced other human intrusions such as the use of Irish Cove Road for the quarry and by locals for recreational vehicles and hunting, incidental quarrying activities, and for forestry. While these effects will occur, the overall final expanded footprint of the quarry and degree of impact will be relatively small compared with the overall area of protected areas at the site.

The quarry will be developed in consultation with regulatory agencies to ensure that impacts on the local environment will be minimized. The present project does not extend to the unnamed stream on the west end, whose gorge will not be impacted. At a later date the diverted stream could be returned through a restored quarry floor to its former outflow in the Brook. Efforts should be made, when areas are revegetated (e.g. on berms and slopes) to encourage reseedling of native plant species to help minimize the spread of invasives into adjacent forest areas.

6.3.12 Resource Use—Forestry, Hunting & Trapping

The site of the quarry will not be available for logging in future; however the area occupied by the quarry is relatively small in relation to the available forest resources in the area, and the overall impact on economic return from logging is expected to be small. The quarry occupies a relatively small area of habitat for furbearing and game species, and will not have a significant impact on hunting and trapping in the Irish Cove area.

6.4 Biophysical Impacts—Impacts of the Project on the Environment

6.4.1 Air Quality, Noise and Light

Various project activities have the potential to generate dust, combustion emissions, noise and light. In particular, operation of heavy equipment (e. g. earth movers, crushers), rock drilling and blasting, as well as onsite routine operations contribute to increased dust and particulate levels. Noise levels can impact human use and enjoyment of the environment. Dust emissions during the construction phase will be localized and short term, and from the routine operations are expected to be minimal, and dust management will be undertaken, including use of water spray and covering working and lay down areas with blasted rock. Monitoring of airborne particulate emissions will be conducted at the request of NSE and in accordance with the Pit and Quarry Guidelines and the Nova Scotia Air Quality Guidelines and the Nova Scotia Air Quality Guidelines. An Environmental Protection Plan will be put in place and followed during all phases of operations. In particular, Particulate Emissions shall not exceed the following limits at or beyond the Site property boundary:

Annual Geometric Mean 70ug/m³

Daily Average (24 Hr.) 120ug/m³

Exhaust emissions will be generated from the operation of vehicles and equipment. Given the scope of the planned operations, these emissions will be minimal (i.e. restricted to several pieces of heavy equipment, earth movers, trucks, etc., as well as the operation of crushers and an asphalt plant), which will be localized and similar in type and amount to those produced during previous operations. Ambient air quality monitoring will be conducted at the request of NSE.

Noise levels from the quarry expansion are expected to be similar to those already produced at the site, since the operations are expected to be similar in size at a given time, and the proponent will ensure that they do not exceed those specified in the Nova Scotia *Pit and Quarry Guidelines*.

Sound levels, as per the Pit and Quarry Guidelines and the existing permit, will be maintained at a level not to exceed the following levels (Leq) at property boundaries:

Leq 65dBA 0700-1900 (days)

 60dBA 1900-2300 (evenings)

 55dBA 2300-0700 (nights)

Light during night time operations will be seen in Irish Cove, particularly during times of low hanging cloud, and can attract migrating birds. Light “pollution” is increasingly a concern globally. Measures can be taken to ensure the use of directional lighting, which minimizes emanation of light upward and laterally over the horizon.

Blasting is expected to occur infrequently (1-2 times per year) and will occur only during daylight hours (0800 and 1800 hours). Concussion (air blast) is limited to 128dBI as measured within 7 m of the nearest structure not located on the site. Ground vibration is limited to 0.5 in/sec (12.5

mm/sec) as measured below grade or less than 1 m above grade in any part of the nearest structure not located on the site.

As indicated previously, Municipal is committed to the utilization of Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust and water quality and will operate in accordance with applicable Federal and Provincial legislation and standards.

6.4.2 Hydrogeology/Hydrology

The site is immediately underlain by unconsolidated surficial materials described as glacial till with a stony, sandy matrix derived from local bedrock sources. Where drumlins occur, the facies is siltier due to erosion and incorporation of older till units by glaciers. The till plain is estimated to be between 2 and 20 meters thick, whereas the drumlin overlain areas may be between 4 and 30 meters thick. (NS Department of Natural Resources, Map 92-3; Scale 1:500,000 – Stea, R. R., Conley, H. and Brown, Y. (compilers). Bedrock geology in the general area consists of intrusive granites of the Huntington Mountain Formation of Sturtian to Early Cambrian age (Geological Map of Nova Scotia. NS Department of Natural Resources, Minerals and Energy Branch, Map Me 2000-1; Scale 1:500,000 – Keppie, J. D., (compiler).

The site topography is generally rolling with the slope, in the immediate area of the quarry, predominantly to the southwest toward Irish Cove Road and Irish Cove Brook. Irish Cove Brook then trends towards the Bras d'Or Lakes, approximately 2.25 km. to the northwest. It is anticipated that the surficial and shallow groundwater flow mirror the topographic flow. Therefore, it is also anticipated that the local/site specific shallow groundwater will flow towards Irish Cove Brook. It also anticipated that the bedrock aquifer will exhibit fracture flow. The pre-existing quarry area has been previously disturbed and altered for surface and shallow groundwater control, thereby altering the water flow regime in the immediate area, which has been directed off-site to the southwest again to Irish Cove Brook, which eventually flows northwest towards the Bras d'Or Lakes.

Shallow groundwater is expected to discharge to the on-site surface water control structures; where ultimately it would become part of the surface water regime. The deeper bedrock groundwater regime in the general area is used as a potable water source. However, a search of the NSE well log database notes that there are no well log records for the subject site or within 800 m of the quarry property. The NSE Well Log data base identifies 21 wells located within 10 km of the site. The nearest well noted by the database is located on Highway 4 in Irish Cove, approximately 1.5 km from the quarry. A fly by "windscreen" survey was completed in the general area of the quarry. This process confirmed that homes with on-site wells were located at a distance of approximately 1.5 km from the quarry. It is also noted that the actual depth of the bedrock water table at the quarry site is not known, however it is known that this water table has not been encountered during historic quarry operations. Given the fact that the quarry expansion is not intended to extend below the deep bedrock water table, it is concluded that this groundwater will not be encountered during future operations.

Activities associated with the project including forest clearing, grubbing and removal of overburden, and blasting, influence groundwater locally in the vicinity of the quarry, but are not expected to influence groundwater aquifers elsewhere on the property or in adjacent areas. The amount of recharge area involved in project activities is extremely small in relation to the overall size of the aquifers in the Irish Cove area. The effect on overall groundwater patterns will be

small, however, due to the small area of the quarry in relation to the scale of the aquifers. The overall impact on hydrogeology at the site is therefore expected to be negligible.

Expansion of the quarry will result in an artificial and managed regime of surface water movement and runoff at the site, mainly near the quarry but potentially affecting the entire active area of quarry operations. Increased proportions of runoff from the quarry floor will be directed into sedimentation ponds before entering Irish Cove Brook. Exposed surfaces on Irish Cove Road lead to more sudden, flashy runoff patterns during heavy rainfall events. A stream formerly flowing into the existing quarry has been diverted west. With the quarry present, peak runoff flows at the site have likely increased over historic levels, and in future will be more sudden and greater in volume as the area of quarry expands and the amount of natural watershed decreases. These changes will have an insignificant impact on broader runoff and flow patterns in the area as a whole, due to the relatively small footprint of the quarry in the larger watershed as a whole.

6.4.3 Water Quality

Water quality downstream of the site is important for fish habitat in the lower watershed of Irish Cove Brook. Quality of water leaving the site and entering the stream is high, due both to the onsite flow management and the bedrock quality. Quarry rock is within acceptable limits for sulphur and acid-generating potential. Presence of the quarry probably has not impacted the quality of the surface waters in downstream areas significantly. Blasting is not expected to result in groundwater quality changes, particularly with efforts to reduce releases of other chemicals such as nitrates used in blasting. Forest clearing and grubbing activities can lead to releases of fines from the soil, resulting locally in elevated suspended sediment levels. The stream diversion running along the northeast boundary is providing clear and sediment-free water flows. Release of other contaminants such as oils and lubricants from operating equipment, as well as contaminants which may be found in material, such as recycled asphalt, potentially can impact downstream areas, but is expected to be mitigated by normal precautions on equipment operations and fuelling locations, and measures to reduce runoff from storage piles, and in any case, the concentrations of contaminants are expected to be exceedingly low. All activities will conform to the Nova Scotia Erosion and Sedimentation Control Handbook (NSE 1988) and the Nova Scotia Pit and Quarry Guidelines (NSE 2003). Impact of the quarry on water quality in adjacent streams and Irish Cove Brook is expected to be negligible.

The quarry has onsite sedimentation and flow management, which effectively mitigates release of fines from normal quarrying operations. As indicated previously, Municipal has been collecting surface water samples, which serves as a baseline for ongoing operations at the property.

6.4.4 Freshwater Aquatic Environments

Several small flowages for surface drainage found on the site will be removed by quarry expansion. These are not fish habitat, although they would support biological organisms (e.g. aquatic insects); but the area affected represents a small proportion of that available in the area. Flow arising from these features will form part of future quarry drainage and is expected to be at a high level of quality and not likely to impact conditions in Irish Cove Brook. Irish Cove Brook has been the subject of fish habitat restoration efforts in the vicinity of the abandoned Irish Cove limestone quarry and the protection of the restored habitat is of particular concern. However, the quarry is unlikely to generate significant quantities of contaminants or suspended

sediments which could impact any downstream habitat in Irish Cove Brook. Therefore loss of freshwater environments at the site is considered to be a negligible impact.

6.4.5 Wetlands

No wetlands occur on the proposed site; although intermittent flowages may support mosses and occasionally wetland plants. Overall the quarry expansion will not impact wetlands.

6.4.6 Fish and Fish Habitat

None of the proposed project activities will physically impact fish bearing streams—no streams are on or adjacent to the site and runoff leaving the site is expected to be of high quality, which will not impact conditions in Irish Cove Brook. A forested buffer between Irish Cove Road and the Brook helps to maintain temperatures, inputs of nutrients, leaves and woody debris. Presence of Irish Cove Road and turnaround areas may lead to release of silt and sudden runoff events, which can be mitigated by use of suitable paving materials and erosion control measures. Blasting occurs infrequently at the site and is sufficiently separated from Irish Cove Brook to eliminate harm to fish. All guidelines for activities and timing of blasting in the quarry will be followed. Overall the effects of the quarry construction and operations are expected to be negligible.

6.4.7 Flora, Fauna and Habitat

The existing terrestrial ecosystem (plants and animals) will be removed in areas covered by the footprint of the quarry. Several species of migratory birds are in decline in Nova Scotia, in particular interior forest birds, which rely on large expanses and continuity of intact forest. Similarly important wildlife species of concern such as the Canada Lynx have large territories and need large areas of undisturbed forest. The East Bay Hills, in which the quarry is located, is one of the few remaining areas of the Province with natural and old forest stands. Expansion of the Iris Cove quarry will result in only a comparatively small change in the coverage of natural and mature forest stands in the area and have comparatively small impact on interior forest birds and wildlife such as Lynx. An analysis of abundance and distribution of natural forest stands in the area is presented in Appendix F of the supporting Biophysical report contained in **Appendix D**, of this document.

In terms of vegetation and plant species at risk, most of the woodland on the quarry has been cut at times and does not contain significant species; however some of the areas support mature forest (e.g. the eastern section) which may in some cases retain plant species which may have conservation significance. In particular Lesser Rattlesnake Plantain is found outside the project area but near the boundary on the northeast side. Impacts on adjacent plant communities such as these can be mitigated by placing buffers zones in these areas. As the quarry expands, areas not needed will be reclaimed and revegetated, in consultation with Nova Scotia Environment and in response to likely approval requirements. Reclamation will reduce the overall impact of the project on loss of terrestrial ecosystems at the site. Grubbed and marginal areas of the quarry offer potential nesting sites for certain species of birds and other wildlife; employees should be educated on the need to check areas for activity and nests before undertaking activities which would disturb established surfaces. Night operations and use of lights have various effects, including attracting insects which otherwise would need darkness to mate and reproduce; light pollution is considered to be an important factor globally in decline of songbird populations, through declines in populations of some insects. Lights during night

operations during migration periods (August-September) would attract migrating birds. If possible, 24-hour operations in August-early September will be avoided and lighting used at the site should focus downward and below the normal horizon, to limit visibility by birds and insects from a distance.

6.4.8 Species at Risk

No species at risk were found at the site; however Lesser Rattlesnake Plantain occurs outside the northeast corner, in a forest zone which extends into the expansion area. As a precaution to protect the plant, it is suggested the mature forest in the northeastern corner of the proposed expansion area be avoided and used as a buffer zone. No other species of concern were found at the site, and impacts of quarry expansion as proposed, overall, will be negligible. Common nighthawk, a ground-nesting species, potentially could nest in grubbed and marginal but open areas of the quarry; employees should be made aware of the need to check areas for activity and nests before undertaking activities which would disturb established surfaces. Lights during night operations during migration periods (August-September) would attract various bird species and insects, which could include species at risk. If possible, 24-hour operations in August-early September will be avoided and lighting used at the site should focus downward and below the normal horizon, to limit visibility from a distance.

6.4.9 Natural Areas and Wilderness

The project is located in an area where some of the land and forest is in a natural state and has wilderness and conservation value, although it has not been identified as having particular significance for wilderness appreciation. Traffic, noise, dust and light from quarry operations contrast with the human experience of nature and wilderness and the social values they attribute to them. Activities at the quarry will be carried out with a view to minimizing impacts of the quarry and associated infrastructure, such as roads, on the adjacent natural environment at the site and ensuring that as much as possible of the quarry is reclaimed in future. The restoration should also take into consideration values important in conservation of biological communities and ecosystems (e.g. importance of the land for Canada lynx habitat); as well as changes in physical conditions which could affect those communities. Normal procedures such as dust control and light management will help to minimize impacts on natural and wilderness values at the site.

6.5 Other Undertakings in the Area

There are no known undertakings in the study area, with the exception of the proposed quarry expansion, as described herein.

Table 3 Potential interactions between project activities and operations and Valued Environmental Components (VECs) for Irish Cove Quarry expansion.																			
General Category of VEC	Biophysical								Socioeconomic										
	Air Quality, Noise and Light	Hydrogeology & Hydrology	Water Quality	Aquatic Environments and Wetlands	Natural Areas & Wilderness	Fish and Fish Habitat	Flora & Fauna Species & Habitat	Species at Risk	Mi'Kmaq	Cultural/ Historical	Recreation, Tourism & Viewscape	Residential Use	Recreational & Mi'Kmaq Fishing	Water Supply	Land Use and Value	Transportation	Industrial, Agricultural	Parks & Protected Areas	Resource Use Forestry /Trapping
Construction																			
Site Clearing /Grubbing	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			√	√
Drilling	√	√	√	√	√					√	√							√	
Blasting	√	√	√	√	√	√	√	√		√	√	√	√					√	
Lights	√				√		√	√		√									
Operation																			
Moving/Transporting Rock and Product	√				√		√				√	√	√	√	√	√	√	√	
Crushing	√				√						√		√	√				√	

Washing	√	√	√	√	√	√	√		√			√						√	
Lights	√				√		√	√			√								
Site Runoff Management		√	√	√	√	√			√						√		√	√	
Portable Asphalt Plant	√		√		√							√			√	√		√	
Onsite Materials Storage (e.g. recycled asphalt)			√		√														
Accidents (Oil/Fuel Spills)		√	√	√	√	√	√	√	√		√	√	√		√		√		

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
BIOPHYSICAL COMPONENTS						
Air Quality/Noise/Light	Construction	Noise and dust from heavy equipment during logging and grubbing.	Significant	Negative	Schedule activity to avoid peak periods of use by residents in the Irish Cove community. Avoid engine braking.	Not significant.
		Light from the quarry can be seen for great distances.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.
	Operation	Drilling and blasting; equipment for moving rock; crusher & heavy equipment operation.	Significant	Negative	Monitor noise levels and undertake to avoid exceedences of regulatory levels. Institute measures for dust control.	Not significant.
		Light from the quarry can be seen for great distances.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.
Hydrogeology/ Hydrology	Construction	Forest and soil removal changes surface water flow.	Negligible	Negative	Likely small changes in groundwater and runoff patterns.	Not significant.
	Operation	Blasting fractures bedrock and changes groundwater flow patterns.	Significant	Negative	Bedrock not in same aquifer used in Irish Cove. Monitor groundwater hydrology to determine changes.	Not significant.
	Operation	Quarry and work areas change surface water flows. Increased peak stormwater flows.	Significant	Negative	Onsite water management to moderate extreme surface water runoff and suspended sediment levels; measures to maintain normal flow regime.	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
	Operation	Stream diversion increases flow, erosion, and flashiness in unnamed stream	Negligible	Negative	Restore diverted stream to original course after quarry closed.	Not significant.
	Operation	Accidental hydrocarbon spills and blasting residues contaminate groundwater	Significant	Negative	Measures to minimize danger of spills; on-site emergency numbers, spill kits etc. Avoid refueling near watercourses.	Not significant.
Water Quality	Construction	Increased surface water flows and turbidity in watershed flowages	Negligible	Negative	Onsite water management to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Dust & suspended sediment from operations potentially enters Irish Cove Brook. Chemicals (e.g. nitrates) from explosives entering runoff.	Significant	Negative	Onsite dust control and water management to moderate surface water runoff and suspended sediment levels. Closely monitor explosive residues after blasting.	Not significant.
	Operation	Chemicals in runoff from materials stored on site.	Negligible	Negative	Best management practice allows leaving piles exposed to the environment.	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
Natural Areas & Wilderness	Construction & Operation	Presence of the quarry affects natural wilderness values and local physical conditions.	Significant	Negative	Area affected is small in relation to remaining natural areas and previous development has occurred in the area, diminishing value of natural areas and wilderness. Attempt to minimize footprint and avoid damage to areas, which contribute most to supporting the natural ecosystem and enhancing values. Manage releases of dust and light, and control noise.	Not significant.
Freshwater Aquatic Environments	Construction	Brief occurrences of high suspended sediments and nutrient levels from grubblings and locally diverted flows.	Significant	Negative	Preserve woodland in buffer areas of quarry. Onsite water management to moderate surface water runoff and suspended sediment levels.	Not significant.
	Operation	Retention of runoff for aggregate washing. Lower normal flows in watercourses adjacent to site.	Significant	Negative	Onsite water management to store additional wash water during off peak season. Preserve woodland in buffer areas of quarry.	Not significant.
	Operation	Higher peak flows and suspended sediment during activities.	Significant	Negative	Onsite water management to store additional wash water during off peak season. Preserve woodland in buffer areas of quarry.	Not significant.
	Operation	Releases of chemicals from blasting and runoff from materials stored on site.	Negligible	Negative	Measures to isolate chemical releases and runoff from stored materials piles.	Not significant.
	Construction & Operation	Routine releases and accidental spills of hydrocarbons on site.	Significant	Negative	Provide pollution prevention and emergency measures.	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
Wetlands	Construction & Operation	No wetlands on or near the site.	Not Significant	Not Applicable	NA	Not significant.
Fish & Fish Habitat	Construction	Change runoff patterns at site in local and adjacent watersheds.	Negligible	Negative	Quarry affects small area relative to Irish Cove Brook watershed as a whole.	Not significant.
	Operation	Change in flow regime in Irish Cove Brook.	Negligible	Negative	Restore diverted brook upon closure of the quarry.	Not significant.
	Construction & Operation	Nominal releases of oils, hydraulic fluids etc. from operating equipment. Accidental spills of hydrocarbons on site.	Significant	Negative	Maintain equipment to minimize loss of lubricants and fuels. Provide pollution prevention and emergency measures.	Not significant.
	Operation	Accidental spills into Irish Cove Brook and other waters from truck operations and accidents.	Negligible	Negative	Recommend truck traffic use safe driving practices and reduce speed in vicinity of quarry and intersection on Highway 4. Provide pollution prevention and emergency measures.	Not significant.
Terrestrial Flora & Fauna & Habitat	Construction	Removal of Existing Communities	Negligible	Negative	Restore damaged and unused parts of the site (e.g. grubblings and waste rock piles) as soon as possible. Long-term site rehabilitation plan developed with NSE.	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
	Construction	Eagle Nesting Area	Negligible	Negative	Activities such as heavy equipment operation, light, dust and blasting are not expected to harm eagles in the area. The species can become accustomed to human activity, and a major highway passes near the nesting site to which they may be already accustomed. The quarry also may not be operated continuously.	Not significant
	Construction & Operation	Accidental releases, contamination of habitat.	Significant	Negative	Provide pollution prevention and emergency measures & response capability. Remediate any permanent areas affected by spills.	Not significant.
		Light influences movements of birds and insects.	Significant	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	Not significant.
		Removal of potential forest and wildlife resource (i.e. wildlife habitat)	Negligible	Negative	Small area affected relative to total available. Minimize footprint of quarry. Restore and rehabilitate areas not used.	Not significant.
		Quarry affects wildlife movement patterns and connectivity of habitats.	Significant	Negative.	Restoration should include consideration for wildlife movement through the restored site.	Not significant.
Species at Risk	Construction	No species at risk in the proposed footprint of the quarry.	Negligible	Negative	Leave mature standing trees where possible as nest cavities.	Not significant.
	Operation	At Risk Plant Species (Lesser Rattlesnake Plantain) in nearby area.	Significant	Negative	Avoid area and provide an undeveloped buffer (i.e. forest left intact for 50-100 m from footprint of quarry).	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
		Light influences movements of species at risk birds and insects.	Significant	Negative	Use directional lighting with downward and lateral focus to minimize light leaving the quarry.	Not significant.
SOCIOECONOMIC COMPONENTS						
Mi'Kmaq	Construction and Operation	Any land use conflicts with Mi'Kmaq Right to Use Land	Significant	Neutral	Consult with Mi'Kmaq First Nations including the Assembly of NS Mi'Kmaq Chiefs regarding East Bay Hills MEKS.	Not significant.
		Accidental contamination of Irish Cove Brook may affect Mi'Kmaq recreational fishing and food fishery in Irish Cove Brook and Bras d'Or Lakes.	Negligible	Negative	Surface water monitoring program will be developed in consultation with NSE. Follow company Best Practices to avoid accidental release of contaminants to headwaters of Irish Cove Brook.	Not significant.
Archaeological, Cultural and Historical Significance	Construction	Expansion may affect part of remaining Old Irish Cove Road.	Significant	Negative	Preserve as much as possible ridge of west gorge containing road.	Not significant.
Recreation	Construction & Operation	Quarry traffic & activities affects ATV traffic and local use of Irish Cove Road.	Not significant	Negative	Users will be aware of activity at quarry but will not be otherwise impacted by it.	Not significant.
		Truck and recreational traffic interact.	Negligible	Negative	Ensure awareness of truck operators of local traffic and uses.	Not significant.
Tourism and Viewscape	Construction & Operation	View of site and industrial character.	Not Significant	Negative	Maintain a clean operation. Rehabilitate areas no longer needed for activity and future development.	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
Residential Use	Construction & Operation	Noise; light pollution; operation of trucks and transportation of heavy equipment. Restrict expansion of urban area.	Significant	Negative	Use best management practices to reduce disturbance to nearby residents. Inform residents about quarry operations. Provide community with safety information for truck traffic on Highway 4.	Not significant.
Recreational and Mi'kmaq Hunting and Fishing	Construction & Operation	Accidental Hydrocarbon spills and blasting residues contaminate surface waters.	Significant	Negative	Provide pollution prevention, emergency measures & response capability. Identify and control contaminant releases.	Not significant.
	Construction	Loss of forested area under quarry footprint.	Not significant	Negative	Rehabilitate areas no longer needed for activity and future development.	Not significant.
Water Supply	Construction and Operation	Blasting potentially impacts aquifers.	Not significant	Negative	Develop groundwater-monitoring plan in consultation with NSE.	Not significant.
Land Use and Value	Construction & Operation	Removal of potential forest and wildlife resource (e.g. forestry & trapping).	Not significant	Negative	Small area affected relative to total land available. Minimize footprint of quarry. Restore and rehabilitate areas not used.	Not significant.
Transportation	Operation	Wear on highway	Negligible	Negative	Current levels low and will not increase.	Not significant.
	Operation	Collisions with trucks and equipment on Highway 4 at Irish Cove Road.	Not significant	No Change	Use good directional signs, viewing pull-offs, posted speed limits and speed policy in vicinity of quarry.	Not significant
Industrial & Agricultural Use	Construction & Operation	Noise for local residents	Not significant	Negative	Schedule activities to take place during off peak usage and daylight hours.	Not significant.
	Operation	Wind Turbine foundations	Not significant	Negative	Blasts unlikely to have sufficient force.	Not significant.
	Operation	Competition with other Quarries	Negligible	Neutral	No other quarries in close proximity.	Not significant.
Resource Use Forestry, Hunting & Trapping	Construction & Operation	Removes woodland; game habitat.	Not significant	Negative	Relatively small area is used.	Not significant.

Table 4 Summary of impacts and mitigation on Valued Ecosystem Components, Irish Cove Quarry Expansion.						
VEC	Project Component	Nature of Effect	Significance	Nature of Impact	Mitigation	Significance after Mitigation
Parks and Protected areas	Construction & Operation	Changes local physical environment (e.g. microclimate)	Negligible	Negative	Minimize footprint and avoid most significant or important natural areas.	Not significant.
	Construction & Operation	Changes factors affecting biological communities (e.g. connectivity, migration routes)	Negligible	Negative	Provide corridors for wildlife across restored site at project completion.	Not significant.
		Light influences movements of birds and insects from adjacent areas.	Negligible	Negative	Use directional lighting with downward focus to minimize light leaving the quarry.	Not significant.

7.0 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The operating quarry will not be impacted by weather, including high rainfall and precipitation, through its nature and design, which includes site water management. Aggregate and other rock products stored at the site are stable under varying conditions of rainfall and wind. Integrity of the stream diversion constructed on the northeast border of the property is partially dependent on the integrity of the berm⁷, which is constructed from local till, and could be damaged by strong flows caused by extreme rainfall events. If a failure were to occur, the flow would end up in the pit, where it could be managed until repairs are affected, and consequently no major impact to the local environment would occur. To avoid failures of the diversion, the integrity of the berm will be checked regularly (e.g. annually) and suitably maintained.

8.0 CUMULATIVE IMPACTS

No significant cumulative impacts (impacts arising from the project in combination with ongoing or foreseen activities) are likely to be caused by the project. In future, however, construction and operation of quarries and pits, as well as wind farm development, could take place in the vicinity of the quarry. Development of other quarries in the vicinity are likely, although there are no confirmed projects at present. Four construction companies own properties on suitable rock formations within 5 km of the Irish Cove Quarry, and could potentially develop sites, but the present quarry is the only one developed to date. If they were to be developed, properties owned by Alva Construction within 1 km of the Irish Cove Quarry would probably require upgrading of Irish Cove Road, with associated environmental concerns regarding impacts of roads on Irish Cove Brook. The other properties are accessed from other areas. Any developments affect the ecological integrity of the area, making it less suitable for conservation purposes and affecting the value of the protected areas near the site and all should be undertaken with a view to minimizing the impact on the local natural environment. The proposed East Bay Hills Wind Project is located north of Irish Cove Quarry with the closest turbines proposed approximately 1,300 m northeast. The project area includes the watershed of Irish Cove Brook, and although there is usually considerable care taken to avoid interference with watershed characteristics, there is potential for influencing water quality in it. Changes would not likely be large and together with any changes due to the Irish Cove Quarry, would be negligible.

9.0 MONITORING

Monitoring of hydrological conditions at the site, as well as water quality monitoring, may be conducted to ensure conditions have been maintained by quarry operations. Routine monitoring of noise levels will be done if required by NS Environment. On-site groundwater monitoring may be conducted, at the request of NSE.

Municipal is committed to the utilization of Best Management Practices in all phases of their operations, including the on-site management of air quality, greenhouse gas emissions, noise, dust and water quality and will operate in accordance with applicable Federal and Provincial legislation and standards.

⁷ The diversion is excavated into bedrock and consequently only extremely high flows would reach the berm.

10.0 PUBLIC CONSULTATION

The Proponent has not held public consultations in the area about the proposed expansion of the Irish Cove quarry—public meetings are not required for the EA registration. However, it is important to note that Municipal has been in contact with various Government and First Nations groups and individuals, as noted earlier in this document. Municipal will continue this dialogue, to the best of our abilities, to ensure any concerns that may be raised are addressed in a timely manner. All communication will be documented and made available for NSE review.

11.0 PROJECT CLOSURE

Remediation of the affected environment during the closure or decommissioning phase of the quarry will involve the execution of a Rehabilitation Plan developed in consultation with the NSE.

12.0 APPROVAL OF UNDERTAKING

Municipal will comply with all provisions of the Nova Scotia Environment Act and Regulations. Applications for Water Rights and Industrial Approvals will be submitted to the Sydney District office of Nova Scotia Environment.

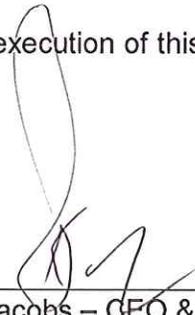
13.0 FUNDING

No public or other government funding is involved in the execution of this undertaking. All costs are borne by Municipal.

14.0 SIGNATURE OF CEO AND DATE

December 18, 2014

Date



Kurt Jacobs – CEO & President
Municipal Enterprises Limited