

## 7.0 HUMAN ENVIRONMENT ASSESSMENT

The following Human Environment Assessment for Avalon's Thor Lake Rare Earth Element Project has been conducted in general accordance with the MVEIRB's (2011) Terms of Reference.

The Regional Study Area (RSA) for assessing effects to the human environment includes the following communities: Yellowknife, N'Dilo, Dettah, Lutsel K'e, Fort Resolution, Hay River, Hay River Reserve, and Fort Smith. These locations will be referred to as the RSA communities.

Every year, NWT diamond mine operators, BHP Billiton, Diavik and De Beers, provide specific monitoring data to the GNWT for analysis as part of their Socio-Economic Assessment reporting. The GNWT departments that review this information are as follows: Health and Social Services; Education, Culture and Employment, Finance, Industry, Tourism and Investment; Justice; Bureau of Statistics; and NWT Housing Corporation. The results of the analysis and potential trends for several socio-economic indicators are provided in the report: *Communities and Diamonds: Socio-Economic Impacts in the Communities of Behboko, Gameti, Whati, Wekweeti, Dettah, N'Dilo, Lutsel K'e and Yellowknife* (also referred to as the Communities and Diamonds report). Trends are identified for Yellowknife, Small Local Communities, and Other NWT Communities (GNWT HSS et al. 2010)

According to the Communities and Diamonds report, "Small Local Communities include Lutsel K'e, Rae Edzo, Rae Lakes, Whati, Wekweeti, Dettah, and N'Dilo. Three of these communities (i.e., Lutsel K'e, Dettah, and N'Dilo) are within the Project's RSA. Given their population size and geographical placement, the Small Local Communities are considered adequately representative of all of the communities within the Project's RSA. Therefore, the associated trends identified in the Communities and Diamonds report for Yellowknife and Small Local Communities are used to anticipate social effects in the RSA communities within the Human Environment Assessment.

It is important to note that there are often multiple spellings for the communities located within the RSA. In particular, the Deninu Ku'e First Nation has two different spellings: Deninu Ku'e or Deninu K'ue. The former is predominantly used in this report.

Information in the following sections addresses socio-economic considerations as outlined by MVEIRB. Results of Traditional Knowledge Studies conducted in August and September 2010 are incorporated throughout this section. Studies were held with participants from the following groups: the Yellowknives Dene First Nation (N'Dilo and Dettah), the Deninu Ku'e First Nation and Fort Resolution Metis Council, and the Lutsel K'e Dene First Nation.

The Human Environment Assessment information requested by the MVEIRB Terms of Reference (2011) is presented under the following primary headings:

- Economic Effects – 7.1
- Social Effects – 7.2

- Cultural Effects – 7.3
- Human Environment Monitoring and Management – 7.4

Table 7.0-1 summarizes Avalon’s predicted socio-economic assessment for the Thor Lake Project using the Mackenzie Valley Environmental Impact Review Boards’ impact criteria template.

<b>TABLE 7.0-1 SOCIO-ECONOMIC ASSESSMENT SUMMARY</b>						
<b>Socio-Economic Component</b>	<b>Potential Effect</b>	<b>Magnitude (+/-)</b>	<b>Geographic Extent</b>	<b>Affected Community</b>	<b>Likelihood</b>	<b>Capacity to Manage Effect</b>
Business Opportunities	Beneficial	High (+)	All stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	High	Developer and Territorial business management agencies have the capacity to manage
Contribution to Sustainable Development	Beneficial	High (+)	Aboriginal stakeholders and communities in the North and South Slave regions	Yellowknife, Lutsel K’e, Fort Resolution, Hay River Reserve and Hay River	High	Developer and Territorial human resource management agencies have the capacity to manage
Direct and Indirect Employment	Beneficial	Moderate (+)	Aboriginal stakeholders and communities in the North and South Slave regions	Yellowknife, Lutsel K’e, Fort Resolution, Hay River Reserve and Hay River	High	Developer and Territorial human resource management agencies have the capacity to manage
Population in- and out-Migration	Beneficial	Moderate (+)	Primarily Yellowknife and Hay River	Primarily Yellowknife and Hay River	High	Developer and municipalities have the capacity to manage
Alcohol and Drug Access and Use	Neutral	Negligible	Aboriginal stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	High	Developer and Territorial social services agencies have the capacity to manage
Access to Health Care	Neutral	Negligible	Aboriginal stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	High	Developer and Territorial health care agencies have the capacity to manage
Housing Pressures	Neutral	Minor (+)	Primarily Yellowknife and Hay River	Primarily Yellowknife and Hay River	Moderate	Municipalities and Territorial government have the capacity to manage
Crime Rates	Neutral	Negligible	Aboriginal stakeholders and communities in	Aboriginal stakeholders and most or all communities in the	Low	RCMP and Territorial social services agencies have the capacity to manage

**TABLE 7.0-1 SOCIO-ECONOMIC ASSESSMENT SUMMARY**

Socio-Economic Component	Potential Effect	Magnitude (+/-)	Geographic Extent	Affected Community	Likelihood	Capacity to Manage Effect
			the region	region		
Access to Childcare	Neutral	Negligible	Aboriginal stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	Moderate	Developer and Territorial social service agencies have the capacity to manage
Divisions within/ between Communities	Neutral	Negligible	Aboriginal stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	Low	Developer and Territorial social services agencies have the capacity to manage
Education Access and Completion Levels	Beneficial	Minor (+)	Aboriginal stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	Low to Moderate	Developer and Territorial education delivery agencies have the capacity to manage
Physical, Mental, and Cultural Health	Neutral	Negligible	Aboriginal stakeholders and communities in the region	Aboriginal stakeholders and most or all communities in the region	Low	Developer and Territorial social services agencies have the capacity to manage
Social Services	Neutral	Negligible	Aboriginal stakeholders and communities in the region	Aboriginal Stakeholders and most or all communities in the region	High	Social services agencies have the capacity to manage
Heritage Resources	Neutral	Not Applicable	Within development footprint areas	Aboriginal stakeholders	Low	Developer and Territorial government have the capacity to manage
Protected and Withdrawn Areas	Neutral	Negligible	Thor Lake and Pine Point area	Aboriginal stakeholders and most or all communities in the region	Low	Developer has the capacity to manage
Aesthetic Resources and Wilderness Values	Neutral	Negligible	Within 2 km	Aboriginal stakeholders and local communities	Low	Developer has the capacity to manage

## 7.1 ECONOMIC EFFECTS

The Thor Lake Project will provide broad benefits to the economy in terms of employment and government tax revenues. The construction and operation of the mine, mill and associated processing plant will provide major economic stimulus to the regional communities, the NWT, and the Canadian economy. The Project also offers the opportunity for Aboriginal peoples to have meaningful participation in the wage economy,

while also having the work schedule flexibility to accommodate traditional pursuits and activities.

The following section summarizes the *Thor Lake Project: Economic Impacts* report commissioned by Avalon by GSGilson and Associates Ltd. (2011) which is found in Appendix K. Capital and operating cost information is summarized from the *Preliminary Feasibility Study on the Thor Lake Project* by Scott Wilson RPA (2010).

For this assessment, the Local Study Area (LSA) for the Thor Lake Project has two components:

- Mine and Mill Site (LSA #1) – which affects the communities of Yellowknife including N'Dilo, Dettah and Lutsel K'e; and
- Hydrometallurgical Plant Site (LSA #2) – which affects the communities of Fort Resolution, Fort Smith, Hay River, and Hay River Reserve.

### 7.1.1 Capital and Operating Costs

Capital costs were compiled for the life of the Project and are described in Table 7.1-1. Working capital costs related to the time between the shipment from the site and the receipt of payment for the products is not included in the capital estimate in Table 7.1-1, but is included in the Project cash flow.

TABLE 7.1-1: CAPITAL COST ESTIMATE	
Component	Cost Estimate (C\$ Million)
Mine	54,445
Concentrator	137,344
Surface Infrastructure	36,069
Hydrometallurgical Facility	313,102
First Fills and Containers	48,414
Indirect Costs	80,657
Sustaining Capital	73,000
Reclamation	11,000
Royalty Buy Out	1,200
Contingency	144,502
<b>Total Capital Costs</b>	<b>899,733</b>

Source: Scott Wilson RPA (2010)

The capital costs do not include:

- Costs to obtain permits;
- Costs for feasibility study;
- GST/HST;
- Corporate administration costs;

- Exploration activities;
- Salvage value of assets; and/or
- Severance cost for employees at the cessation of operations.

An operating cost estimate was compiled for the life of the Project, and is shown in Table 7.1-2. Estimated annual costs are shown for the 2,000 tonnes per day (tpd) operating phase and for the Life of Mine (LOM) average. The LOM average operating cost per tonne includes mining, processing at site and at the Hydrometallurgical Plant, and transporting the product to a point of sale.

<b>TABLE 7.1-2 OPERATING COST ESTIMATE</b>		
	<b>Life of Mine (C\$/t milled)</b>	<b>2,000 tpd (C\$/t milled)</b>
<b>Thor Lake</b>		
Mining	37.00	35.88
Processing (Power Removed)	25.85	24.87
Surface Services	6.54	6.11
Administration	11.57	11.01
Power	28.89	10.90
Summer Freight	11.47	27.07
<b>Pine Point</b>		
Processing	123.87	119.88
Surface Services	1.86	2.26
Administration	2.56	10.18
Power	5.46	5.48
Sales and Marketing	11.86	1.64
<b>Total Operating Costs per Tonne</b>	<b>266.92</b>	<b>225.27</b>
<b>Total Annual Operating Cost</b>		<b>186,349,391</b>
Notes:		
1. C\$/t is the operating cost per tonne, expressed in Canadian dollars.		
2. Operating costs are expressed in Q1 2010 dollars in Canadian currency.		

Source: Scott Wilson RPA 2010

The operating costs do not include:

- Provision for inflation;
- Provision for changes in exchange rates;
- GST/HST;
- Pre-production period expenditures;
- Corporate administration and head office costs in Delta and Toronto; and

- Site exploration costs, infill drilling, or development for conversion of additional resources to Mineral Reserves.

### 7.1.2 Socio-economic Effects

GSGislason (2011) identified that expenditures over the life of the Thor Lake Project will total an estimated \$4.2 billion; \$1.0 billion during construction and reclamation and \$3.2 billion during the initial 18-year production period. All dollar amounts refer to 2010 dollars in Canadian currency (Table 7.1-3).

<b>TABLE 7.1-3: CONSTRUCTION AND OPERATION EXPENDITURES (CANADA-WIDE)</b>			
<b>Expenditures</b>	<b>Construction*</b>	<b>Operations**</b>	<b>Total</b>
Wages and Benefits (C\$ million)	118	654	772
Goods and Services (C\$ million)	875	2,571	3,446
<b>Total Expenditures (C\$ million)</b>	<b>993</b>	<b>3,225</b>	<b>4,218</b>
<b>Direct Employment (PYs)</b>	<b>880</b>	<b>6,120</b>	<b>7,000</b>
Notes:			
* Includes reclamation.			
**Includes property tax and payroll tax but excludes federal and NWT corporation/royalties taxes.			

Source: GSGislason 2011

The approximately \$3.4 billion in purchases of goods and services during construction and operations include expenditures on equipment, materials, fuel, and contract services, amongst others. Approximately \$0.8 billion will be spent in wages and benefits during construction and operations.

Approximately 880 person-years (PYs) of direct employment will occur during the construction phase, and a much greater 6,120 PYs of direct employment will be generated during the initial 18-year mine operating life (GSGislason 2011). Of the total 7,000 PYs of direct employment, an estimated 3,590 PYs are anticipated to be in the NWT.

The direct economic effects in the NWT from the construction and the 18-year operating life of the Project are estimated to include:

- \$382 million spent in wages and benefits;
- 3,590 person-years of employment;
- \$774 million in territorial government revenues; and
- \$1,229 million in supply purchases.

The direct economic effects across Canada from the construction and the 18-year operating life of the Project are estimated to include:

- \$771 million spent in wages and benefits;
- 7,000 person-years of employment;

- \$1,471 million in government revenues; and
- \$3,214 million in supply purchases.

Table 7.1-4 summarizes the direct economic effects in NWT and across Canada.

<b>TABLE 7.1-4: DIRECT ECONOMIC EFFECTS</b>						
	<b>NWT Effects</b>			<b>Canada-wide (including NWT) Effects</b>		
	<b>Construction</b>	<b>Operations</b>	<b>Total</b>	<b>Construction</b>	<b>Operations</b>	<b>Total</b>
<b>Direct Industry Effects</b>						
Employment PYs	170	3,420	<b>3,590</b>	880	6,120	<b>7,000</b>
Wages and Benefits (\$millions)	20	362	<b>382</b>	118	653	<b>771</b>
Purchases (\$millions)	220	1,009	<b>1,229</b>	745	2,469	<b>3,214</b>
<b>Government Tax Revenues</b>						
Income Tax: -						
Corporate	0	343	<b>343</b>	0	789	<b>789</b>
Personal	1	26	<b>27</b>	30	163	<b>193</b>
Mining Royalty	0	296	<b>296</b>	0	296	<b>296</b>
Payroll Burden: -						
Payroll Tax	2	12	<b>14</b>	2	12	<b>14</b>
EI Premiums	0	0	<b>0</b>	1	7	<b>8</b>
CPP Premiums	0	0	<b>0</b>	4	26	<b>30</b>
WCB Premiums	2	14	<b>16</b>	2	14	<b>16</b>
Fuel Tax	1	12	<b>13</b>	1	59	<b>60</b>
Property Tax	0	65	<b>65</b>	0	65	<b>65</b>
<b>Total Tax Revenues</b>	<b>6</b>	<b>768</b>	<b>774</b>	<b>40</b>	<b>1,431</b>	<b>1,471</b>

The additional effects associated with indirect supplier purchases and induced spending in consumer industries increases the benefits significantly, as shown in Table 7.1-5. For example, direct NWT employment during construction and operations is estimated at 3,590 PYs, whereas total (direct, indirect supplier and induced consumer) NWT employment is 9,355 PYs. Direct Canada-wide employment is estimated at 7,000 PYs while total Canada employment is estimated at 23,975 PYs (GSGislason 2011).

<b>TABLE 7.1-5: TOTAL ECONOMIC EFFECTS</b>						
	<b>NWT Effects</b>			<b>Canada-wide (including NWT) Effects</b>		
	<b>Construction</b>	<b>Operations</b>	<b>Total</b>	<b>Construction</b>	<b>Operations</b>	<b>Total</b>
<b>GDP (\$millions)</b>						
Direct	325	4,700	<b>5,025</b>	325	4,700	<b>5,025</b>
Indirect	60	300	<b>360</b>	175	740	<b>915</b>
Induced	18	158	<b>176</b>	85	424	<b>509</b>
<b>Total</b>	<b>403</b>	<b>5,158</b>	<b>5,561</b>	<b>585</b>	<b>5,864</b>	<b>6,449</b>
<b>Wages and Benefits (\$millions)</b>						
Direct	20	362	<b>382</b>	118	653	<b>771</b>
Indirect	40	165	<b>205</b>	95	407	<b>502</b>
Induced	11	95	<b>106</b>	51	254	<b>305</b>
<b>Total</b>	<b>71</b>	<b>622</b>	<b>693</b>	<b>264</b>	<b>1,314</b>	<b>1,578</b>
<b>Employment (PYs)</b>						
Direct	170	3,420	<b>3,590</b>	880	6,120	<b>7,000</b>
Indirect	665	2,750	<b>3,415</b>	1,585	7,750	<b>9,335</b>
Induced	240	2,110	<b>2,350</b>	1,280	6,360	<b>7,640</b>
<b>Total</b>	<b>1,075</b>	<b>8,280</b>	<b>9,355</b>	<b>3,745</b>	<b>20,230</b>	<b>23,975</b>
Notes:						
1. Construction figures are two year totals (plus reclamation).						
2. Operations figures are the totals over the 18 years of production.						
3. Direct effects derived from pro formas and information provided by Avalon Rare Metals Inc.						
4. Indirect and induced effects derived from Input-Output economic multipliers provided by NWT Bureau of Statistics and Statistics Canada.						
5. All financial figures in 2010 dollars in Canadian currency.						
6. Employment expressed in person-years (PYs).						

Source: GSGislason (2011)

### 7.1.3 Employment Opportunities

#### Potential Effects

The Thor Lake Project will positively affect employment in the Northwest Territories. Avalon will operate under a preferential northern and Aboriginal hiring policy; therefore, NWT residents with the requisite skills will have the first chance to be hired. Northern contractors will benefit from this policy and southern contractors will abide by the northern hiring policy when hiring staff for the Project.

Estimates of the human resource requirements by skill level during the operations phase of the Project are shown in Tables 4.9-1 and 4.9-2. In Summary, of the 216 estimated employees required at the Nechalacho Site, approximately 81% will be skilled workers, while an estimated 19% will be unskilled. Of the 69 estimated employees required at the



Hydrometallurgical Plant Site, approximately 72% will be skilled workers and 28% will be unskilled.

The proposed TLP labour market will be based on primarily hiring from an unemployed labour pool. It is also anticipated that a small number of employed workers from other mines or businesses may choose to work at either the Nechalacho Mine and Flotation Plant or the Hydrometallurgical Plant due to its close proximity to the surrounding communities and a favourable work rotation schedule.

It is predicted that about 20% of the direct employees during the construction phase at both Project sites will be northerners. Based on expected results of the employment strategy (i.e., involvement in training programs, etc.) actively undertaken by the Mine Training Society and Avalon's active recruitment strategy (see Section 4.9), the direct employment of northerners for the operations phase is expected to increase. On average, it is predicted that 30% of the direct workers would be from the communities in the RSA, including Aboriginal communities, over the Project life. The Project is also anticipated to provide indirect and induced employment opportunities in the region.

The majority of participants in the three Traditional Knowledge Studies (from the Yellowknives Dene First Nation, the Deninu Ku'e First Nation and Fort Resolution Metis Council, and the Lutsel K'e Dene First Nation) indicated that they thought job opportunities would result from the proposed Thor Lake Project. Many of the participants indicated that Project-related employment would be good for community members, with an emphasis that job specific training opportunities provided. There was concern among a small number of participants that "few" or only "low level" jobs would be offered to community members due to the requirement of special skills. One participant from the Yellowknives Dene First Nations expressed concern that Blachford Lodge would be closed and that the people who teach traditional activities courses would lose their jobs (EBA 2011a, b, c).

Avalon Rare Metals Inc. has signed Negotiation Agreements with both the Yellowknives Dene First Nation and the Deninu Ku'e First Nation regarding the development of the Nechalacho rare earth metals deposit at Thor Lake, NWT. Broad principles for co-operation are outlined in the Negotiation Agreement (often referred to as a Memorandum of Understanding), providing the basis for the negotiation towards an Impacts and Benefits or Accommodation Agreement. An Accommodation Agreement typically covers a number of issues including: environmental protection, business and employment opportunities (Avalon 2011a).

According to GSGlason (2011), about 470 positions will be created annually in NWT during the life of the Project, depending on the Project phase and volume of production: 180 directly, 170 indirectly in supplier industries, and 120 in retail through the re-spending of wages earned at the direct and indirect stage. The anticipated employment, described in person-years, in the NWT and across Canada during the construction phase and annually during the operations phase is provided in Table 7.1-6.

<b>TABLE 7.1-6: REGIONAL SOURCING OF DIRECT LABOUR</b>		
	<b>Construction</b>	<b>Operations (per Year)</b>
<b>Employment (PYs)</b>		
NWT Residents – Existing	170	130
NWT Residents – In-Migrants	NA	60
Other Canadians	710	150
<b>Total (PYs)</b>	<b>880*</b>	<b>340</b>
<b>Wages and Benefits (\$ millions)</b>		
NWT Residents – Existing	20	13.6
NWT Residents – In-Migrants	NA	6.5
Other Canadians	98	16.2
<b>Total (\$ millions)</b>	<b>118</b>	<b>36.3</b>

\*Includes contingency

Source: GSGislason (2011)

The direct personnel requirements for the Nechalacho Mine site are estimated at:

- 80 employees during the construction of Nechalacho underground mine and surface infrastructure;
- 216 full-time employees during the mining and processing operations; and
- 20 employees during the reclamation phase.

The Hydrometallurgical site at Pine Point is expected to directly require:

- 87 employees during the construction phase of the Hydrometallurgical Facilities and associated infrastructure;
- 69 full-time employees during operations; and
- 10 employees during the reclamation phase (Cox et al. 2010).

It is anticipated that residents from the RSA, including Aboriginal communities, will fill many of the direct, indirect and induced job positions. If positions cannot be filled by residents of the RSA, it is anticipated that they will be filled by in-migrants to the NWT or employees from across Canada. Typically, in-migrants bring approximately 2.5 family members to the region, some of which may work in indirect and induced jobs. In-migrants to the region will increase the potential labour pool.

Aboriginal communities in the RSA such as N'Dilo, Dettah, Lutsel K'e, Fort Resolution, and Hay River Reserve typically have small populations and limited local employment opportunities, as evidenced by participation rates of generally less than 50% and unemployment rates generally greater than 25% (GSGislason 2011). Therefore, Avalon's active recruitment strategy will target employees from these communities.

According to GSGislason (2011), there is significant slack in the RSA's economy compared to Yellowknife's economy, which has a tight labour market. Training and other recruitment strategies can help draw and equip potential workers from other parts of the RSA. It is not expected that there will be significant competition from other major projects for workers as the other major diamond mines in the region are already in operation and have a secure workforce.

Unless mitigated, there are several potential barriers to direct or contract employment, advancement and employee retention. Common barriers to employment include skills or training gap, inability to be away from home for the rotation periods, criminal records, and drug and alcohol use, amongst others.

As stated previously, many of the jobs require specific skills in professional and technical areas, which may not be readily found in the available NWT labour force. Technical or skilled employment types require minimum education levels and/or training, and there may be a limited available number of skilled workers to fill these positions. The work rotation period may also prohibit potential employment for single parents or primary caregivers or those involved in traditional activities. Employers, particularly in the mining industry, recognize the importance of a safe work environment, and therefore, may not hire candidates with criminal records or drug and alcohol abuse issues. Another potential barrier to employment, particularly for residents living in small communities outside of Yellowknife, is having the opportunity to apply for a position or the cost of transportation to or from the job location.

Specific barriers to increasing Aboriginal participation in the minerals industry include Aboriginal workforce education and skills, a lack of understanding between Aboriginal and non-Aboriginal cultures, and a broad range of social, political and economic issues (Sub-committee of the Intergovernmental Working Group on the Mineral Industry 2005)

Furthermore, women living in the north are confronted with many barriers when accessing the industry and trades employment sectors. These barriers include: being the primary or only caregiver in a family and lack for support from family members, limited education levels and opportunities, limited financial resources to further education, and the perception that trades and industrial occupations are more suited to men. These along with significant social issues such as physical and sexual abuse, and substance abuse and addictions are considered barriers to women working in the mining, oil and gas industries (Status of Women Council of the NWT ND).

Unless these barriers are overcome, this will result in jobs being filled by southern Canadians, some of whom will choose to relocate to NWT (in-migrants) while others will maintain a permanent residence in southern Canada (GSGislason 2011). However, the influx of workers from other locations also provides opportunities for cross-training and mentorship. Skilled employees hired for the Project may also mentor less skilled workers, which may result in northern workers gaining further experience in their respective field (De Beers Canada 2008).

### **Mitigation Measures**

Avalon will operate under a preferential northern hiring policy; therefore NWT residents with the requisite skills will have the first chance to be hired. Northern and Aboriginal contractors will benefit from this policy and southern contractors will abide by the northern hiring policy when hiring staff for the Project.

Avalon is currently in negotiation with both the Yellowknives Dene First Nation and the Deninu Ku'e First Nation to establish Accommodation Agreements. These agreements will be structured to mitigate any adverse effects of the Project, define the benefits to the parties, including employment, and provide greater certainty with respect to the development of the Project.

Avalon is committed to employing Aboriginal and northern residents and has successfully demonstrated its ability to do so. As of December 2010, Avalon's employment breakdown was 60% Aboriginal, 24% northern residents and 16% other Canadians (Avalon 2011b).

Using a strategic recruitment plan, Avalon intends to attract, recruit and retain qualified candidates, with priority given to Avalon's Aboriginal stakeholders and local communities. The five main elements of Avalon's recruitment plan are as follows:

- *Define*: Identification phase;
- *Plan*: Strategic development phase;
- *Attract*: Recruitment phase;
- *Screen*: Selection phase;
- *Select*: Job offer phase.

The recruitment process will be ongoing throughout the Project life with a large number of positions being required during the first year of start-up. Concurrent recruitment cycles will be required during the first six months of Project life. Strategies will include advertising and physical recruitment drives.

Postings for all open positions will be made in the local area newspapers surrounding Yellowknife and Hay River. Advertisements will also be posted in other mining communities throughout the northern territories and in neighbouring provinces. Employment opportunities will also be posted on mining websites such as InfoMine and Misco Jobs.

Physical recruitment drives will be comprised of Avalon Human Resources staff who will travel to various communities to advertise positions. Recruitment drives will provide candidates the opportunity to learn about Avalon, the Thor Lake Project, the positions available, and to submit their resume in person and/or be interviewed. Positions offered through recruitment drives will typically be hourly positions with multiple openings. Regional newspapers will be used to advertise where and when the recruitment drives will be held.

As part of pre-employment screening, criminal background checks will occur for all job candidates. In considering whether to hire a candidate who has been convicted of a criminal offense, Avalon will consider several factors including, but not limited to:

- the relevance of the criminal conviction to job duties;
- the date of the most recent offense and employment history since the commission of the crime;
- the nature of the offense;
- the accuracy of the information the candidate provided on the employment application; and
- whether the offense was committed as a minor.

Furthermore, potential discrimination and harassment is addressed within Avalon's Code of Business Conduct and Ethics Policy. Avalon is committed to providing equal opportunity in all aspects of employment and abusive, harassing or offensive conduct is unacceptable, whether verbal, physical or visual. Discrimination and harassment included racial or ethnic comments and unwelcome sexual advances. Employees are encouraged to report harassment when it occurs.

Avalon's Human Resources department, in partnership with the Mine Training Society (MTS), is focusing on providing pre-employment training opportunities that will ensure that local stakeholders gain access to employment through the Thor Lake Project. In addition to working with the MTS, Avalon will also be working with Aurora College to develop training programs that are tailored to job-specific functions related to the Thor Lake Project.

Aboriginal Skills and Employment Partnership (ASEP) was launched by the federal government through Human Resources and Skills Canada in 2004. ASEP is a partnership made up of Aboriginal groups, businesses, and governments. Their main purpose is to secure and increase Aboriginal participation in economic developments within or near their communities, with the goal of achieving sustainable employment for Aboriginal people. ASEP funding is administered through MTS. Avalon is currently receiving ASEP funding for Project training initiatives.

Avalon recognizes that training initiatives are essential in achieving and maintaining a healthy, safe and productive workplace. Site-based training initiatives will focus on specific skills, with training areas including:

- Safety systems and safe work practices;
- First aid and emergency response;
- Environmental and waste management;
- Skill specific on-the-job training (supervisor and employee);
- Apprenticeship training programs (skilled employee and employee); and
- Administration functions (Cox et al. 2010).

In the interest of reducing disruption to family and community wellness and/or traditional activities, Avalon will be operating a preferred one-week on and one-week work rotation schedule. The proposed work rotation schedule ensures that employees are away from their families and communities for a shorter period of time, and provides time to continue to participate in family, community, and traditional activities. The shorter rotation time may also make it easier for women to participate in employment opportunities offered by the Thor Lake Project.

As discussed throughout the DAR, Avalon seeks to create employment and business opportunities. As an example, the Company is working with the Deninu Ku'e First Nation on potential business opportunities, such as the construction of core boxes that Avalon could purchase for the Project. Since then, the Deninu Ku'e First Nation accessed funding from the government to start the initiative and have a contract in place from Avalon to manufacture the core boxes. Avalon's geologists have found the boxes to be of excellent quality and have extended the contract to 2011 (Avalon 2011a).

### **Residual Effects**

Avalon's recruitment strategy, human resources policies, and substantial training and apprenticeship opportunities will help to strengthen local communities and provide individuals with transferrable skill sets to use over time.

## **7.1.4 Business Opportunities**

### **Potential Effects**

Operating under the preferential northern hiring policy, the Project will make substantial purchases from NWT suppliers. Opportunities will be provided to local NWT businesses to provide goods and services to the Project, based on competitive rates. However, due to limited availability and/or competition for specialized goods and services/expertise in the north, much of the goods and services will likely be supplied by businesses from southern Canada and other parts of the world.

The approximately \$3.4 billion in purchases of goods and services during construction and operations include expenditures on equipment, materials, fuel, and contract services, amongst others. Total expenditures in the NWT are estimated at \$220 million during construction and \$1.009 billion during operations. During operations 39% of each purchase dollar will be spent in the north, an increase from the 25% spent in the north during construction.

Total direct economic benefits as a result of the construction and initial 18-year operating life of the Project include:

- \$382 million spent in wages and benefits,
- 3,590 person-years of employment,
- \$774 million in territorial government revenues, and
- \$1,229 million in supply purchases.

Economic benefits of the Project increase significantly when the effects associated with indirect supplier purchases and the induced spending in consumer industries is considered. The contribution of the Project to the NWT Gross Domestic Product (GDP) over the life of the Project is estimated at \$5,561 million (GSGislason 2011).

Northern Aboriginal businesses may be affected by the Project in indirect or induced ways. The northern hiring and contracting policy will stimulate the local economy, including Aboriginal and northern owned businesses. As well, Aboriginal art and traditional activities may attract business from new in-migrants or temporary contract employees seeking a traditional experience.

As discussed in Section 6.10, Blachford Lake Lodge may be affected by the Project's noise and lights. Noise levels emanating from the Nechalacho Mine site and associated infrastructure during all phases of this component of the Project are predicted to be typically less than 40 dBA at a distance of 1.5 km from the site. Regarding possible effects of light associated with infrastructure and activities related to the future construction and long term operation of the Nechalacho Mine, ambient light levels are likely to be somewhat higher than current levels for the relatively short (2 year) construction phase, and will likely return to current exploration phase levels as all mining activities will be underground and the process plant and camp will be contained inside solid structures.

### **Mitigation Measures**

In considering contract bids, Avalon will prioritize Aboriginal and northern businesses, and will implement measures to maximize local business opportunities. These measures will include:

- preparing annual business opportunities forecast to identify foreseeable procurement requirements for mining equipment, operations and maintenance support services;
- providing technical support and assistance in accessing sources of commercial capital;
- working closely with local Aboriginal organizations and communities;
- identifying Project components at all stages of development and operations that should be targeted for the northern business development strategy;
- facilitating subcontracting opportunities for northern businesses; and
- identifying possible opportunities for joint ventures with Aboriginal and northern businesses.

Other programs are currently available from MTS and ASEP (Section 7.1.3) that also provide training and education for local and regional businesses to build capacity.

Avalon will seek out bid packages from all local communities and Aboriginal groups for the non-specialized services required for the Project. Avalon will work first with the Aboriginal groups to compare their demonstrated capacity, competitiveness and regulatory compliance against Avalon's operational requirements. Alternatively, Avalon will investigate potential joint ventures with local business to meet these requirements.

As discussed previously, Avalon seeks to create employment and business opportunities. As an example, the Company is working with the Deninu Ku'e First Nation on potential business opportunities, such as the construction of core boxes that Avalon could purchase for the Project. Since then, the Deninu Ku'e First Nation accessed funding from the government to start the initiative and have a contract in place from Avalon to manufacture the core boxes. Avalon's geologists have found the boxes to be of excellent quality and have extended the contract to 2011 (Avalon 2011a).

Avalon is currently in negotiation with both the Yellowknives Dene First Nation and the Deninu Ku'e First Nation to establish Accommodation Agreements. These agreements will be structured to mitigate any adverse impacts effects of the Project development, define the benefits to the parties, including employment, and provide greater certainty with respect to the development of the Project.

With respect to the Blachford Lake Lodge, mitigation measures that will be implemented to minimize noise generated by the Project have been discussed in Section 6.2.3. Avalon is committed to ensuring that reasonable measures will be taken to minimize noise levels and manage light emissions associated with its operations and will work closely with Blachford Lake Lodge to ensure the wilderness experience enjoyed by their guests is maintained.

### **Residual Effects**

The substantial contribution that the Project expenditures are making to the NWT GDP will likely benefit the territory during the life of the Project, and may increase the capacity of northern and Aboriginal businesses.

## **7.2 SOCIAL EFFECTS**

The MVEIRB Terms of Reference (MVEIRB 2011) specifies that identification and mitigation of adverse effects on the social and cultural environment be considered during the assessment process.

Participants in the Traditional Knowledge Studies conducted for this Project from the Yellowknives Dene First Nation, the Deninu Ku'e First Nation and Fort Resolution Metis Council, and Lutsel K'e Dene First Nation (EBA 2011a, b, c) were asked to identify foreseeable social effects resulting from the proposed Project. In general, participants did not anticipate social effects from the Project but expected that some would occur. Some participants indicated that social effects resulting from the Project would be known only if/when they occur in the future. One participant believed that if any social effects resulted from the Project that it would be their children that would be affected (EBA 2011b, c).

One participant from the Fort Resolution study indicated that they did not think there would be social effects resulting from the Project as there would be more opportunities for employment. Another participant thought there would likely be a beneficial partnership resulting between the company (i.e., Avalon) and the community (EBA 2011b).

Throughout this section of the assessment, potential effects and mitigation measures, including Avalon's policies, strategies, plans and commitments, are identified.



The socio-economic indicators considered in this section include:

- Effects from increased income;
- Population in- and out-migration;
- Alcohol and drug access and use;
- Access to health care;
- Housing pressure;
- Crime rates;
- Access to child care;
- Divisions within/between communities;
- Education completion rates by level;
- Physical, mental, and cultural health; and
- Social services.

Several of the socio-economic indicators are also used in the Communities and Diamonds report, and the trends are described in Table 3.4-1.

### **7.2.1 Effects from Increased Income**

The primary adverse effect identified by participants of the Traditional Knowledge Studies was that more money and outside influence may result in more drugs, alcohol and disease in the community. Effects related to finances and family were also identified, including concern that the young people with good jobs would not think of the future and would mismanage their money. The other participant in this group indicated that while some people may mismanage their money, others would use it to take care of their families (EBA 2011c).

According to GNWT HSS et al. (2010), higher incomes may be linked to alcohol and drug use. However, higher incomes may also be linked to the decrease in core housing need, a decrease in income assistance, and an increase in trapping, hunting, and fishing.

The Project will offer wages appropriate to the skill level and offers the opportunity for Aboriginal peoples to have meaningful participation in the wage economy, while also having the work schedule flexibility to accommodate traditional pursuits and activities. It is anticipated that depending on the employee or contractor's behaviours following employment at the mine site that the effects could be either beneficial or adverse, as stated above.

Although Avalon cannot monitor the financial spending or behavior of its employees or contractors, the Company does recognize the importance of awareness and sensitivity to community concerns regarding this issue. Avalon will provide support consistent with Company policy to employees and their immediate families in dealing with social issues resulting from increased income.

## 7.2.2 Population In- and Out-Migration

As indicated in Section 7.1.1 Employment Opportunities, Avalon is committed to employing local and Aboriginal residents to the greatest extent possible. To facilitate regional employment at the remote site, Avalon will provide employees with flights to the TLP site to/from Edmonton, Yellowknife, Lutsel K'e and Hay River. Avalon will provide employees with bus transportation from Hay River and Fort Resolution to the Hydrometallurgical Plant site (Cox et al. 2010). By facilitating pick-up of employees from many communities in the region, the potential for out-migration from small communities to regional centres is reduced.

Consistent with past experience in northern mines, some in-migration will likely be needed during the operational phase (GSGislason 2011). GSGislason (2011) predicts that during operations about 60 in-migrants will move to the region (either by themselves or with their families). It is expected that, because of the availability of housing and other services, new in-migrants will move into the more market-based and larger communities of Yellowknife and Hay River. There should be no new significant incremental population growth or pressure on infrastructure capacity in other communities in the region, particularly Aboriginal communities. There should be no new significant incremental population growth or pressure on infrastructure capacity in other communities in the region, particularly Aboriginal communities. A recent review indicates that limited, but sufficient housing exists to accommodate southern employees and contractors needed for the construction and operation of the Project. It is expected that all in-migrants (singles and families) will leave the LSA once the Project is completed. However, there is some chance that some will stay if they find other employment.

## 7.2.3 Alcohol and Drug Access and Use

Avalon is aware that there are existing problems related to alcohol and drug access and use in many communities throughout the NWT, including the North and South Slave regions. The issue continues to be a source of concern in the affected communities (GNWT HSS et al. 2007). In the Traditional Knowledge Studies conducted with Yellowknives Dene First Nation, the Deninu Ku'e First Nation and Fort Resolution Metis Council, and Lutsel K'e Dene First Nation (EBA 2011a, b, c), 18 of the 49 total participants noted that more money and outside influence may result in more drugs, alcohol and disease in the community; furthermore, it was acknowledged that adverse effects from drugs and alcohol use already exist in many communities (EBA 2011a, b, c).

Avalon is committed to maintaining a safe, healthy and productive work environment for all employees, contractors, and visitors. Every employee and contractor has a role to play in meeting this commitment. It is the responsibility of all employees and contractors to report for work in fit condition and to work safely throughout their work period. To this end, Avalon has zero tolerance for the possession and/or use of drugs or alcohol at any Avalon project site. Avalon also understands that alcohol and/or drug dependencies are preventable and treatable conditions. As part of Avalon's policy regarding these matters, employee privacy will be respected.

Avalon will provide support consistent with Company policy to employees and their immediate families in dealing with personal health and well-being issues, including issues related to alcohol and drug use. Avalon responded to a request by the Yellowknives Dene First Nation to sponsor a radio program to target youth and raise awareness around substance abuse issues (Avalon 2011b). While able to encourage a safe and healthy lifestyle, Avalon cannot control existing issues related to these matters within the communities of the North and South Slave regions and defers to the social services authorities of the respective communities and region to assist with managing these ongoing issues.

Given Avalon's commitment to a dry worksite and a strong commitment to maintaining a safe and healthy environment for its employees and contractors, Avalon believes that the Project will not add to the existing level of effects related to alcohol and drug access and use in the region's communities.

#### **7.2.4 Access to Health Care**

The H.H. Williams Memorial Hospital in Hay River, the Fort Smith Health Centre in Fort Smith and Stanton Territorial Hospital in Yellowknife provide primary medical and health care services for the communities and residents of the North and South Slave regions. The Fort Resolution Health Centre and the Hay River Reserve Health Station provide initial and routine medical and health care services to the residents of Fort Resolution and the Hay River Reserve, respectively.

Accident prevention and maintenance of safe and healthy work conditions are priorities for Avalon in daily operations. Safe work procedures and practices are applied and prescribed protective equipment (PPE) is provided to staff to ensure that each employee is responsible for accident prevention and is contributing to a safe work environment.

Avalon recognizes that sexually transmitted infections (STIs) can affect the health and well-being of residents. According to GNWT HSS et al. (2010) there have been overall increases in the rates of STIs in Yellowknife and Small Local Communities, but since 2006 the rates have been declining in Small Local Communities. The increase in STIs may be due to a number of factors including the effects of rotational parenting related to mine employment, increased alcohol and drug abuse and/or a general disregard for safer sex practices (GNWT HSS et al. 2010).

Avalon recognizes that communities may be concerned that in-migration may contribute to already increasing STI rates. It is anticipated that in-migrants, related to the Avalon Project, into the more market-based and larger communities of Yellowknife and Hay River. There should be little to no additional pressure on health care services in these two communities, and no pressure on health care capacity in other communities in the RSA. Although Avalon cannot monitor the sexual behavior of its employees or contractors, the Company does recognize the importance of awareness and sensitivity to community concerns regarding this issue.

Avalon's northern recruitment priority and commitment to maintaining a safe and healthy environment for its employees and contractors are expected to have a neutral effect on access to and/or use of health care services in the region.

### 7.2.5 Housing Pressure

Avalon is committed to a preferential northern hiring strategy to encourage NWT resident employment. By focusing on hiring northern residents, Avalon is attempting to minimize potential housing pressures caused by in-migrants.

Consistent with past experience in northern mines, some in-migration will likely be needed to fill job positions during the operational phase (GSGislason 2011). It is expected that, because of the availability of housing and other services, new in-migrants will move into the larger, market-based communities of Yellowknife and Hay River. An estimated 60 in-migrants predicted during the operations phase, either as singles or with their families. It is possible that some of the single employees may choose to share accommodations, in which case the demand for housing would be reduced.

Yellowknife's current available housing includes rental apartments, bed and breakfast units and private homes for sale. According to CMHC (2010), as of October 2010 there was a 0.9% apartment vacancy rate to accommodate southern employees and contractors needed for the Project. The vacancy rate fluctuates based on market need and is currently in a down cycle. As of March 2011, there were approximately 47 apartments and townhouses available for rent ranging in size from bachelor to 4 bedroom units (24/7 Apartments 2011). In Hay River, there was a 2.1% vacancy rate for apartments and over 70 homes changed ownership in 2008 (CMHC 2008).

Major spending in Yellowknife and Small Local Communities (Behchoko, Gameti, Whati, Wekweeti, Dettah, N'Dilo and Lutsel K'e) is continuing to increase in the areas of housing, transportation and warehousing. This capital spending indicates an expanding economy (GNWT HSS et al. 2010).

It is anticipated that, given the gradual growth of Project development, there will be adequate housing available and ample time for the market in Yellowknife and Hay River to respond to housing needs over time. As such, Avalon does not anticipate that the TLP will adversely affect housing pressures in the region.

### 7.2.6 Crime Rates

Avalon is aware that incidents of violent crimes, property crimes and other crimes related to the criminal code occur in the communities of the North and South Slave regions. The report *Communities and Diamonds: Socio-Economic Impacts in the Communities of Behchoko, Gameti, Whati, Wekweeti, Dettah, N'Dilo, Lutsel K'e and Yellowknife* identifies an increase in crime for Yellowknife and Small Local Communities: Behchoko, Gameti, Whati, Wekweeti, Dettah, N'Dilo and Lutsel K'e (GNWT HSS et al. 2010).. Overall, property crime rates have been declining in the NWT, this trend began before the NWT diamond mines were developed (GNWT HSS et al. 2010).

Avalon recognizes that the increased incomes and the resulting purchase of goods or access to drugs and alcohol may indirectly influence crime rates in North and South Slave communities. As previously indicated, for its employees and their families, Avalon will

provide support consistent with Company policies in dealing with personal health and well-being issues.

However, Avalon cannot control ongoing issues related to the incidents of crime that are likely to continue to occur in the communities of the North and South Slave regions and elsewhere in the NWT. The company will therefore defer to the existing social services authorities and law enforcement agency (RCMP) present in each of the communities to assist with managing this ongoing concern.

As previously discussed, it is not expected that workers from the south will relocate to communities outside of Yellowknife or Hay River. As a result, there should be no new significant incremental population growth or pressure on social services or law enforcement in these communities. Based on the very limited in-migration (60 in-migrants and their families, if applicable) anticipated for Yellowknife and Hay River due to this Project, Avalon does not anticipate any effects on social services or law enforcement in these communities.

Avalon anticipates that the Project will not have a significant effect on crime rates or social or social services in the communities of the North and South Slave regions.

#### **7.2.7 Access to Child Care**

Avalon is aware that child care is a consideration for employees at both Project sites. As previously indicated, Avalon is committed to employing northern and Aboriginal resident to the extent possible during the life of the Project.

The Thor Lake Mine and Flotation Plant site will use a rotational schedule for employees who will live on-site for the duration of their work shift (i.e., 7 days). Avalon expects that employees with children will be able to address their child care needs within their community through existing family and/or social support networks.

The communities in the South Slave region are all located within relatively close driving distance of the Hydrometallurgical Plant site. Avalon anticipates that all local employees or contractors hired at this site will commute to/from their communities on a daily basis. Avalon also anticipates that most employees will be able to address child care needs within their community through their family or child care arrangements.

As also indicated, Avalon will provide support consistent with Company policies to employees and their families in dealing with personal health and well-being issues, including possible concerns related to child care. Through the provision of such support, Avalon believes that child care-related concerns can be effectively addressed.

#### **7.2.8 Community Cohesiveness**

The potential for increasing divisions within or between key stakeholder groups (i.e., Aboriginal and northern communities) in the region is a concern recognized by Avalon. Through its regular dialogue and consultations with RSA communities, Avalon has become aware that each of these key stakeholder groups share common views on a number of interests and aspirations, but differ or compete with each other on certain items.

Divisions within or between stakeholder groups is a common circumstance encountered in other areas of the north and, indeed, throughout Canada. Potentially affected stakeholders in a proposed development commonly share similar views on matters such as environmental and cultural values protection. However, at the same time, they may compete with each other on other aspects of a proposed development such as the sharing of employment and business opportunities or other perceived benefits.

As discussed in Section 5.0, Avalon has been making continuous and concerted efforts to engage and consult with nearby Aboriginal and northern communities. Avalon has been discussing all aspects of the proposed Project, including potential benefits and opportunities associated with the Project, with interested stakeholders. To date, all issues have been dealt with in an open, honest, transparent and mutually agreeable manner.

The benefits that will be gained from the Project by residents in the RSA include direct and indirect employment, training, apprenticeships and business opportunities for a number of people over the 20 year construction and operation timeframe. Through shorter shift rotations, efforts are being made to align with family and community values, to offset homesickness, to encourage participation in community and traditional activities, and to maintain Project performance. By emphasizing training and skill building, local residents and businesses will acquire expertise that can be utilized in multiple business environments over the long term.

Avalon has committed to treating all key stakeholder groups as fairly as possible within the limits of their capacity to participate in various aspects of the Project, including the sharing of potential benefits and opportunities. Avalon is optimistic that the continued implementation of this approach will contribute to minimizing any divisions related to this Project within and between the key stakeholder groups.

### **7.2.9 Cultural Identity and Language Retention**

The GNWT report, *Communities and Diamonds: Socio-Economic Impacts in the Communities of Behchoko, Gameti, Whati, Wekweeti, Dettah, N'Dilo, Lutsel K'e and Yellowknife* (GNWT HSS et al. 2010), is another resource available to assess potential effects of the Thor Lake Project on traditional activities and language use. The Cultural Well-being and Traditional Economy section of the report uses "Aboriginal Language Use (15-24 Years of Age)" and "Workforce-aged Group Engaged in Traditional Activities" as indicators for cultural well-being and traditional economy. For a complete list of trends, see Table 3.4-1 Socio-Economic Indicators.

Since 1999, trends regarding the use of Aboriginal languages in Yellowknife remain unclear but are possibly increasing; however the Small Local Communities have shown a decrease in Aboriginal language use. It is possible that the increase in Aboriginal language use in Yellowknife is the result of people moving to the city from communities with higher use of Aboriginal languages (GNWT HSS et al. 2010).

From 1998 to 2003, the percent of the population aged 15 and older engaged in hunting and fishing activities increased in Small Local Communities (Behchoko, Gameti, Whati, Wekweeti, Dettah, N'Dilo and Lutsel K'e). Hunting and fishing engagement in Yellowknife

during this time decreased. From 1993 to 2003, the percent of the population aged 15 and older engaged in trapping activities increased in Small Local Communities and decreased in Yellowknife.

According to GNWT HSS et al. (2010), the increase in trapping, hunting and fishing activities could be the result of more income in these communities and rotational work schedules.

It was also noted that the percent of households in Small Local Communities consuming meat or fish harvested in the NWT has slightly increased since 1993; however there was no change identified in Yellowknife. It was noted that there appears to be no link between the amount of country food consumed and the presence of the BHP, Diavik or De Beers diamond mines (GNWT HSS et al. 2010).

Avalon is committed to employing Aboriginal and northern residents and has successfully demonstrated its ability to do so. Avalon worked with stakeholders to identify shorter rotation schedules (i.e., one-week in/one week out compared with other mines that may offer two-week or three-week rotation schedules) to ensure that employees are away from their families and communities for a shorter period of time. This provides employees time to continue to participate in family, community, and traditional activities while earning cash incomes. No anticipated effects related to cultural identity and language use were identified.

#### **7.2.10 Education Completion Rates, by Level**

As previously noted in Section 3.0, residents in RSA communities have access to Kindergarten to Grade 12 education. The GNWT report *Communities and Diamonds: Socio-Economic Impacts in the Communities of Behboko, Gameti, Whati, Wekweweti, Dettah, N'Dilo, Lutsel K'e and Yellowknife* indicates an increase in high school completion and a decrease in the percentage of the population with less than Grade 9 for both Yellowknife and Small Local Communities (GNWT HSS et al. 2010).

This improving trend is considered to be very encouraging and important due to the linkages between education and employment. According to the NWT Bureau of Statistics (2010j) the 2006 employment rate for persons with a high school diploma or greater was 81.6%, compared to only 42.2% for persons with less than a high school diploma (GNWT Bureau of Statistics 2010j). Statistics per community are reported in Section 3.0 and follow a similar trend.

Avalon's Human Resources department, in partnership with the Mine Training Society (MTS), is focusing on providing pre-employment training opportunities to ensure that local stakeholders gain access to employment through the Thor Lake Project. In addition to working with MTS, Avalon will also be working with the Aurora College to develop training programs that are tailored to job specific functions related to the Thor Lake Project.

As discussed in Section 4.9, Aboriginal Skills and Employment Partnership (ASEP) is a partnership made up of Aboriginal groups, businesses, and governments. Their main purpose is to secure and increase Aboriginal participation in economic developments within or near their communities, with the goal of achieving sustainable employment for

Aboriginal people. ASEP funding is administered through MTS. Avalon is currently receiving ASEP funding for Project training initiatives (Cox et al. 2010). Avalon is committed to employing as many persons as it can from the limited, locally available labour pool. The criteria for employee selection will recognize the value of years of work experience. However, it needs to be emphasized that, particularly for the more skilled positions, completion of Grade 12 is typically a minimum requirement.

One Traditional Knowledge participant expressed concern that people may drop out of school in favour of gaining employment (EBA 2011c). However, this does not reflect trends observed from other operating mines in the region (GNWT HSS et al. 2010).

Avalon also provides resources to communities for educational efforts. Avalon offers grant funding for community and social initiatives and events related to education, health and safety, environment, skills training, and culture and arts. Avalon responded to a request by the Yellowknives Dene First Nation to sponsor a radio program to target youth and raise awareness around substance abuse issues. Since 2007, Avalon has also participated in the WHERE Challenge, a popular competition launched as part of the International Year of Planet Earth, which invites NWT children grades 7-9 to explain the sources of earth resources that go into the construction of everyday objects. In addition to providing financial support for this competition, Avalon's senior geologist judged the contest from a tent at the TLP exploration camp while linked to the participants via the Internet. Avalon geologists also visit schools in the communities near the Project to talk to children about earth sciences and careers in geology.

Avalon will offer a number of employment and business opportunities. Residents of the North and South Slave regions with Grade 12 and/or post-secondary education will be in a position to take advantage of these opportunities. On this basis, Avalon believes that the Project may provide further incentive for people to stay in school, complete Grade 12, and perhaps pursue a trade or post-secondary education through programs offered through Aurora College and the Mine Training Society.

### **7.2.11 Physical, Mental, and Cultural Health**

Maintaining or enhancing the physical, mental and cultural health and well-being of mine workers and their families is a key consideration for Avalon. As previously indicated, Avalon is committed to maintaining a safe, healthy and productive work environment for all employees and contractors. As part of this commitment, Avalon will provide support consistent with Company policies to employees and their immediate families in dealing with personal health and well-being issues, including, to the extent possible, issues related to cultural health.

To that extent, Avalon worked with stakeholders to identify shorter rotation schedules (i.e., one-week in/one week out compared with other mines that may offer two-week or three-week rotation schedules) to ensure that employees are away from their families and communities for a shorter period of time. This provides employees time to continue to participate in family, community, and traditional activities while earning cash incomes. The



adjusted rotation time may also make it easier for women to participate in employment opportunities offered by the Thor Lake Project.

Avalon recognizes that training initiatives are essential in achieving and maintaining a healthy, safe and productive workplace. Site-based training initiatives will focus on specific skills, with training areas including:

- Safety systems and safe work practices;
- First aid and emergency response;
- Environmental and waste management;
- Skill specific on-the-job training (supervisor and employee);
- Apprenticeship training programs (skilled employee and employee); and
- Administration functions (Cox et al. 2010).

Avalon has prioritized the physical, mental, cultural health, and well-being of employees and their families. No adverse effects are anticipated.

#### **7.2.12 Social Services**

Currently, the existing social services in each of the communities located near the Project sites provide important support for community-based health and wellness programs to serve the needs of their respective community members.

As previously indicated, maintaining or enhancing the health and well-being of employees and their families is a high priority for Avalon. Avalon is committed to maintaining a safe, healthy and productive work environment for all employees and contractors. As part of this commitment, Avalon will provide support consistent with Company policies to employees and their immediate families in dealing with personal health issues, including, to the extent possible, issues related to the health and well-being of their families.

The Traditional Knowledge participants did not express concerns related to access or capacity of social service resources. There is no indication that access to or the capacity of social services will be affected by the Project.

#### **7.2.13 Lessons Learned from Previous Mine Developments**

The mining industry has made recent significant improvements to increase the beneficial socio-economic effects associated with the industry while reducing the adverse effects. The effects of these mines on the communities in the region are monitored through comprehensive Social-Economic Monitoring Agreements (SEMA).

Avalon is aware that the more recent generations of new mines developed in the NWT, Nunavut and elsewhere have set new standards for social, cultural and environmental responsibility and performance. The subject of lessons learned in relation to mining in Canada has been embraced by the Mining Association of Canada (MAC) on behalf of its member companies, as well as provincial and territorial mining associations and chambers for more than 15 years.

As a result, in 1993, the Whitehorse Mining Initiative (WMI) was launched. A broad group of stakeholders came together in a consultative process to address key issues affecting both the industry and other stakeholders. These entities included: federal, provincial and territorial governments; business, including the banking community; Aboriginal groups; environmentalists; and labour. The main objective of the WMI was to move toward a socially, economically and environmentally sustainable mining industry, underpinned by political and community consensus (WMI 1994).

More recently, an Aboriginal – Mining Industry Round Table took place in March 2004 in Edmonton, Alberta (MAC/CAMA 2004). The leading partners in the event were the Mining Association of Canada (MAC) and the Canadian Aboriginal Minerals Association (CAMA). The event was held in collaboration with the Minerals and Metals Sector, Natural Resources Canada (NRCan).

The objective of the Round Table was to provide a forum to share experiences, best practices and lessons learned and to identify future goals. MAC member companies were invited to co-present case study presentations with Aboriginal representatives from the communities where they operate. Additional presentations were given by government and Aboriginal associations (MAC/CAMA 2004).

Furthermore, the GNWT and the three existing diamond mines (Ekati, Diavik, and Snap Lake) in the NWT have conducted regular monitoring and reporting to identify potential trends for socio-economic indicators. Each mine produces yearly socio-economic assessments (SEAs), which are incorporated into the Territory’s annual *Communities and Diamonds Report: Socio-Economic Impacts in the Communities of Behchoko, Gameti, Whati, Wekweweti, Dettah, N’Dilo, Lutsel K’e and Yellowknife* (GNWT HSS et al. 2010).

Table 7.2-1 summarizes the 2009 socio-economic indicators and trends related to the three operational diamond mines on the small local communities and Yellowknife as per the GNWT report (GNWT HSS et al. 2010).

<b>TABLE 7.2-1: SOCIO-ECONOMIC INDICATOR TABLE</b>			
<b>Indicator</b>	<b>Observation</b>	<b>Trend</b>	
		<b>Small Local Communities</b>	<b>Yellowknife</b>
<b>Community, Family and Individual Well-being</b>			
Potential Years of Life Lost (PYLL)	PYLL has remained the same in Yellowknife, but has declined in the Small Local Communities (SLCs).	↓	---
Injuries	Injuries are going down in Yellowknife. No trend in SLCs.	---	↓
Suicides	No trend is noted in Yellowknife or SLCs.	---	---
Communicable Diseases	Sexually transmitted infections (STIs) have gone up in the NWT, including Yellowknife and SLCs. Youth aged 15-24 have been most affected.	↑	↑
Teen Births	The teen birth rate has dropped across the NWT, especially in SLCs.	↓	↓

<b>TABLE 7.2-1: SOCIO-ECONOMIC INDICATOR TABLE</b>			
<b>Indicator</b>	<b>Observation</b>	<b>Trend</b>	
		<b>Small Local Communities</b>	<b>Yellowknife</b>
Single-parent Families	Single-parent families are increasing across the NWT, mostly in SLCs.	↑	---
Child Receiving Services	The rate of children receiving services has gone up in SLCs.	↑	---
Spousal Assault/ Family Violence	It is difficult to draw conclusions about the trend for spousal assault on the basis of rates of reported assault. The number of women and children using shelters has fallen. However, in the NWT, family violence is quite high.	---	---
Total Police-Reported Crimes	The total crime rate in Yellowknife and SLCs is higher than in 1996, primarily due to Other <i>Criminal Code</i> Offences.	↑	↑
Violent Crimes	The violent crime rate has gone up in Yellowknife. No trend is noted in SLCs.	---	↑
Property Crimes	Property crime rates have been declining.	↓	↓
Federal Statute Crimes	Federal statute crimes have gone up in Yellowknife and SLCs; these crimes include drug offences.	↑	↑
Traffic Crime	The trend for traffic crime has decreased in SLCs, but no trends are identified in Yellowknife.	↓	---
Other <i>Criminal Code</i> Offences	The rate of Other <i>Criminal Code</i> crimes has increased in Yellowknife and SLCs.	↑	↑
Home Ownership	Home ownership has grown in Yellowknife. However, growth has slowed since 1996. No trend is noted in SLCs.	---	↑
Crowding	Crowding has gone down in the NWT. They are still highest in SLCs. However, the sharpest drop in crowding has been seen in SLCs.	↓	↓
Core Need	Core need went up in Yellowknife and dropped sharply in SLCs.	↓	↑
<b>Cultural Well-being and Traditional Economy</b>			
Aboriginal Language Use (Youth)	Home-language use of mother tongue has dropped in NWT. No trend is noted for Yellowknife, but may be starting to increase.	↓	---
Trapping	Trapping has increased in SLCs. No trend is noted for Yellowknife.	↑	---
Hunting and Fishing	Hunting and fishing have declined in Yellowknife. These activities have increased in SLCs.	↑	↓
<b>Non-traditional Economy</b>			
Average Income	Average income has been rising for some time, but has risen sharply since 1997. The largest increases have been seen in Yellowknife and SLCs. Average income levels remain lowest in SLCs.	↑	↑

<b>TABLE 7.2-1: SOCIO-ECONOMIC INDICATOR TABLE</b>			
<b>Indicator</b>	<b>Observation</b>	<b>Trend</b>	
		<b>Small Local Communities</b>	<b>Yellowknife</b>
Wage Disparity	The proportion of high- and middle- income earners has gone up across the NWT.	↓	↓
Income Assistance Cases	The income assistance case rate has dropped across the NWT. The drop was sharp in SLCs.	↓	↓
Employment Rate	The employment rate in Yellowknife has gone down. It has gone up in SLCs. More people are working more than 26 weeks periods across the NWT. In SLCs, the percent working more than 26 weeks increased by almost 40%.	↑	↓
Unemployment Rate	The unemployment rate has gone down in SLCs. No trend has been noted in Yellowknife.	↓	---
Participation Rate	The participation rate has gone down in Yellowknife and has increased in SLCs.	↑	↓
High School Completion	More people are completing high school. However, this was true before the diamond mines developed.	↑	↑
Less than Grade 9	The percent of population with less than Grade 9 has gone down across the NWT.	↓	↓
Business Activity	The number of listed businesses in Yellowknife has been declining, but there has been no change in SLCs.	---	
<b>Net Effect on Government</b>			
Net Government Costs	The direction of the trend cannot be stated with certainty. The cost of maintaining program and service levels is going up. Demand for government services is increasing.	---	
<b>Sustainable Development</b>			
Secondary Industry	The cutting and polishing industry is affected by a change in demand as a result of the global economic crisis. Two of the three diamond processing companies operating in the NWT closed at the end of 2009.	---	↑

Source: GNWT (2010)

Several socio-economic lessons have been learned from these and other previous mining projects including:

- early and ongoing dialogue with Aboriginal stakeholders is imperative;
- developing relationships with Aboriginal stakeholders is key;
- recognize traditional knowledge in planning process;
- recognize and respect Aboriginal treaty claims/rights;
- adopt environmentally sound practices;

- provide employees with a healthy and safe work environment;
- provide employees with a high standard of living while away from home;
- involve the public stakeholders when public interest is affected;
- provide opportunities to northern residents first; and
- develop the northern workforce as much as reasonably possible.

As described in previous sections, Avalon has incorporated these lessons into its Project plans, policies, and way of doing business.

With regard to strategies and plans to address Project closure, Avalon is using the lessons learned from other mining company's experiences. One of the primary lessons learned is to support and provide opportunity for residents to live at home and work on rotation at Project camps rather than create a town at the Project site that could risk exposure to cyclical economic fluctuations or potential mine closure. Therefore, Avalon is committed to supporting existing communities and infrastructure. Another lesson learned is to ensure that staff are trained over the course of their employment, so , which will add to the skill base of northern workers and will increase their access to future employment opportunities, if needed (IFMMMS 2010). Finally, by developing a new Project in the north, this provides overlapping employment opportunities with other existing mines, which potentially provides alternative employment should other existing mines close during the TLP's life span.

#### **7.2.14 Plan Strategies and Commitments**

Avalon has made several commitments to positively affect socio-economics in RSA communities and minimize adverse effects. As an example of ongoing consultation with communities, Negotiation Agreements with the Yellowknives Dene and Deninu K'ue First Nations are in place to establish a cooperative and respectful relationship for responsible mineral development and cover a number of topics such as environmental protection, business and employment opportunities. The signing of this Negotiation Agreement is reflective of Avalon's commitment to work collaboratively with Aboriginal partners in the north and its general commitment to socially responsible mineral development (Avalon 2011a). The following is a summary of Avalon's key commitments.

Avalon is committed to employing as many persons as it can from the limited, locally available labour pool. The criteria for employee selection will recognize the value of years of work experience. Employment screening pertaining to criminal background checks will be filtered to consider several factors including but not limited to: the relevance of the criminal conviction to job duties, the date of the most recent offense and employment history since the commission of the crime, the nature of the offense, the accuracy of the information the finalist provided on the employment application, and whether the offense was committed as a minor.

Avalon's commitment to training will include site-based, on-the-job training and the support of a number of apprenticeships. Avalon will consult and collaborate with local

Aboriginal interests and communities to encourage effective development and delivery of the training programs. Avalon's training program will initially be designed to fill apprenticeship and technological occupations. In addition, all Thor Lake Project contractors will also be required to adhere to Avalon's goal of maximizing Northern and Aboriginal employment.

Avalon will be working with the Mine Training Society to begin mine and process training programs that will target local communities including but not limited to Yellowknife, N'Dilo, Dettah, Lutsel K'e, Fort Resolution, Hay River, Hay River Reserve and Fort Smith. Avalon's HR Management will liaise with the community points of contact and the Mine Training Society to advertise, screen and select candidates. Avalon will provide content expertise to the Mine Training Society to development curriculum for college certificate level training in mining and processing at Aurora College in Yellowknife, NT.

As previously indicated, Avalon is committed to maintaining a safe, healthy and productive work environment for all employees and contractors. As part of this commitment, Avalon will provide support consistent with Company policies to employees and their immediate families in dealing with personal health and well-being issues, including, to the extent possible, issues related to cultural health. Avalon will also have zero tolerance for the possession and/or use of drugs or alcohol at any Avalon work location. The Company will conduct drug screening for "reasonable cause" and "post-accidents".

In considering contract bids, Avalon will prioritize Aboriginal and northern businesses, and will take a number of measures to maximize Project-related business opportunities. These measures will include: preparing an annual business opportunities forecast to identify foreseeable procurement requirements for mining equipment, operations and maintenance support services; providing technical support and assistance in accessing sources of commercial capital; working closely with local First Nations interests and communities; identifying Project components at all stages of development and operations that should be targets for a northern business development strategy; facilitating subcontracting opportunities for northern businesses; and identifying possible opportunities for joint ventures with Aboriginal and northern businesses.

Avalon will seek out bid packages from all local communities and Aboriginal groups for the non-specialized services required for the Project. Avalon will work first with Aboriginal groups to determine and demonstrate capacity, competitiveness, regulatory requirement compliance and Avalon's operational requirements. If this cannot be achieved, the developer will encourage joint venturing with local business to meet these requirements.

## **7.3 CULTURAL EFFECTS**

### **7.3.1 Traditional Land Use and Harvesting**

#### **7.3.1.1 Potential Effects**

Participants of the Traditional Knowledge Studies conducted for the Yellowknives Dene First Nation, Deninu Ku'e First Nation and Fort Resolution Metis Council, and Lutsel K'e

Dene First Nation identified several potential effects of the Project on traditional land use. Other potential effects, such as noise, light and aesthetics, were also considered.

### **Yellowknives Dene First Nation**

In the Yellowknives Dene First Nation Traditional Knowledge Study, seven of the 17 participants were concerned about potential effects to land access and harvesting, stating that they would “lose the use of their land.”. The participants also expressed concern that pollution from the mine will kill or contaminate harvested fish or animals.

Nine participants cited potential environmental effects that they indicated may result from mine activities. These participants expressed concern about potential contamination including: water, land, air and noise pollution.

When asked about community related effects, six of the 17 participants indicated that access to harvesting sites would be restricted as a result of the Project, leading to the reduction of hunting, fishing and trapping activities in the Thor Lake site area. Two participants noted that cultural effects would result from restricted land access.

Some participants suggested that fewer people would trap as a result of Project-related employment. One participant indicated that the moose population would be adversely affected. Another participant noted that the Project would create easy access to the Thor Lake site area and/or greater area, resulting in more garbage and increased use of the area by people from the south.

All participants indicated that they historically and/or currently harvest animals in the geographic North Slave region. However, three of the 17 mentioned that they avoided harvesting in the Thor Lake area because of the mine. One person noted that the area was avoided because the minerals there are dangerous and the water in the site area should not be used.

Thirteen of the 17 participants of the Yellowknives Dene First Nations Traditional Knowledge Study indicated that they thought the Project would affect fish. Potential lake water contamination, noise, lower water levels and air pollution were noted as the primary effects to fish habitat that may result from mining operations (EBA 2011a).

### **Deninu Ku’e First Nation and Fort Resolution Metis Council**

The Traditional Knowledge Study for the Deninu Ku’e First Nation and Fort Resolution Metis Council indicated that three of the 19 participants were concerned that the Project would affect traditional harvesting and access to land. Participants stated that a lack of access may result in restricted or disrupted hunting, trapping and fishing activities. One participant indicated that the former Pine Point Mine site area is “still healing from Cominco”. Social implications regarding a lack of access were also identified by one participant who expressed concern that the Project would restrict or eliminate people’s ability to picnic, camp and hunt along the former Pine Point Mine site area’s proposed access road.

Eight of the 19 participants identified potential lake water contamination (from mine and barge activity) and potential decreases in fish populations as primary effects. Eight

participants indicated that fish may or may not be affected depending on whether or not environmental contamination resulted from the Project. Three participants reported that they did not think fish would be affected. These three participants also noted that fish would not be affected as long as barging activity did not contaminate Great Slave Lake (EBA 2011b).

#### **Lutsel K'e Dene First Nation**

One of the 13 study members of the Lutsel K'e Dene First Nation Traditional Knowledge Study indicated that the Project would have access and harvesting effects. This participant indicated that traditional hunting and trapping activities would be affected due to restricted access. Another participant also indicated that mine activity would cause animals to move out of the greater Thor Lake site area. If the animals move, their ability to trap in the Narrow Island and Francois Bay areas would be affected

Four of the 13 participants reported that they thought the Project would affect fish. Within this group, participants identified potential lake water contamination (from mine activity) as the primary effect. Five participants indicated that they did not think the Project would affect fish (EBA 2011c).

#### **Other Effects**

Minimal visual and audible changes resulting from mining operations are anticipated at the Nechalacho Mine and Flotation Plant Site. The remote proposed Nechalacho Mine Site is located 8 km north of Great Slave Lake. The only evidence of industrial operations visible from the shores of Great Slave Lake will be the temporary loading dock for the transport of concentrate by barge.

As discussed in Section 6.10, Blachford Lake Lodge may be affected by the Project's noise and lights. Noise levels emanating from the Nechalacho Mine site and associated infrastructure during all phases of this component of the Project are predicted to be typically less than 40 dBA at a distance of 1.5 km from the site. Regarding possible effects of light associated with infrastructure and activities related to the future construction and long term operation of the Nechalacho Mine, ambient light levels are likely to be somewhat higher than current levels for the relatively short (2 year) construction phase, and will likely return to current exploration phase levels as all mining activities will be underground and the process plant and camp will be contained inside solid structures.

The Hydrometallurgical Plant site is not visible from the shore of the Great Slave Lake, as it is located approximately 8 km inland. No noise or visual effects are anticipated.

#### **7.3.1.2 Mitigation Measures**

The main concern among participants of the Traditional Knowledge Studies was the restriction of access to traditional harvesting land. The Thor Lake Property encompasses an area of 4,249 ha located in a remote area 100 km southeast of Yellowknife. Although access will be restricted at the Thor Lake Site area, the surrounding areas will remain accessible for traditional land use. The Hydrometallurgical Plant at the Pine Point site is a brownfields site, in which only two participants of the TK study reported actively trapping.



Avalon recognizes the concerns that the communities have regarding potential effects to traditional harvesting areas and activities. Avalon encourages and supports its employees in continuing to conduct traditional activities by providing shorter rotation schedules.

Furthermore, Avalon has taken steps to minimize noise and light pollution as a result of the Project. To ensure noise is reduced throughout operations, drilling will be compartmentalized. Once the mine is in operation, flights will be limited to transporting personnel, equipment and camp materials in and out of the camp. Currently, flights operate in the region to access Blachford Lake Lodge and other communities such as Lutsel K'e.

Light pollution will be limited as the mining will be underground. Above-ground lighting will be utilized to ensure the health, safety and well-being of employees and visitors to the site. Light fixtures or stands will be positioned to direct light to the ground where the work is being done both underground and on the surface.

With respect to the Blachford Lake Lodge, Avalon is committed to ensuring that all reasonable measures will be taken to minimize noise levels and managing light emissions associated with its operations and will be working closely with Blachford Lake Lodge to ensure the wilderness experience enjoyed by their guests will be maintained.

### 7.3.1.3 Residual Effects

Although many participants of the Traditional Knowledge Studies indicated that they do not conduct traditional activities in the proposed Thor Lake Project sites, Avalon is committed to implementing mitigation measures to ensure that traditional harvesting activities conducted in the greater area surrounding these sites remains uncompromised. Following the implementation of mitigation measures, it is expected that Avalon's Thor Lake Project will not affect traditional land use and/or harvesting activities.

### 7.3.2 Heritage Resources

Archaeological resources are protected through various federal, territorial and Inuvialuit legislation and regulations. The *Northwest Territories Archaeological Sites Regulations*, pursuant to the *Northwest Territories Act*, applies throughout the Territories and states:

4. No person shall search for archaeological sites or archaeological artifacts, or survey an archaeological site, without a Class 1 or Class 2 permit.
5. No person shall excavate, alter or otherwise disturb an archaeological site, or remove an archaeological artifact from an archaeological site without a Class 2 permit.

The *Mackenzie Valley Land Use Regulations* (MVLUR) stem from the *Mackenzie Valley Resource Management Act* (MVRMA), and apply throughout the NWT, except in the Inuvialuit Settlement Region. Two sections of the MVLUR are relevant to archaeological sites:

- 6 (a). Unless expressly authorized by a permit or in writing by an inspector, no permittee shall conduct a land use operation within 30 m of a known monument or a known or suspected historical, archaeological site or burial ground; and

12. Where, in the course of a land-use operation, a suspected historical or archaeological site or burial ground is discovered,

(a) the permittee shall immediately suspend operations on the site or burial ground and notify the Board or an inspector; and

(b) the Board or inspector shall notify any affected First Nation and the department of the Government of the Northwest Territories responsible therefore of the location of the site or burial ground and consult them regarding the nature of the materials, structures or artifacts and any further actions to be taken.

Through the Access to Information and Protection of Privacy Act (Territorial 1994) the location of archaeological and cultural sites can be protected by not permitting their locations to be made public. Section 19 of the Act states:

19. The head of a public body may refuse to disclose information to an applicant where the disclosure could reasonably be expected to result in damage to or interfere with the conservation of

(a) fossil sites or natural sites;

(b) sites having an anthropological or heritage value or Aboriginal cultural significance; or

(c) any rare, endangered, threatened or vulnerable form of life.

### **7.3.2.1 Potential Effects**

An archaeology study of the Thor Lake area was conducted in 1988 as part of the Thor Lake Environmental Baseline Survey (Melville et al. 1989). The archaeological study was conducted to determine the cultural resources present at or within the Thor Lake Project site. The following were the objectives of the survey:

- review the relevant literature;
- examine, on foot, areas which might have been used as campsites whether in the historic period or in pre-contact times;
- record the locations and characteristics (e.g. size and nature of terrain) of sites found; and
- recover samples of exposed artifacts.

The study focused on areas proposed for construction, and areas where disturbances had already occurred. Artifacts found on disturbed sites indicated potential cultural site locations and the need for further testing. Selected areas adjacent to the mine site were analyzed to determine the importance of the area during prehistoric times, in particular, the north shore of Great Slave Lake. These areas included:

- the docking area on Great Slave Lake;
- the first 2 km of the road to Great Slave Lake;
- the mine site proper;

- the area between Thor and Cressy Lakes;
- the high rock ridges adjacent to the mine site; and
- the construction camp present at that time (September 1988).

Three sites were recorded by the study. The “Reg” site consisted of prehistoric and recent material found at the docking area on the shore of Great Slave Lake and the adjacent road at Great Slave Lake. The “Lori” site consisted of prehistoric lithic debitage scatter found along the crest of the high ridge south of Den Lake and east of the mine site. The “Strathcona” site was the disused diamond-drilling exploration camp at the west end of Thor Lake; it was recorded for future archaeological reference. Maps of these sites can be found within the archaeological study attached to Appendix E. In total, four artifacts were found and collected in the Reg site. Three of the artifacts were white quartz biface fragments and one was a bone hide flesher. Further detail can be found in Section 3.7.

The study also determined whether or not people had been using the general area. It was thought the area would be utilized as the high ridges would provide escape from insects, ease of travel and observation points. Similarly the lake shores and creeks would provide camp spots and access to fisheries. However, little evidence was found to indicate use and it was speculated that “people probably made little use of the area because there were excellent access routes into the interior by means of the nearby Francois and Beaulieu Rivers” (Melville et al. 1989). This is consistent with the Traditional Knowledge Studies, where several participants mentioned important travel routes all over Great Slave Lake between Yellowknife, Fort Reliance and Lutsel K’e (EBA 2011a, b, c).

The 1988 Thor Lake archaeology study indicated that no further archaeological work be done at the Thor Lake mine site proper as the sparse nature of cultural materials at the Reg site near Great Slave Lake did not warrant further archaeological investigation. However, it was also stated that because cultural materials were found within the Reg site, further development should be avoided on the north half of the beach where cultural materials were identified (Melville et al. 1989).

The Hydrometallurgical Plant is located on the historic Pine Point Mine site. It is anticipated that, due to the extensive ground disturbance that occurred historically, there is limited potential for archaeological resources to be present.

Participants of the 2010 Traditional Knowledge Studies identified significant cultural sites in the greater Project areas, but not within the local Project sites (Tables 3.7-1 to 3.7-3). Some graves may be located along the shores of the Great Slave Lake as much travel was conducted along the lake.

The participants were also asked if the Thor Lake Project would affect significant cultural sites. Participants from the Yellowknives Dene First Nation Study identified land disturbance (near graves), air pollution (toxic exposure), contaminated water, contaminated animals and geographic proximity (i.e. people will avoid cultural sites located near the mine) as potential effects (EBA 2011a). Participants from the Deninu Ku’e First Nation and Fort Resolution Metis Council Study identified potential land and water disturbance (near graves), pollution (land, water and noise), and restricted access to the former Pine Point

Mine site area's proposed access road/"water line road" as potential effects (EBA 2011b). Participants from the Lutsel K'e Dene First Nation Study identified mine activity (noise and smells), long-term environmental changed during the mine's life and contaminated water as potential effects (EBA 2011c).

### **7.3.2.2 Mitigation Measures**

Avalon will conduct archaeological impact assessments at both sites prior to construction, to ensure that archaeological resources are not disturbed. A qualified archaeologist will be hired to perform the study. As fieldwork can only be effectively undertaken during the summer months, NWT Archaeologists Permit applications will be applied for during spring, prior to field season. On the recommendation of the contract archaeologist in the field, or the PWNHC, the Developer shall implement avoidance or mitigation measures to protect archaeological sites or to salvage the information they contain through excavation, analysis, and report writing.

An archaeological impact assessment typically consists of two phases of archaeological research, inventory and assessment, focused on the Project footprint or study area (PWNHC ND). An inventory is generally conducted once the direct, indirect and perceived geographical areas affected by the Project are well defined. Systematic and intensive fieldwork identifies potential effects on archaeological sites from possible and alternate construction components. All archaeological sites must be recorded and submitted on Archaeological Survey of Canada site survey forms. Information is collected from field, library, and archives to identify likely effects and identify any further required studies or mitigations. An NWT Class 2 Archaeological Permit is required.

Following the inventory phase, an assessment is conducted to predict the form and magnitude of the effects. Assessments provide information on the size, volume, complexity, and content of an archaeological site, which is used to rank the values of different sites and to identify mitigation measures or programs (PWNHC ND).

An Archaeological Site(s) Protection Plan will be prepared that will facilitate the continued protection and management of archaeological resources during the construction phase of the Project. A typical plan includes detailed procedures for information flow between relevant agencies, how minor route realignments during construction will be assessed for archaeological impacts, and how this information will be communicated in a timely manner.

Mitigation measures will be designed on an individual basis, and require prior approval by the Prince of Wales Northern Heritage Centre. Mitigation measures may include avoidance (the preferred mitigation), temporary site protection, or systematic data recovery. It is expected that most archaeological sites found will be small and could be readily avoided with a minor footprint adjustment. Avalon will make every effort to avoid and protect recorded any unrecorded archaeological and heritage resources during the conduct of this Project.

In the unlikely event that Project relocation is not feasible and a site will be impacted, recommended site mitigation will likely comprise detailed mapping, recording and excavation of a sufficient number of units to ensure a representative sample of the site

contents is obtained. This ensures that knowledge of that site is available for future generations.

### 7.3.2.3 Residual Effects

With the application of the mitigation measures described, no residual effects to archaeological resources in the proposed development areas are expected to occur.

## 7.4 HUMAN ENVIRONMENT MONITORING AND MANAGEMENT

Avalon is committed to progressive human resource practices and compliance with all applicable governing labour laws and regulations. Avalon's human resources staff will administer and monitor the following primary human resources functions as shown in Table 7.4-1.

<b>TABLE 7.4-1: AVALON HUMAN RESOURCE PLAN OUTLINE</b>	
<b>Employment</b>	• Recruitment/Selection
	• Hiring
	• Orientation
<b>Compensation/Benefits</b>	• Medical/Dental
	• Vacation
	• Disability
	• Other
<b>Employee Relations</b>	• Performance Management
	• Ethics
	• Drug Use
<b>Training and Development</b>	• Pre-Employment/Apprenticeship
	• On-the-Job
	• Environmental Protection
	• Archaeological Resource Protection

Avalon is committed to tracking and making monitoring information available to government, so that effects from mining on regional communities can continue to be monitored and evaluated by the GNWT. Specifically, Avalon will track key indicators such as employment (including contractors), employee retention, Aboriginal and northern employment, and amount spent on wages and goods and services. Avalon will confidentially track other human resources information, including the use of compensation/ benefits and employee relations. This will provide insight regarding the health and wellness of workers and their families. By monitoring these indicators, Avalon can identify any gaps or areas that require improvement through a change in policy or implementation strategy.

To monitor the success of training initiatives, training records for all operations employees will be stored in Avalon's training database and managed by the Human Resources

Manager. The database will allow all employee skill-sets and training dates to be tracked and monitored, ensuring employees are properly certified or trained for the specific tasks they are assigned. Training records will be reviewed on an annual basis, and available to the GNWT for inclusion in future monitoring assessment initiatives, upon request. Through effective monitoring and management programs, training opportunities provided by Avalon will expand as necessary. The expansion of training programs will be guided by sustainable development principals to generate further economic and social benefits for future generations (Cox et al. 2010).

Another resource available to Avalon relating to the monitoring of community wellness includes the *Communities and Diamonds: Socio-Economic Impacts in the Communities of Behchoko, Gameti, Whati, Wekweti, Dettah, N'Dilo, Lutsel K'e and Yellowknife* report (GNWT HSS et al. 2010). The report provides key baseline information and trends relating to the social effects resulting from the mining industry in the NWT. The trends for Yellowknife and Small Local Communities are used to anticipate social effects in the Project's RSA communities. This report is issued on an annual basis and can be utilized by Avalon in its ongoing monitoring of impacts on culture.

Other types of monitoring will be conducted through formal and informal, ongoing communications with communities and responsible agencies in the region. As demonstrated by Avalon's years of communication and formal agreements to continue to engage with communities, Avalon is committed to ensuring that these relationships are upheld and that the terms of the agreements are followed. It is anticipated that the results of ongoing consultation will provide information regarding social, economic, and cultural effects, including traditional harvesting and land use, and potential mitigation or adaptive management strategies. Therefore, Avalon will continue to monitor their relationships and the agreement results.

A summary of Avalon's human environment monitoring and management plans including the locations of where they are described in this document is provided in Table 7.4-2.

<b>TABLE 7.4-2: HUMAN ENVIRONMENT MONITORING AND MANAGEMENT PLANS</b>	
<b>System</b>	<b>Location in Report</b>
Personnel Requirements and Recruitment Strategy	4.9
Employment	4.9
Compensation/ Benefits	4.9 7.4
Employee Relations	4.9 7.4
Training and Development	7.4
Consultation and Agreement Terms	5.0
Community Wellness via <i>Communities and Diamonds</i> Reports	7.4