

**GAHCHO KUÉ PROJECT
ENVIRONMENTAL IMPACT STATEMENT**

**SECTION 12
SOCIO-ECONOMIC IMPACT ASSESSMENT SECTION**

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Appendix 12.III	Archaeological Assessment

12 SOCIO-ECONOMIC IMPACT ASSESSMENT

12.1 INTRODUCTION

12.1.1 Context

This section contains the social, cultural, and economic effects analysis (referred to as the Socio-economic Impact Assessment [SEIA]) of the Environmental Impact Statement (EIS) for the Gahcho Kué Project (Project) as proposed by De Beers Canada Inc. (De Beers). The Terms of Reference for the Gahcho Kué EIS, issued on October 5, 2007 by the Mackenzie Valley Environmental Impact Review Board's (MVEIRB) Gahcho Kué Panel (2007) outlined the requirements for the proponent to consider three key lines of inquiry, six subjects of note, and 11 "other issues".

In preparing this section, the *Socio-Economic Impact Assessment Guidelines* (MVEIRB 2007) and the direction provided in the *Terms of Reference for the Gahcho Kué Environmental Impact Statement* (Terms of Reference) (Gahcho Kué Panel 2007) were used as guidance material. De Beers further relied on the input received from communities to interpret the breadth and scope of the key lines of inquiry and subjects of note. In general, the issues of concern focus on the capacity of the families and communities to respond to the anticipated changes from the Project. Collectively, there is considerable overlap and inter-relationships among the socio-economic key lines of inquiry, subjects of note, and other issues.

Socio-economic issues were identified as high levels of community concern during the Report of the Environmental Assessment (MVEIRB 2006). Accordingly, the EIS includes a description of the engagement with potentially affected communities so that there is adequate consideration of these issues. Community concerns have been integrated into the SEIA wherever possible, and a separate section on community engagement with potentially affected communities is detailed in Section 4 of this EIS.

The public record from the scoping workshops and Report of the Environmental Assessment (MVEIRB) indicated that particular aspects of the Project and of the environment require higher levels of effort than others. In the Terms of Reference (Gahcho Kué Panel 2007), the MVEIRB requires that the SEIA give priority to and analyze these particular aspects of "greatest concern" as key lines of inquiry. The key lines of inquiry have been identified to provide a comprehensive, detailed analysis of the issues of significant public concern

related to the Project. There are three key lines of inquiry that concern the human or socio-economic environment.

- Long-term Social, Cultural, and Economic Effects (Section 12.6.1);
- Family and Community Cohesion (Section 12.6.2); and
- Social Disparity Within and Between Communities (12.6.3).

The Terms of Reference also require a thorough analysis of subjects of note, including a cumulative effects assessment, although they do not require the same level of detail as key lines of inquiry. There are six subjects of note that pertain to the SEIA.

- Employment, Training, and Economic Development (Section 12.7.1);
- Demands on Infrastructure (Section 12.7.2);
- Tourism Potential and Wilderness Character (Section 12.7.3);
- Proposed National Park (Section 12.7.4);
- Culture, Heritage, and Archaeology (Section 12.7.5); and
- Aboriginal Rights and Community Engagement (Section 12.7.6).

In addition to the key lines of inquiry and subjects of note, 11 other issues that pertain to socio-economic effects are outlined in the Terms of Reference, and include:

- employment;
- education;
- training;
- income and expenses;
- cultural/population health;
- community capacity;
- heritage resources;
- labour force;
- government capacity;
- northern business; and
- sustainable economy.

The key lines of inquiry and subjects of note have been rearranged to more effectively tell the “human story”. It should also be noted that the “other issues” are captured inside the key lines of inquiry and subjects of note evaluations. Given the concerns of people expressed during the scoping workshops in Yellowknife, Detah, Łutselk’e, Fort Resolution, and Behchokò and the interests of other Mackenzie Valley residents and communities, the SEIA addresses issues raised in these and other consultations. The SEIA proposes mitigation, and commits to benefit enhancement measures targeting the different potentially affected communities. These communities include both non-Aboriginal and Aboriginal people, along with vulnerable sub-populations such as women, children, and Elders who expressed concerns during the environmental assessment that they may not benefit from this development.

12.1.2 Purpose and Scope

The purpose of the SEIA is to meet the Terms of Reference issued by the Gahcho Kué Panel. The terms for the key lines of inquiry and subjects of note are shown in Table 12.1-1. The entire Terms of Reference document is included in Appendix 1.I and the complete table of concordance for the EIS is in Appendix 1.II of Section 1, Introduction of the EIS.

The impact assessment will evaluate all Project phases, including construction (i.e., Kennady Lake dewatering), operation, and closure and reclamation (i.e., refilling and recovery of Kennedy Lake). Project-specific (incremental) and cumulative effects have been included in this section. Given that people and communities occupy a large area, the effects from the Project must be considered in combination with other developments and activities that influence people within their communities and traditional areas.

Table 12.1-1 Terms of Reference Pertaining to Socio-economics

Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
4.1.5 Family and Community Cohesion	Money management and changes in lifestyle choices.	12.3.4.4.4, 12.3.5, 12.5.6, 12.6.2.3, 12.6.3.3, 12.8.2.1, 12.8.4
	Provide an analysis of alternatives to the conventional two-week rotation.	12.4.2.5, 12.6.1.3.1, 12.6.2.2.2, 12.7.1.2.2, 12.8.4.1.1
	Address potential for the influx of outside workers placing increasing demands on community social fabric and facilities.	12.6.1.3, 12.6.2.4, 12.7.2.2, 12.7.2.8, 12.8.4.1.2
	Absence of workers from their family.	12.6.2.2, 12.6.2.4, 12.6.2.7, 12.6.3.2, 12.8.7
	Decreased family cohesion, including breakup of families.	12.6.1.3.1, 12.6.1.5.1, 12.6.2.2.1, 12.6.2.3.2, 12.6.2.4, 12.6.2.6, 12.8.4.4
	Absence of leaders, volunteers, etc. from communities.	12.3.4.4.6, 12.5.6, 12.6.2.2, 12.6.3.3.1, 12.6.3.6.2, 12.7.2.1.2, 12.7.2.5, 12.7.2.7, 12.7.2.8.2, 12.8.7
	Changes in levels of substance abuse.	12.3.4.4.7, 12.3.5, 12.6.2.3.1, 12.6.2.3.2, 12.6.3.3.1, 12.8.4.3
	Changes in traditional practices and levels of participation in traditional practices.	12.3.4.4.6, 12.3.4.8.4, 12.3.4.8.5, 12.3.4.8.6, 12.3.5, 12.6.2.2.1, 12.6.2.4, 12.6.3.3.1, 12.7.1.2.1, 12.7.4.2.1, 12.7.5.3, 12.7.5.7.2, 12.8.5, 12.8.6.3, 12.8.7
	Provide an outline as to how a cooperative approach to social, economic, and cultural problems related to the proposed development may be facilitated.	12.7.1.2.1, 12.8.6.4, 12.9.1
	Determine how the proposed development might magnify existing vulnerabilities of the community.	12.3.4.4.7, 12.6.3.3.1, 12.6.3.3.2, 12.8.4.3, 12.8.4.4
	Isolate aspects of the proposed development that might add to the "impact load" being felt by potentially affected communities.	12.7.1.2.1, 12.8
	Report on indicators of cultural resilience for affected communities, such as practice of language, story telling, and cultural activities, as well as consumption of country food.	12.3.4.4.1, 12.3.4.6.1, 12.3.4.8.3, 12.3.5, 12.6.2.2.1, 12.6.2.4, 12.7.5.2, 12.7.5.3, 12.7.5.5, 12.7.5.7.2, 12.8.5.1, 12.8.5.3, 12.8.6.1, 12.8.6.3, 12.8.7
	Provide a discussion concerning the development of a Human Resources Management Plan and any programs that will be offered at the mine site to identify and mitigate social problems.	12.4

Table 12.1-1 Terms of Reference Pertaining to Socio-economics (continued)

Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
4.1.5 Family and Community Cohesion (continued)	Impacts related to population in-and out-migration.	12.2, 12.3.4.3, 12.3.5, 12.6.1.3.1, 12.6.1.3.2, 12.6.2.3.2, 12.6.2.4, 12.7.1.2.1, 12.7.2.2, 12.7.2.8.2, 12.8.3.2.1, 12.8.3.4, 12.8.4.1.2
	Decreased access to health care.	12.3.4.4.4, 12.3.4.4.7, 12.3.4.7.1, 12.3.4, 12.3.5, 12.4.15, 12.7.2.2.2
	Increased housing pressures.	12.3.4.1.1, 12.3.4.4.7, 12.3.4.6.7, 12.3.5, 12.6.3.3.1, 12.8.4.3
	Increased crime rates.	12.3.4.4.6, 12.3.4.4.7, 12.3.5, 12.6.2.3.1, 12.6.3.3, 12.8.4.3
	Decreased access to childcare.	12.3.4.6.1, 12.6.1.3.1, 12.7.5.2.1
	Increased social divisions within or between communities.	12.6.3.3, 12.8.4.3, 12.8.6.3
	Decreased public safety.	12.3.4.4.7, 12.3.4.7.1, 12.7.2.3.1
	Decreased access to education and decreased education completion levels.	12.3.4.3, 12.3.4.6.1, 12.3.5, 12.6.3.2.1, 12.6.3.2.2, 12.8.6.2
	Decreased physical, mental, and cultural well-being of northern mine workers and northern mine workers' families.	12.3.4.4, 12.3.5, 12.6.2.2.1, 12.7.1.1.2, 12.8.6.3
	Provide a comparison of the likely relative distribution of beneficial and adverse cultural and social impacts among the different potentially affected communities.	12.3.5, 12.6.3.2, 12.6.3.5, 12.6.3.6.1, Annex K
	Describe the required social service networks to support community health and wellness (pressures on social services).	12.3.4.4.6, 12.3.4.7, 12.7.5.2.1, (see also Annex K)
	Impacts of the proposed development and other past, present and reasonably foreseeable developments on political and social development, cultural values, traditional practices and language in potentially affected communities.	12.6.2.4, 12.7.5, 12.8.2, 12.8.4, 12.8.5, 12.8.7, 6.6.2
	Provide a description, for each identified potential effect, as to how the development may effect valued social and cultural components: at the regional level; at the local level for each potential-affected community; and among particularly vulnerable sub-populations within potentially affected communities, such as women, children, and elders.	12.3.4.4.7, 12.5.5.2, 12.6.1.8, 12.6.1.9.2, 12.6.2.6, 12.6.2.7, 12.6.3.3, 12.6.3.5, 12.6.3.6, 12.7.1.4, 12.7.1.6, 12.7.2.2.2, 12.7.2.3.2, 12.7.2.4.2, 12.7.2.6, 12.7.2.8, 12.7.3.6, 12.7.4.3, 12.7.4.4, 12.7.4.6.2, 12.7.5.2.2, 12.7.5.3.2, 12.7.5.4.2, 12.7.5.5, 12.7.5.7, 12.8.4.3, 12.8.4.4, Appendix K.I

Table 12.1-1 Terms of Reference Pertaining to Socio-economics (continued)

Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
4.1.6 Social Disparity within and Between Communities	State the criteria and relevant indicators for analyzing increased social disparity.	12.6.3.1.3
	Address disparity not only between individuals but also between communities.	12.6.3.2
	Describe the engagement with potentially affected communities so that there is adequate consideration of socio-economic issues, including the specific concerns raised; mechanisms for their resolution, and any aspects of project design intended to accommodate concerns.	12.1.1, 12.3.4.4.6, 12.5.2, 12.5.4, 12.5.5.2, 12.6.2.2, 12.6.2.4, 12.6.2.5, 12.6.3.1.2, 12.6.3.5, 12.7.1.3.2, 12.7.4.2.2, 12.7.5.3, 12.7.6, 12.8.6.4, 12.9, Section 4
	Provide a separate analysis for each potentially affected community addressing vulnerabilities, community engagement, and innovative solutions that may indirectly offset the direct impacts from the proposed development.	12.5.5.2, 12.5.7.2, 12.8.4.4, 12.8.5.3, 12.8.6, 12.9, Section 4, Annex K, Appendix K.I
4.1.7 Long Term Social, Cultural and Economic Effects	Provide a summary of the long-term social, cultural, and economic effects.	12.2, 12.6.1.8
	Provide an analysis of projected benefits, actually accrued benefits, and how the proposed development may improve on previous developments.	12.6.1, 12.8.3.1, 12.8.3.2, 12.8.6.2, 12.8.7, Appendix 12.II
	Address the contribution of the development to the cumulative long term effects on communities from an increasing pace of development, considering communities' abilities to respond to, plan for and benefit from development.	12.3.3, 12.3.4.6.2, 12.7.4.2.2, 12.8.2.3, 12.8.3.1.1, 12.8.3.3, 12.8.7
	Address the lack of capacity for monitoring by communities and government.	12.7.2.4, 12.9
	Address the concern regarding single resource dependency – economic over-reliance on one resource.	12.8.6.1
	Increased demands on social, cultural and economic services (e.g., medical transportation, emergency services, hospital services, education, child care, social service, and public health services).	12.3.4.5.3, 12.3.4.6, 12.3.4.7, 12.7.2, Annex K
	Address the likely level of in- and out-migration as a result of the development, including out-migration of skills, and the likely economic impacts of in- and out-migration among potentially affected communities.	12.6.1.3, 12.6.1.8, 12.6.2.3, 12.6.2.5, 12.6.2.7, 12.7.2.2, 12.7.2.7, 12.8.2.1, 12.8.2.4, 12.8.3.2.1, 12.8.3.4, 12.8.4.1.2, 12.8.4.1.3
	Health effects from changed diet (e.g., less country food).	12.3.4.4.1
	Effects associated with increasing disposable income and a larger reliance on the wage economy.	12.3.4.4.7, 12.3.5, 12.5.7.1, 12.6.2.3.1

Table 12.1-1 Terms of Reference Pertaining to Socio-economics (continued)

Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
4.1.7 Long Term Social, Cultural and Economic Effects (continued)	Address sub-populations within potentially affected communities that are more vulnerable to potential economic impacts.	12.3.4.4.7, 12.3.5, 12.4.3, 12.6.1.3.1, 12.6.2.2.1, 12.6.3.1.2, 12.6.3.3.1, 12.6.3.3.2, 12.6.3.6.2, 12.7.1.3.1, 12.7.1.3.2, 12.7.2.2.2, 12.8.4.3, 12.8.4.4
	Provide an estimate of required contractor and subcontractor goods and services required through the different stages of the project life cycle, and associated direct and indirect economic effects (e.g., local and regional income multipliers).	12.6.1.2.2, 12.6.1.5, 12.6.1.6, 12.7.1.2, Appendix 12.II
	Provide a summary of the opportunities for - and capacities of - local, regional and Territorial businesses to compete for the right to supply required goods and services, both directly to the proposed development, as well as to meet new demand created by economic growth spurred by the development.	12.4.17, 12.4.18, 12.6.1.4.2, 12.6.1.5.2, 12.6.1.5.3, 12.6.3.4, 12.7.1.1.3, 12.7.1.2.1, 12.7.1.2.2, 12.7.1.6.2, 12.8.2.4, 12.8.3.1, 12.8.3.1.1, 12.8.3.2.2, Appendix 12.II
	Provide estimates of what percentage of goods and services might feasibly be provided by northern businesses, and discuss any plans, commitments or strategies the developer has for maximizing this percentage.	12.4.17, 12.6.1.5, 12.7.1.2.1, 12.7.1.2.2, Appendix 12.II
	Provide an assessment of how the development will contribute to opportunities to diversify the economic base at the local, regional, and Territorial level including the production and supply of new goods and services at the local and regional levels.	12.7.1.2.2, 12.8.3.1, 12.8.3.1.1, 12.8.3.1.3, 12.8.3.2, 12.8.7, Appendix 12.II
	Provide an assessment of other potential economic uses of the area that may be affected by the proposed development, including opportunity costs.	12.6.2.4, 12.7.3.2, 12.7.3.3.1, 12.7.3.6.2, 12.7.4.4, 12.7.4.6.2, 12.7.5.3, 12.8.1, 12.8.3.2.1, Appendix 12.II
	Address increased government revenues at the local, Territorial and national levels, including at minimum an estimate of total expected direct and indirect taxes to be paid to each level of government as a result of Gahcho Kué activities.	12.6.1.6, 12.6.1.8, Appendix 12.II
	Increased employment numbers, including a prediction of employment multipliers, and the development's estimated effects on employment levels in potentially affected communities.	12.4.2, 12.6.1.2, 12.6.1.3, 12.6.1.8, Appendix 12.II
	Increased local income and disposable income levels (identify income multipliers where possible).	12.5.5.3.1, 12.6.1.2, 12.6.1.8, Appendix 12.II
	Impacts on local and regional inflationary pressure and the cost of living.	12.6.1.4, 12.6.1.8, 12.6.1.9.2, 12.6.3.2, 12.6.3.5, 12.7.1.2.1, 12.8.2.1, 12.8.2.4, 12.8.4.3, Appendix 12.II
	Impacts on other types of economic activity, with emphasis on the traditional economy.	12.3.4.4.6, 12.6.2.2.1, 12.6.2.2.3, 12.6.3.3.1, 12.6.3.3.2, 12.8.4.1.1, 12.8.6.1, 12.8.6.3, 12.8.7, Appendix 12.II
	Describe how the economic effects identified will be distributed among potentially affected communities versus other areas.	12.6.1.2.2, 12.6.3.3.2, 12.8.4.1.2, 12.8.4.3, Appendix 12.II
	Provide an overview of proposed follow up programs to verify the impact predictions and to monitor the effectiveness of any mitigation measures which must include an evaluation of possible joint monitoring of cumulative effects.	12.5.2.1, 12.7.2.4, 12.9

Table 12.1-1 Terms of Reference Pertaining to Socio-economics (continued)

Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
5.3.1 Employment Training and Economic Development	Provide an analysis of training and education needs for mine employment and mine worker advancement including an analysis of how the proposed development might affect training and education in the potentially affected communities in general.	12.4.14, 12.5.6, 12.7.1.3.2, 12.7.1.4, 12.8.4.2
	Assess the current capacity of training programs and of Aboriginal and northern people to engage in these training programs.	12.5.6, 12.7.1.3.2, 12.7.1.4
	Describe all employment requirements by skills category over the life of the project.	12.4.3, 12.4.4, 12.4.5, 12.4.6, 12.5.6, 12.7.1.1.3, 12.7.1.2.1, 12.7.1.3, 12.7.1.4, 12.7.1.6
	Describe which employees will be direct versus contractor employees, and describe whether and how the developer will require its contractors to have similar commitments to maximizing regional and Aboriginal employment.	12.4.3, 12.4.6, 12.4.17, 12.5.6, 12.6.1.3.3, 12.6.1.7, 12.6.3.3.1, 12.6.3.4, 12.7.1.1.3, 12.7.1.2.2, 12.7.1.3.2, 12.7.1.5
	Describe where the likely labour pool "draw" is going to be from for this development, including an assessment of the available labour pool, at varying geographic scales, to meet the direct mine labour requirements, including: individual communities and the Akaitcho and Tlicho regions as a whole, Territorial, and beyond the NWT.	12.3.4.2, 12.3.5, 12.7.1.3.1, 12.8.2.3, 12.8.3.1, 12.8.3.2
	Describe any identified barriers to employment, advancement and retention for Northern workers (with particular emphasis on residents of smaller potentially affected communities and Aboriginal people), including minimum skill requirements, hiring policies related to criminal records or substance addictions, availability of willing employees, and lack of training opportunities for community members.	12.3.4.2, 12.6.1.3.1, 12.6.3.5, 12.7.1.3.1, 12.7.1.3.2
	Describe the requirements for any training, education, and other improvements necessary to maximize employment of residents of potentially affected communities in the workforce of the mine, and compare these requirements to existing training initiatives available in the NWT.	12.4.3, 12.4.4, 12.4.6, 12.4.8, 12.4.9, 12.4.17, 12.4.18, 12.6.3.4, 12.7.1.3.1, 12.7.1.3.2
	Describe requirements for any training, education or other improvements necessary to maximize engagement of businesses of each potentially-affected community in the economic benefits accruable from the development.	12.4.14, 12.4.18, 12.5.6, 12.6.1.3.1, 12.6.1.5.1, 12.7.1.2.1, 12.7.1.4, 12.7.1.5, Section 1
	Describe the developer's strategies, plans or commitments with respect to maximizing the proportion of direct mine employees that are NWT residents, Aboriginal persons, and residents of potentially affected communities (e.g., through hiring policies, training initiatives).	12.4.2.4, 12.4.3, 12.4.6, 12.4.7, 12.4.8, 12.4.9, 12.4.14, 12.5.6, 12.6.1.9.2, 12.6.2.4, 12.6.2.5, 12.6.3.4, 12.7.1.1.3, 12.7.1.2.2, 12.7.1.3.2, 12.7.1.4, 12.7.1.5, 12.8.6.4, Section 1
5.3.2 Impacts on Tourism Potential and Wilderness Character	Loss of tourism potential.	12.7.3, 12.8.3.2.1, 7, 11.10, 11.11, 11.12
	Impacts from air traffic.	12.7.4.3.3, 12.8.3.3
	Loss of wilderness character.	12.7.3, 12.7.4.6.2, 12.8.2.1
	Decreased hunting success and / or wildlife sightings.	12.3.4.8.4, 12.3.4.8.6, 12.3.5, 12.6.2.2.1, 12.7.3.2, 12.7.3.3, 12.7.3.6.2, 12.7.5.3, 12.8.6.3

Table 12.1-1 Terms of Reference Pertaining to Socio-economics (continued)

Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
5.3.3 Demands on Infrastructure	Infrastructure pressures on regional centres from in-migration.	12.7.2.3, 12.7.2.7
	Shortage of locally available labour for community services.	12.7.2.2
	Assess the costs for government to provide service increases and maintain adequate physical infrastructure.	12.7.2.3
	Monitoring and regulatory capacity of government.	12.7.2.4
	Rotational schedule resulting in absence of critical volunteers (e.g., volunteer fire fighters).	12.7.2.5
	Provide an assessment of the socio-economic costs and who will bear them of any increases in physical and social service infrastructure predicted to be required which must include discussion of likely in- and out-migration scenarios to which the development will contribute.	12.7.2
	Describe lessons learned from economic, cultural and social impacts of previous mine developments in the NWT and the North, and how they have been incorporated into the impact identification, prediction and mitigation for the development which must describe any plans, strategies or commitments designed to mitigate the identified adverse impacts.	12.7.1.2, 12.7.2.3, 12.7.2.7
5.3.4 Culture, Heritage and Archaeology	Effects on the Lockhart River system, including the original Łutselk'e settlement at Artillery Lake and Our Lady of the Falls taking into consideration that they are closely related to several Key Lines of Inquiry (e.g., caribou and increasing social disparity).	12.7.5.3.2
	Reduced involvement in communal activities including communal hunts.	12.7.3.3.4
	Address the potential for growing sense of disempowerment.	12.3.4.4.6, 12.6.2.2.3, 12.6.2.4
	Increased out-migration and skills drain to regional centres.	12.8.4.1.2
	Reduced harvesting success and loss of traditional skills.	12.8.6.3
	Loss of language.	12.8.5.1
	Loss of spiritual connections and knowledge.	12.7.5.1.4
	Physical impact on heritage and archaeological sites.	12.7.5.1.4
	Loss of spiritual value of place.	12.7.5.1.4
	Lost of aesthetic value of place.	12.7.5.1.4
	Hunting restrictions around mine sites.	12.4.12
5.3.6 Proposed National Park	Provide maps showing the exact location of the proposed development in relation to the National Park preliminary area of interest.	Figure 12.7-3, Figure 12.7-4

Table 12.1-1 Terms of Reference Pertaining to Socio-economics (continued)

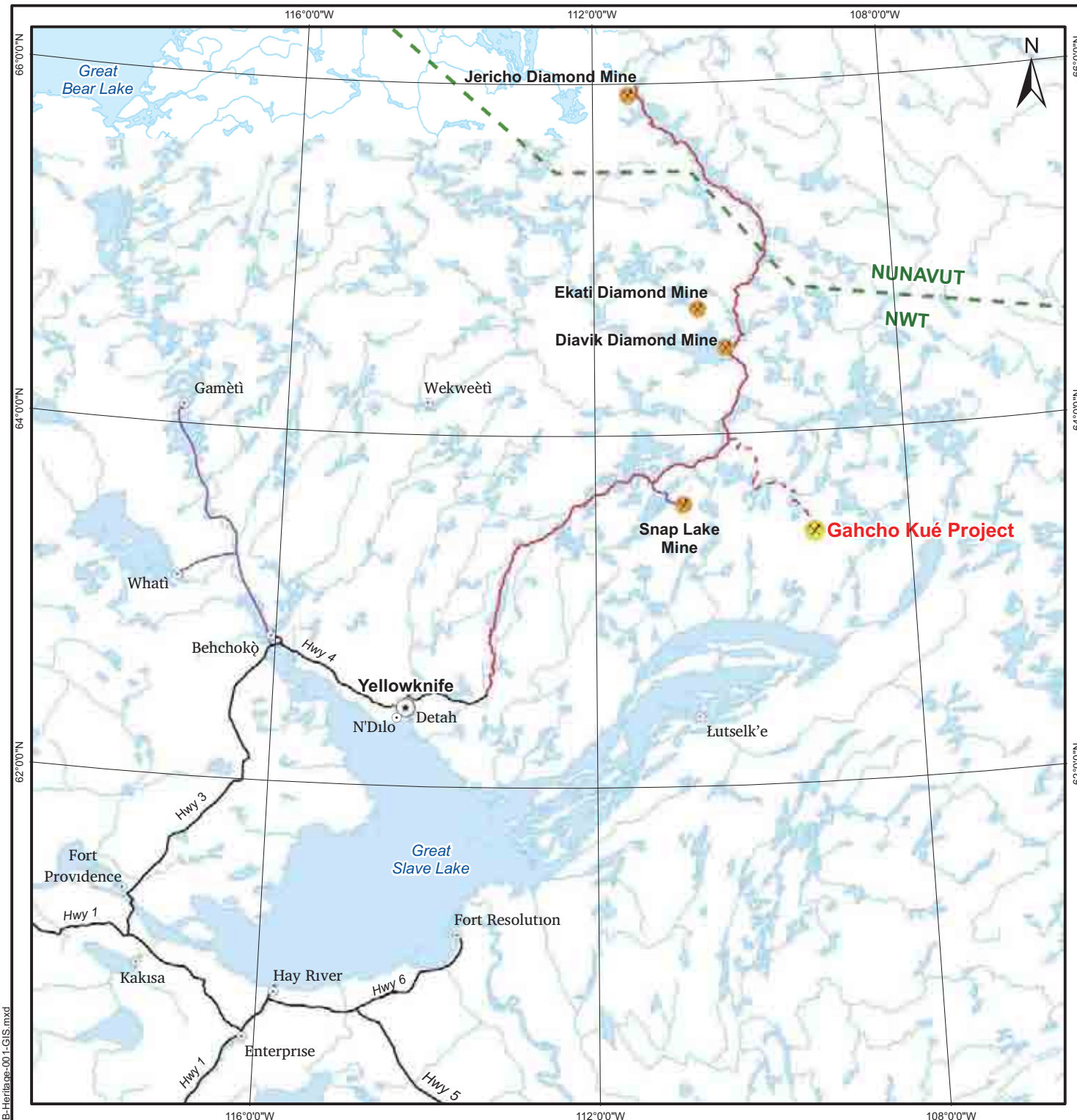
Terms of Reference Section	Final Terms of Reference Requirements	Applicable EIS Sub-Section
6.1.1 Integrated Project-Specific Analysis and Sustainability	Evaluate the extent to which the proposed development makes a positive overall contribution towards environmental, social, cultural, and economic sustainability.	12.8.6, 12.8.7
	The proposed development's contribution to sustainability and effects on future generations must be evaluated on the basis of:	12.8
	<ul style="list-style-type: none"> the extent to which it makes a positive overall contribution towards environmental, social, cultural and economic sustainability; 	12.8.6, 12.8.7
	<ul style="list-style-type: none"> how the planning and design take into account its effects on achieving sustainable development; 	12.8.6
	<ul style="list-style-type: none"> to what degree it promotes the present generation's ability to meet its needs without compromising the ability of future generations to do so; 	12.8.6.1
	<ul style="list-style-type: none"> how monitoring, management and reporting systems have incorporated indicators of sustainability; and 	12.7.2.4.1, 12.9
	<ul style="list-style-type: none"> the views of stakeholders and participants in the environmental impact review process. 	12.5.4, 12.8.6.1, 4

12.1.3 Study Areas

The Project is situated north of the eastern arm of Great Slave Lake in the Northwest Territories (NWT) at Longitude 63° 26' North and Latitude 109° 12' West. The Project site is about 140 kilometres (km) northeast of the nearest community, Łutselk'e, and 280 km northeast of Yellowknife (Figure 12.1-1). It is located in M̄qwhì Gogha Dèn̄jht'łèè, an area recognized in the Tlicho Agreement and is in the area asserted by the Akaitcho Dene First Nations and the Northwest Territories (NWT) Métis Nation as their traditional area. The North Slave Métis Alliance also asserts rights on behalf of its members in this area. While the Government of Canada is negotiating agreements for land resources and governance with the Akaitcho Dene First Nations and with the NWT Métis Nation, the federal government has not accepted to enter into a negotiation and has indicated the NSMA is required to prove its claim for rights recognition.

To assess the potential socio-economic effects from the Project on people and communities, it is necessary to define appropriate spatial boundaries. The Local Study Area (LSA) for the SEIA includes the North and South Slave regions of the NWT (Figure 12.1-2). More specifically, this region captures all communities as identified in the Terms of Reference (Gahcho Kué Panel 2007), including Behchok̄, Gamètì, Whatì, Wekweètì, Yellowknife, Detah, N'Dilo, Łutselk'e, and Fort Resolution. The Terms of Reference define "community" as "any potentially affected settlement, town, village, or city as well as any First Nation or Métis group within the Tł̄chq̄ and Akaitcho regions". Other communities and groups in this area include NWT Métis Nation, and the NSMA, along with Hay River, Hay River Reserve, Fort Providence, and Enterprise.

While information was collected on all of these groups and communities for the socio-economic baseline (Annex K) along with the NWT, in the rest of Section 12, the potentially-affected communities were determined to be a smaller subset of communities, or LSA, which are Behchok̄, Gamètì, Whatì, Wekweètì, Yellowknife, Detah, N'Dilo, Łutselk'e, and Fort Resolution. The Regional Study Area (RSA) comprises the NWT, where it is often used to support the effects evaluation.



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary

NOTES

Base data source: The Atlas of Canada

GAHCHO KUÉ PROJECT

Location of the Gahcho Kué Project

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:3,500,000
50 25 0 50
Kilometres



FILE No:
B-Heritage-001-GIS

DATE:
September 20, 2010

JOB NO:
09-1365-1004

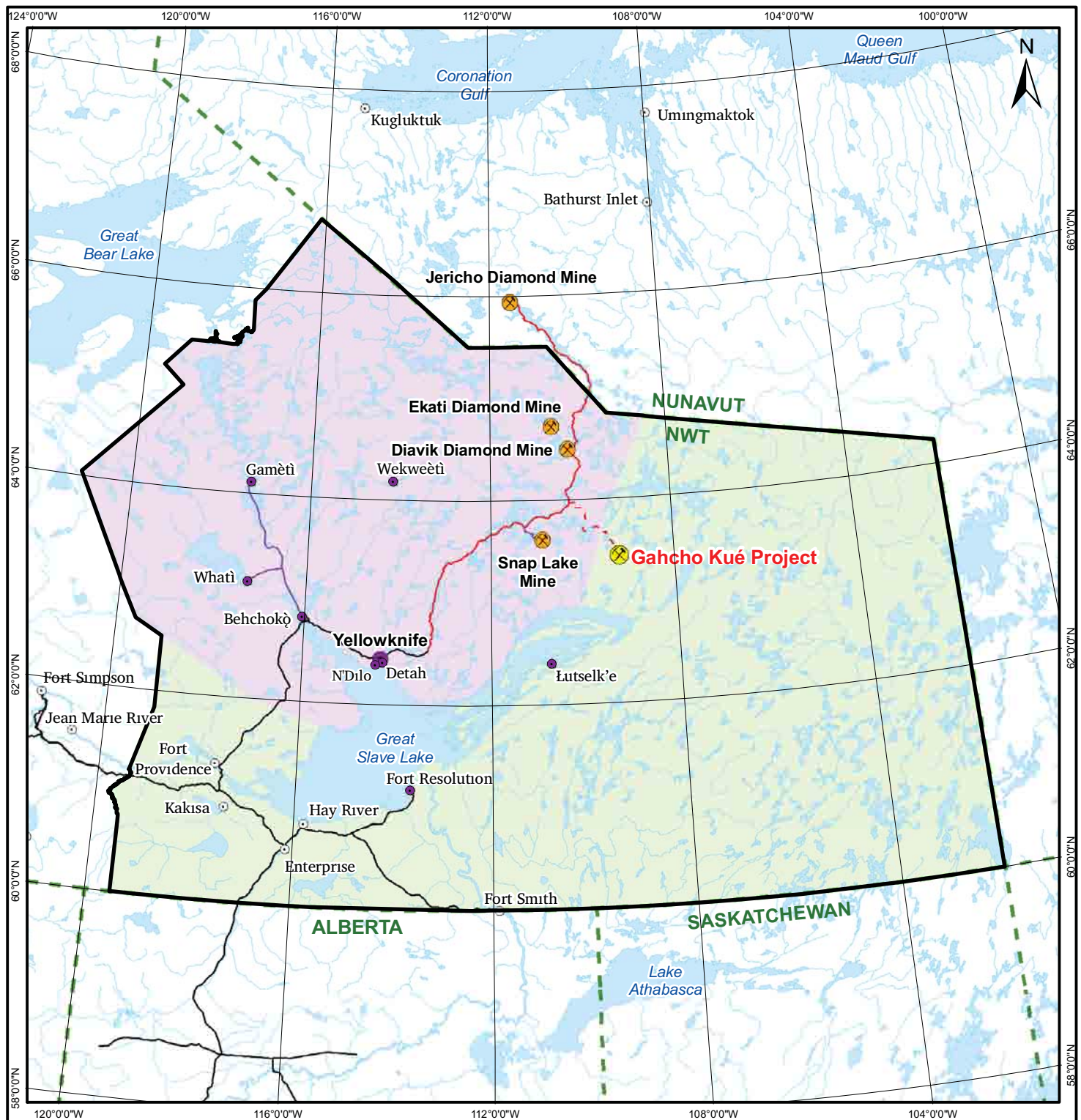
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Figure 12.1-1



LEGEND

- Gahcho Kué Project
- Existing Mine
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial Capital in Local Study Area
- Populated Place in Local Study Area
- Territorial/Provincial Boundary
- Administrative Boundary**
 - North Slave
 - South Slave
- Socio-economic Study Area

NOTES

Base data source: The Atlas of Canada
Administrative boundary source: Government of Northwest Territories

GAHCHO KUÉ PROJECT

Local Study Area for the Socio-economic Assessment

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:6,000,000
70 35 0 70
Kilometres



FILE No:
SON-12.4-001-GIS

DATE:
November 17, 2010

JOB NO:
09-1365-1004

REVISION NO:
1

OFFICE:
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Figure 12.1-2

12.1.4 Content

This section provides details of the effects analysis and assessment related to key lines of inquiry and subjects of note for socio-economics. The headings are arranged according to the sequence of steps in the SEIA. The following briefly describes the content under each heading of this section.

- **Existing Environment** summarizes the existing social, cultural, and economic environmental setting for the Project. A description of notable socio-economic trends in the LSA and NWT is also presented (Section 12.3).
- **Project Description** describes the human resources requirements for the Project, which contributes to the assessment of potential social, cultural, and economic effects (Section 12.4).
- **Assessment Approach and Methods** describes the assessment approach, including valued components, measurement and assessment endpoints, effects pathways, and the determination of environmental significance (Section 12.5).
- **Key Lines of Inquiry** provides the residual effects analysis and results of the impact assessment on the three key lines of inquiry required to be considered in the SEIA (Section 12.6).
- **Subjects of Note** provides the residual effects analysis and results of the impact assessment on the six subjects of note and 11 other issues requiring particular attention that were required to be considered in the SEIA (Section 12.7).
- **Sustainability and Cumulative Effects Analysis** describes the mitigation options to be applied to the Project and the cumulative effects analysis of potential residual effects resulting from the Project (Section 12.8).
- **Monitoring and Follow-up** describes recommended monitoring programs, contingency plans, and adaptive management strategies related to social, cultural, and economic effects of the Project (Section 12.9).
- **References** lists all documents and other material used in the preparation of this section (Section 12.10).
- **Glossary, Acronyms, and Units** explains the meaning of scientific, technical, or other uncommon terms used in this section. In addition, acronyms and abbreviated units are defined (Section 12.11).

12.2 SUMMARY

The Gahcho Kué Project (Project) is located in the watershed of Kennady Lake, a small headwater lake within the Lockhart River system, located about 280 km northeast of Yellowknife, Northwest Territories (NWT). The Lockhart River drains into the north-eastern arm of Great Slave Lake. The Project is also about 140 km North of Łutselk'e, and encompasses the Tłıchǵ region of Mǫwhì Gogha Dènght'łèè, the area claimed by the Akaitcho, as well as the NWT Métis Nation¹ and the North Slave Métis Alliance (NSMA)².

Mine construction is expected to last 2 years, after which mining operations are planned for 11 years. Following operations, there will be 2 years of reclamation to interim closure, and another 6 years for lake refilling. The Project will remove the water from Kennady Lake to access the lakebed and allow mining of the underlying kimberlite pipes. Dewatering will be staged through areas of the lake based on pit development during the course of mining. Following closure, the Project infrastructure will be removed, the area will be reclaimed, and the open pits and other areas will be flooded as the water level of Kennady Lake is returned to previous levels. The remaining change on the landscape will be two mine rock piles, the Coarse PK Pile, and Fine PKC Facility.

Socio-economic issues were identified as those with high levels of community concern during the Report of the Environmental Assessment (MVEIRB 2006). Accordingly, the Environmental Impact Statement (EIS) for the Project includes a description of the engagement with potentially affected communities so that there is adequate consideration of these issues. Community concerns have been integrated into the socio-economic impact assessment (SEIA) wherever possible, and a separate section on community engagement with potentially affected communities is detailed in Section 4 of this EIS.

12.2.1 Existing Environment

The Local Study Area (LSA) includes the North Slave and South Slave regions of the NWT (Figure 12.1-2). This region captures all the communities as identified in the Terms of Reference, including Behchokǵ, Gamètì, Whatì, Wekweètì, Yellowknife, Detah, N'Dilo, Łutselk'e, and Fort Resolution. Other communities and groups in this area include the NWT Métis and the NSMA, along with Hay

¹ The federal government has recognized the land claim of the NWT Métis Nation and will be negotiating a settlement agreement.

² The federal government has yet to accept the NSMA land claim yet and it has requested additional information.

River, Hay River Reserve, Fort Providence, and Enterprise. The Regional Study Area (RSA) includes the LSA communities and the other communities in the NWT, and is used to support the effects evaluation, especially the evaluation of economic impacts.

The data presented in the existing environment indicate both positive and negative factors that are driving socio-economic change in the LSA and throughout the NWT.

1. *Continued Economic Growth.* Mining and oil and gas exploration activities in the NWT continue to be major economic drivers for the NWT's economic development. Governments have benefited further as a result of increased revenues generated at the corporate and personal taxation levels, through resource royalties (transfer payments) and indirect taxes on products. Several proposed developments are currently under review. Nonetheless, the global recession, which began to be felt in the NWT during mid-2008, has had a sobering impact on economic growth. In 2009, the NWT's GDP fell by 5.9%, the fourth largest decline among all provinces and territories.
2. *More Jobs and Training.* Employment rates in the NWT have remained consistently high during the 2000s, exceeding the Canadian average and most provinces and territories. Participation in the workforce has grown considerably and has attracted new labour into the marketplace. Despite the global economic downturn in 2008, the long-term need for a trained and skilled workforce remains high. While the good news is that training opportunities have been greatly increasing, not just in Yellowknife but also in the LSA communities, women have not benefitted as much as men in obtaining mining and related jobs. In some cases, women are the only caregiver in the family and may be unable to work either full time or outside the community. They may also lack support from partners and family in pursuing training.
3. *Aboriginal Businesses.* The future for Aboriginal businesses in the NWT appears to be a positive one. Existing businesses have expanded, new ones have been created, and viable Aboriginal development corporations have emerged. This growth has furthered the size and extent of economic benefits flowing from the diamond industry.
4. *Population Not Growing.* Economic expansion has not been met by an equivalent population growth. Currently at 43,439 people (GNWT Bureau of Statistics 2010a), since 2004, the NWT has lost more people than it has gained through inter-provincial migration. People most likely have been

leaving the NWT for employment, education, and other opportunities elsewhere. Out-migration has been occurring despite more employment opportunities and improving living conditions in the NWT, particularly in Yellowknife.

5. *Decreased Need for Income Support.* The larger workforce has resulted in fewer people drawing on social assistance. Data on household income and supplemental income payments (social assistance) are indicative of a more equal distribution of income among households over the past 15 years. Contributing factors are likely the result of heightened activity in resource exploration and extraction, including diamond mining, construction, and overall growth in the NWT economy. Declining need for income support is also related to rising household incomes. The percentage of NWT families with an income of less than \$25,000 declined from 25% in 1996 to 14% in 2006. More money management training has been identified as of primary importance in the LSA, not just for mine employees, but for families and communities of those employed.
6. *Cost of Living Remains High.* While the economy has grown, along with more jobs and income, high living costs remain a deterrent for those considering a move to the NWT. They also have a negative effect on NWT residents. In 2007, the average home in the NWT spent 21% more than the average Canadian household; this includes 25% more on shelter, 20% more on food, and 23% more on clothing than the average Canadian. The NWT housing market is typified by a lack of affordable housing and rising housing prices, including rentals, even with the recent economic downturn. Rising housing prices and rents can contribute to housing insecurity. Housing prices have not declined in parallel with the recession. Rents have steadily increased for all sizes of apartments in the NWT, and more specifically in Yellowknife.
7. *Education and Skills are Improving.* The socio-economic baseline shows that education and skill levels of NWT residents have greatly improved over the past 10 to 15 years with the combined efforts of community leaders, government programming, and the support of mining companies (e.g., secondary schools are now in nearly all of the communities, mining and trades training has increasing enrolments, and the number of scholarships have increased). During the past decade the number of students graduating from high school in the NWT has increased. From 1986 to 2006, the total number of Aboriginal graduates in the NWT increased almost fourfold. Still, in some of the smaller communities, high school student enrolment and graduation rates have not improved much

over the last few years, which may be related to some students moving to Yellowknife to finish their secondary education, some dropping out for unskilled jobs, or other factors. The number of graduates in trades and technology programs offered through Aurora College and the Mine Training Society (MTS) have increased since the mid-2000s. People have lifestyle options, which includes taking their newly acquired skills and applying them elsewhere. Opportunities for long-term, full-time employment remain in the larger regional communities or Yellowknife.

8. *Crime and Homelessness.* The NWT has had increased crime rates and homelessness, which is likely associated with a growing labour force during the last decade, an increasing number of transient workers, and larger disposable incomes. Substance abuse, gambling, and other addictions continue to increase in the NWT. Factors that contribute to these addictions include increases in family and municipal income and the influx of transient workers. The crime rates differ from place to place and tend to fluctuate annually. Between 1996 and 2008, the violent crime rate in the NWT increased (41%), and in some small communities has increased substantially. A related issue is the increasing homelessness in Yellowknife, and the growing trend to “hidden homelessness” or “couch surfing”. Youths and young families are increasingly moving between other communities and into Yellowknife in search of opportunities.
9. *Improved Infrastructure and Services.* The size of the NWT and the remoteness of the communities present substantial challenges in infrastructure development, funding, and maintenance. The distance between communities in the NWT, and the difficulties recruiting and retaining professionals (e.g., medical and education) limits people's access to health care and education in their own community. Consequently, heavy reliance is placed on the health care, education, and other social service systems in Yellowknife as well as out-of Territory specialists. To address these and other challenges, several infrastructure changes are occurring in the NWT, including the Deh Cho Bridge, new or improved roads, improved airport facilities, and improved housing options.
10. *Traditional Culture Changes.* The traditional cultural environment is changing, but not to the extent that was anticipated at the onset of diamond mining in the 1990s. Although in decline overall in the NWT, Aboriginal language loss is slowing and may actually be increasing in use in certain regions, at least as a second language. Greater local access to culturally-appropriate education and training has also helped increase educational

success and chances of finding jobs. Hunting and fishing has not declined across the NWT from 2002 to 2009, and in some communities may have actually increased. The reliance on hunting and fishing as a source of food has decreased with the growth of the formal economy and greater access to store-supplied goods.

12.2.2 Key Lines of Inquiry

This section of the EIS provides an assessment of three key lines of inquiry associated with concerns for the human or socio-economic environment:

- Long-term Social, Cultural, and Economic Effects (Section 12.6.1);
- Family and Community Cohesion (Section 12.6.2); and
- Social Disparity Within and Between Communities (12.6.3).

Some general results and predictions are highlighted below regarding the potential changes in economic activity that are related to the Project. Residual impacts from the Project on the economy of the NWT (government revenues) are predicted to be positive and significant. Impacts from the Project on family and community cohesion, and social disparity are expected to be mainly positive and not significant.

- The primary direct effect will be the extension of industrial activity in the NWT. As the other mines move towards closure within the next ten years, an economic slowdown may result in the NWT. The operation of the Project will not only provide new employment opportunities, but it may allow workers at the other mines to continue with employment in the mining sector.
- The Project will annually contribute to substantial government revenues. The Project will spend approximately \$910.9 million on goods and services over the life of the mine, and the NWT gross output will increase by an estimated \$300.6 million as a result of this initial business demand. Project construction will increase the NWT gross domestic product (GDP) by about \$112.8 million, and will increase the national GDP by about \$395.3 million. The total GDP that is attributed to the NWT during the 11-year operations phase is estimated at \$3.3 billion, where the majority (\$3.1 billion) is the value added through the production of diamonds.

- The GNWT will receive tax inputs from the Project of approximately \$9.6 million annually (\$19.3 million total) during construction and an estimated \$72 million annually (\$792 million total) during operations.
- The Project will moderately contribute to the growth of a skilled local labour force in the NWT. An estimated 554 FTE jobs will be created annually during operations (direct and indirect combined). The number of positions filled by NWT residents will depend on market conditions, which are expected to change over the life of the mine.
- The long-term impact of the Project on local businesses will be positive.
- During operations, most of the operational workforce will work 12-hour shifts in a two-weeks-on and two-weeks-off rotation system. Other variations on rotation schedules have been considered for the management and professional positions required for the operations phase.

Some results and predictions regarding the potential change to the social environment that are related to the Project are highlighted below.

- The Project is expected to have a positive, moderate influence on employment and income. This will also reduce the rate of unemployment and need for social assistance. Additional jobs created as a result of the Project will largely depend on community and individual capacity.
- The Project is expected to have a positive impact on education and skills upgrading and a positive impact on employment opportunities for women.
- Lifestyle choices include drug and alcohol consumption, crime, spousal and sexual assault, and mobility. The Project is not anticipated to substantially increase drug or alcohol consumption, and other negative lifestyle choices.
- The Project will not have a negative impact on social disparity, cost of living, or social problems. Effects will vary across communities due to some of the aforementioned factors such as experience with mining and the availability of labour and businesses.

12.2.3 Subjects of Note

This section of the EIS provides an assessment of six subjects of note associated with concerns for the socio-economic and cultural environments:

- Employment, Training, and Economic Development (Section 12.7.1);
- Demands on Infrastructure (Section 12.7.2);
- Tourism Potential and Wilderness Character (Section 12.7.3);
- Proposed National Park (Section 12.7.4);
- Culture, Heritage, and Archaeology (Section 12.7.5); and
- Aboriginal Rights and Community Engagement (Section 12.7.6).

Some general results and predictions are highlighted below regarding the potential changes to the economic, social, and cultural environments that are related to the Project. The residual impacts from the Project on the economy are predicted to be positive and significant. Impacts from the Project on employment, training, infrastructure, culture, heritage, and archaeology are predicted to be not significant.

- The Project will likely have a moderate positive influence on the labour force and unemployment rates through 2025. By 2030 when the Project winds-down, unemployment rates will creep upwards to rates nearly double from present day. The employment from the Project offsets the expected job losses at the Ekati and Diavik diamond mines, especially in the later years of the current decade.
- The effects of training on the LSA communities during the lifespan of the Project are anticipated to be moderately positive on maximizing skills development for employees. More people in the LSA are expected to benefit from training and employment opportunities provided by the Project. These benefits are expected to extend after mine closure.
- The addition of the Project will add to overall truck traffic for at least the first five years. Peak truck traffic during the construction and operation phases of the Project can be accommodated without jeopardizing the viability of the other users and their operations. After that, it is expected that the Ekati and Diavik diamond mines will start to wind down operations, reducing the volume of truck traffic.
- The Project is also expected to have a negligible effect on social services or volunteers and, in particular, fire-fighters. Fire-fighter

numbers have already adjusted or are unchanged due to the other operations.

- The Project will have a small measurable residual impact on in-migration, and costs to the government to upgrade infrastructure and to monitor and regulate the Project. Any external or temporary labour brought in by the Project will not likely remain in the NWT, and transportation of these and other staff between the mine site and LSA communities will be the responsibility of De Beers.
- Permanent changes to the landscape after closure will consist of mine rock piles on the shores of Kennady Lake, within line of sight in up to 30 km from the Project in some directions. This effect might influence users of Walmsley and Fletcher Lakes, which are approximately 30 km away from the Project and within the proposed East Arm National Park boundary. This assumes that the observer is able to distinguish mine features from this distance with the naked eye. The Project is situated approximately 120 km from the Tibbitt-to-Contwoyto Winter Road and approximately 390 km by road from the end of the Ingraham Trail, the furthest point of permanent road from Yellowknife. Therefore, the Project will not be visible to any tourist activities on or near these roads. Considering the distance to the Project, it is unlikely that tourists would travel this far along the Tibbitt-to-Contwoyto Winter Road.
- Noise will be generated from mobile and stationary mining equipment, blasting, and aircraft at the Project. The Project is predicted to negatively influence the occurrence of caribou, grizzly bears, wolverines, and wolves within a 15 km radius. Effects on the distribution of birds, moose, and muskoxen is expected to occur within 1 to 5 km of the Project. The effects from noise and other sensory disturbances on the movement and behaviour of wildlife are anticipated to stop after closure of the Project.
- The Key Line of Inquiry: Downstream Water Effects (Section 9) assessed the potential effects of the Project on fish in the streams and lakes downstream of Kennady Lake. The assessment determined that predicted changes to flows and lake levels and water quality during all phases of the Project would be negligible at Kirk Lake and points downstream.
- There are no tourist establishments within the maximum predicted zone of influence around the Project (i.e., 15 km) on wildlife. Therefore, the effect from the Project on the availability of caribou, other ungulates, birds, and carnivores on tourism potential and wilderness character is predicted to be low. The number of tourists and hunters that may be affected by the Project, and the overall effect of the Project on tourism potential and wilderness character is predicted to be low.

- Effects to the proposed East Arm National Park cannot be predicted accurately because the final boundary has not yet been decided. The Park was assumed to be established during the operational phase of the Project, and would include the boundaries defined by the 2007 land withdrawal, which are near the Project. If these assumptions reflect reality, there would be some detectable impacts from the Project within the Park boundaries (from changes in noise levels and visual aesthetics). There would also be the potential for improved access to the Park boundary from the Winter Access Road. The Project may affect the distribution of wildlife in the Park, which may, in turn, affect the availability of wildlife for viewing. In most respects, the area of the Park near the Project is not distinctly unique from the adjacent areas outside the Park, and is not a defining feature.
- It is expected that the Project will have a negligible effect on language use or language loss.
- Noise from Project activities will not be heard at the culturally-important areas. Following closure, cultural landscape changes include two mine rock piles, the coarse PK pile, and the Fine PKC Facility. These piles will be visible should someone travel near the site in the future. As a result, the Project is expected to cause a small permanent change in the cultural landscape.
- As a result of the Project, 254 archaeological sites have been identified; approximately 84% are in locations where they will not be impacted by the Project. The sites, confirm the use of the area in the past and add to the body of knowledge for this area, which is considered a positive effect. The Project will result in systematic data collection for seven sites that cannot be avoided. As a result of intensive archaeological investigations the potential negative residual effect is judged to be moderate rather than high.

12.2.4 Cumulative Effects and Sustainability

Cumulative Effects and Sustainability is a stand-alone section where the residual effects of the key lines of inquiry and subjects of note for the Project are considered in combination with past, present and reasonably foreseeable future developments. Specific cumulative effects and sustainability issues have been assessed, including the following:

- adding to the impact load already being felt by some potentially affected communities;
- the effect of the Project and other past, present, and reasonably foreseeable developments on political and social development, cultural

landscapes, traditional practices, and language in potentially affected communities;

- the issue of potentially “lost opportunities”. The Project proposes to extract a resource at a time when northerners may not be in a position to fully benefit;
- contribution of the Project to the cumulative long-term effects on communities from an increasing pace of development, considering local capacities to respond to, plan for, and benefit from development;
- single resource dependency, or over-reliance on one economic resource; and
- if and how the Project will contribute to opportunities to diversify the economic base at the local, regional, and territorial levels.

The list of VCs and associated residual effects from the Project that were analyzed and assessed in Sections 12.6 and 12.7 provide the foundation for the cumulative effects assessment. The significance of cumulative impacts on VCs is determined, along with the long-term sustainability of the socio-economic and cultural environments. The main results and predictions are summarized below.

- From a cumulative socio-economic effects perspective, the only significant residual effect from the Project will be the positive impact on government revenues, which will benefit the NWT overall.
- Some VCs that will experience positive (but not significant) effects include: jobs and income; local business; lifestyle choices; unemployment; social assistance; education and skills up-grading; and employment access for women.
- Some VCs that will experience negative (but not significant) effects include: costs for infrastructure and services; costs to monitor and regulate the Project; volunteerism; tourist potential; wilderness character; and changes to the cultural landscape. A cumulative effect on harvesting is anticipated; more people will have the financial resources to hunt but people will likely hunt closer to home.
- Residual effects that were determined to be neutral (or close to it) include loss of skilled labour and volunteers, and potential access to the proposed East Arm National Park. In-migration and inflation were rated as slightly negative to neutral.
- One VC that was determined to have both negative and positive residual effects (but not significant) was the disturbance or destruction of known and unknown archaeological sites.

- It is difficult to predict what the cumulative effects may be to the cultural landscape of the LSA. The eventual development of the East Arm National Park is a positive change to the landscape since it will help to protect both cultural and ecological values.

In summary, most of the cumulative effects to the socio-economic and cultural environments in the LSA communities and NWT have already occurred, and the incremental effects from the Project are relatively small. Not everyone will benefit from the Project and other developments. Increased access to money has also aggravated addictions and strained family structures. Income-earners must often work outside their communities for employment in the resource extraction industry. The rapid development in the LSA communities has also been accompanied by an increase in housing prices and rents, which contributes to housing insecurity among those not benefiting during periods of high economic growth. However, it is likely too soon to understand the contribution of diamond mining to sustainability in the NWT, including this Project. Twelve years is a short period of time from which to infer long-term continuity and ability to carry-on with activities indefinitely as related to the use of resources (e.g., individual, financial, natural, cultural). It is also too soon to confirm long-term continuity of the wage economy, or of cultural and societal security and wellbeing.

12.3 EXISTING ENVIRONMENT

12.3.1 Introduction

This section provides a summary of the existing (baseline) socio-economic conditions in the Northwest Territories (NWT), and the communities located close to the Project. Information is presented on population and demographic trends, employment and economic features, types of available infrastructure, and the current capacity to provide social services. Aspects on the cultural environment, such as governance, ethnicity, language, customs and traditions, participation in traditional activities, and cultural landscapes is also provided, along with a summary of main socio-economic conditions and trends in the NWT.

The NWT is undergoing change as a result of many converging forces including the following:

- economic development in the NWT;
- changing population characteristics; and
- changing social and cultural experiences.

In addition to current socio-economic conditions, the changes and trends that are most relevant to the socio-economic impact assessment (SEIA) are summarized within this section. Additional information on the socio-economic environment is found in the Socio-economic Baseline (Annex K).

12.3.2 Study Areas

The proposed Project is 280 kilometres (km) east of Yellowknife and 140 km North of Łutselk'e. It is located in M̱w̱hì Gogha Dèṉht'łèè, an area recognized in the Tlicho Agreement and is in the area asserted by the Akaitcho Dene First Nations and the Northwest Territories (NWT) Métis Nation as their traditional area. The North Slave Métis Alliance also asserts rights on behalf of its members in this area. While the Government of Canada is negotiating agreements for land resources and governance with the Akaitcho Dene First Nations and with the NWT Métis Nation, the federal government has not accepted to enter into a negotiation and has indicated the NSMA is required to prove its claim for rights. The Local Study Area (LSA) includes the North Slave and South Slave regions of the NWT (Figure 12.1-2). More specifically, this region captures all the communities as identified in the Terms of Reference, including Behchokò, Gamètì, Whatì, Wekweètì, Yellowknife, Detah, N'Dilo, Łutselk'e, and Fort Resolution. Other communities and groups in this area include NWT Métis, and the NSMA, along with Hay River, Hay River Reserve, Fort Providence, and Enterprise.

While information was collected on all of these groups and communities for the socio-economic baseline (Annex K) along with the NWT, in the rest of Section 12, a smaller subset of these communities, were identified as the LSA, which are Behchokò, Gamètì, Whatì, Wekweètì, Yellowknife, Detah, N'Dilo, Łutselk'e, and Fort Resolution. The Regional Study Area (RSA) includes the LSA communities and the other communities in the NWT, and is often used to support the effects evaluation, especially the evaluation of economic impacts.

12.3.3 Methods

This report was prepared from publicly available information (e.g., Census data, government reports, on-line academic articles, internet sites) and primary data collection during 2007 to 2010. Both quantitative and qualitative data were collected through primary and secondary research. Qualitative data collection was undertaken through face-to-face meetings, telephone interviews, questionnaire-based surveys, and an informed public engagement process. Several businesses in the NWT were contacted for information and perspectives

on any linkages between mining and their respective sector and line of work. Quantitative data were collected from Statistics Canada and the NWT Bureau of Statistics, as well as from other mining projects such as Diavik Diamond Mines Inc. (Diavik Diamond Mine), BHP Billiton (Ekati Diamond Mine), and De Beers Canada Inc. (Snap Lake Mine).

One source of socio-economic data used as a reference “standard” in this baseline is the annual Communities and Diamonds report. These reports are currently available from 1999 to 2008. Their purpose is to monitor and identify socio-economic trends occurring in the communities of Behchokò, Gamètì, Whatì, Wekweètì, Detah, N'Dilo, Łutselk'e, and Yellowknife. This analysis will also help the communities, governments, and the diamond mine companies, as well as others, to better plan and develop mitigation for reducing negative socio-economic impacts that may result from the construction and operations of the mines. The report is a requirement of the socio-economic agreements between the Government of the Northwest Territories (GNWT) and each of the mining companies.

The “small” or “local” communities reported on in the annual Communities and Diamonds reports include Łutselk'e, Behchokò, Gamètì, Whatì, Wekweètì, Detah, and N'Dilo. Because of its greater size, Yellowknife is reported on separately. The NWT data in the reports, regardless of the year being reported, are aggregates of other NWT communities.

The usefulness of these reports is that observed and predicted trends can be monitored over time. In the 2003 Communities and Diamonds report, indicators began to be expressed as rates where possible. For example, the number of property crimes taking place per 1,000 people was reported so that any noted trend is not merely a function of annual population changes. Rates are compared across the NWT as well as to Canadian rates, if available. The data used are publicly available from government sources, including the NWT Bureau of Statistics Community Surveys (conducted every five years; last one was in 2009) and the Statistics Canada Census of Population (conducted every five years; last one was in 2006). While these reports were useful for the baseline study (Annex K), in some cases more recent reports or a higher level of detail on selected indicators or rates has been published elsewhere.

12.3.4 Results

12.3.4.1 Demographics

In 2009, the estimated population in the NWT was 43,439, with 19,711 people residing in Yellowknife. Of the other communities of the North and South Slave region, Hay River was the largest in 2009, with 3,724 people, followed by Fort Smith with 2,466 people, and Behchokò with 2,026 people. All other communities were smaller, with populations of less than 1,000. In 2009, about half of the NWT population self-identified as Aboriginal (GNWT Bureau of Statistics 2010a).

Table 12.3-1 illustrates population growth trends in the NWT and North and South Slave region communities from 1999 to 2009. The NWT population increased by almost 7 percent (%) (2,875) over a 10-year period, peaking at 43,720 in 2008. Yellowknife's population increased by almost 13% (2,228) during this period. Table 12.3-1 also shows the population growth in the LSA communities; Yellowknife appears to have levelled off since about 2005, and is possibly on a slow downward trend.

Population growth rates vary among different communities in the North and South Slave region. Communities experiencing high levels of growth between 1999 and 2009 include Enterprise (35%), Detah (28%), Hay River Reserve (19%), and Behchokò (15%). The populations of Fort Resolution (-11%), Łutselk'e (-11%), Fort Providence (-10%), and Hay River (-2%) declined in this period. Due to the small size of some of the communities, it is difficult to generalize about population growth since a few additional or fewer people might have a large effect.

12.3.4.1.1 Births, Deaths and Migration

Births, deaths, and migration patterns are important components of population change, with both short- and long-term consequences for society. For example, population and demographic changes can affect both demand and funding for housing, health care, education, and other services and infrastructure.

Although the number of births has slightly increased in the NWT from 2003 to 2007 (from 701 births in 2003 to 725 births in 2007), this increase is neither widespread nor high. In the smaller communities the birth rate has remained relatively constant during this period (GNWT Bureau of Statistics 2010a).

Table 12.3-1 Population Trends for the Northwest Territories and the North and South Slave Communities, 1999 to 2009

Community	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	% Change 1999 – 2009
NWT	40,654	40,499	40,822	41,489	42,240	42,851	42,339	43,198	43,545	43,720	43,439	6.9
Behchokò	1,760	1,770	1,789	1,824	1,861	1,904	1,943	1,977	2,001	2,030	2,026	15.1
Detah	201	204	212	216	217	217	240	255	257	257	257	27.9
Enterprise	80	75	66	74	77	83	97	98	101	101	108	35.0
Fort Providence	846	840	822	809	833	836	797	758	760	759	759	-10.3
Fort Resolution	569	566	569	562	550	541	505	502	501	520	506	-11.1
Fort Smith	2,451	2,436	2,328	2,362	2,430	2,426	2,445	2,465	2,494	2,462	2,466	0.6
Gamètì	285	289	290	294	299	295	292	291	295	291	295	3.5
Hay River	3,784	3,757	3,724	3,672	3,670	3,820	3,844	3,777	3,844	3,787	3,724	-1.6
Hay River Reserve	274	278	290	292	295	298	307	316	319	321	325	18.6
Łutselk'e	352	355	359	395	407	418	352	334	328	322	312	-11.4
Wekweètì	138	142	139	142	148	140	140	142	140	139	137	-0.7
Whatì	467	483	492	498	494	495	488	479	492	499	497	6.4
Yellowknife	17,483	17,415	17,758	18,273	18,958	19,312	19,644	19,522	19,674	19,910	19,711	12.7
LSA Total	28,690	28,610	28,838	29,413	30,239	30,785	30,928	30,916	31,206	31,398	31,123	8.5

Source: GNWT Bureau of Statistics 2010a.

% = percent

Also, according to the 2008 Community and Diamonds Report, teen births have been decreasing. This decrease may be due to more planned parenting, delayed childbirth, more use of birth control, or more teens pursuing education (for specific data, refer to the GNWT Departments of Health and Social Services, Education, Culture and Employment, Industry, Tourism and Investment, Justice, Bureau of Statistics, and Housing Corporation).

The movement pattern of people to and from the NWT provides a revealing picture over the past decade. Statistics Canada determines migration patterns by five-year mobility status, which refers to the relationship between a person's usual place of residence on Census Day and his or her usual place of residence five years earlier. During 2001 to 2006, about half (50%) of the NWT population moved from their former address to another location (i.e., an intra-territorial, intra-provincial, inter-provincial, and/or international move). According to Statistics Canada (2006a), during this five-year period 7,085 people moved into the NWT while 7,055 people left the NWT. The resulting net gain of 30 people shows a relatively stable (if not static) population. It is also a positive contrast to the net loss of 3,200 people experienced between 1996 and 2001 (Statistics Canada 2001, internet site and 2006a). The communities that experienced the most movement were Yellowknife (58%) and the regional centres of Hay River (48%) and Fort Smith (47%). Communities that experienced the least movement were Enterprise (5%), Whati (23%), and Detah (28%).

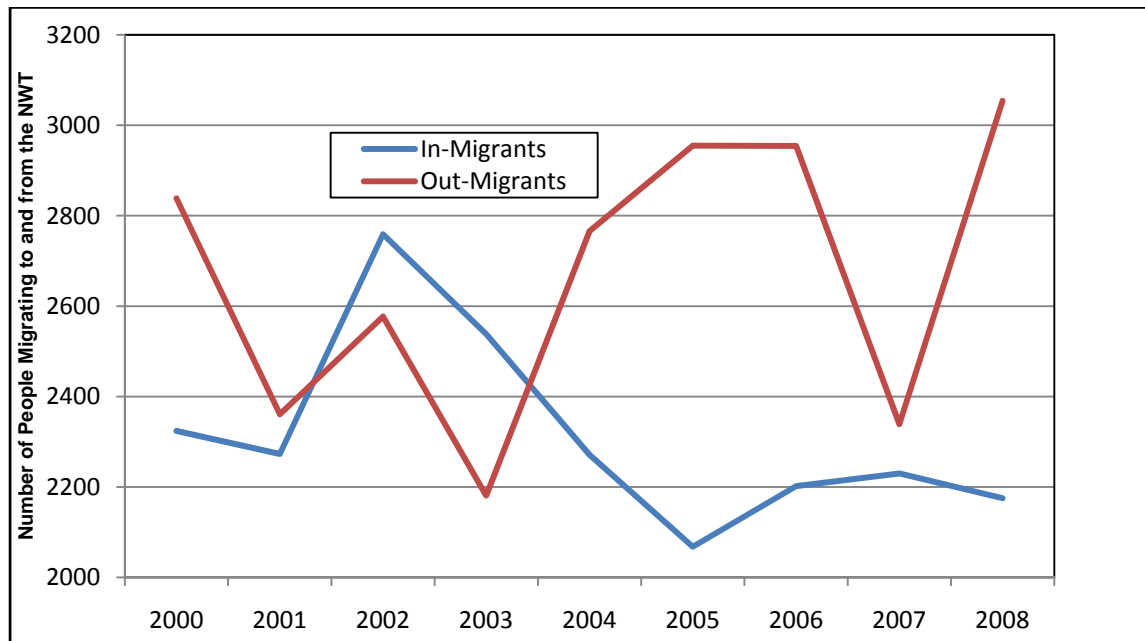
It makes sense that greater movement of people is occurring in places such as Yellowknife, which has a much larger population and greater opportunities for jobs and education than smaller communities. The higher proportion of non-Aboriginals with fewer family and cultural ties compared to the Dene communities is also a factor that influences movement.

Figure 12.3-2 shows both in- and out-migration for the NWT from 2000 to 2008, revealing that migration has had the largest influence on population decline over the past few years. Since 2004, the NWT has lost more people than it has gained through inter-provincial migration. This high movement from Yellowknife and the NWT, more generally, was likely a result of people in search of employment and other opportunities.

12.3.4.1.2 Age

The population of the NWT is young compared to other parts of Canada (with the exception of Nunavut) (GNWT Bureau of Statistics 2010a). In 2009, almost one-quarter (22%) of the population was under the age 15 and those over 60 represented about 6% of the population (GNWT Bureau of Statistics 2010a). The communities with the highest percentage of people over the age of 60 were Fort Resolution and Łutselk'e, where seniors comprised 14% of the population.

Figure 12.3-2 Migration Trends In and Out of the Northwest Territories, 2000 to 2008



Source: GNWT Bureau of Statistics 2009a.

Trend data indicate that the NWT population is getting older. Between 1996 and 2009, the average annual growth rate of the population under the age of 15 declined by 1.7%, and the average annual growth rate of the population aged 60 years and over increased by 4.1% (GNWT Bureau of Statistics 2010a). Life expectancy at birth for the average resident in the NWT and Nunavut in 2007 was 75.3 years (compared to 80.1 years for Canada). By gender, for men, it was 72.4 years (compared to 78.4 years for Canada) and for women, 78.6 years (compared to 83.0 years for Canada) (Canadian Human Mortality Database 2010, internet site). The birth rate is slowing down while at the same time the number of seniors in the NWT has increased from 1,890 in 1991 to 3,650 in 2007; seniors now outnumber pre-schoolers (GNWT no date).

12.3.4.1.3 Gender

In 2009, 52% of the NWT population was male and 48% of the population was female. With the exception of Enterprise (55% female), Hay River Reserve (52% female), and Wekweètì (51% female), all other North and South Slave region communities had either the same or a higher percentage of males compared to females. Comparative data from 2006 and 2009 indicate that the gender distribution is trending toward slightly more females in most small communities (GNWT Bureau of Statistics 2006, internet site, 2010b).

12.3.4.1.4 Family and Household Structure

Although comparative data for 2009 were not available, in 2006, the family structure in the NWT was predominantly couples (79%), including common law and husband-wife couples (GNWT Bureau of Statistics 2010a). In contrast, in 2006, single parent families in the North and South Slave region were relatively common, particularly in the communities of Wekweètì (43%), Whatì (35%), Behchokò (32%), Detah (31%), and Gamètì (31%). In terms of household head and similar to other places in Canada, there were also more female-headed than male-headed single parent households in the NWT (Status of Women Council of the NWT 2005a).

Almost 7% of NWT households in 2009 had over six people (Table 12.3-2), which was a considerable reduction from 1981 when 14% of all households had six or more persons. Likewise, in the North and South Slave region communities, the percentage of households with over six people has declined since 1981. Contributing factors include the falling birth and increasing death rates (GNWT Department of Education, Culture and Employment 2005a). Social trends, such as increased income in the NWT and greater youth migration for educational and work opportunities, have also played a role in these demographic changes (GNWT Department of Education, Culture and Employment 2005a).

Table 12.3-2 Percentage of Households with Over Six People in the Northwest Territories and North and South Slave Communities, 1981 to 2009

Community	1981	1986	1991	1996	2001	2004	2006	2009
NWT	13.9	11.5	9.8	8.6	7.2	7.0	6.2	6.7
Behchokò	48.9	46.0	34.9	31.1	24.4	23.8	27.0	28.1
Detah	33.3	33.3	28.6	-	20.0	15.6	13.3	13.8
Gamètì	57.1	42.9	50.0	36.4	28.6	21.1	26.7	26.8
Enterprise	-	-	-	-	-	7.4	12.5	5.0
Fort Providence	38.5	36.0	21.2	11.4	8.7	9.4	6.4	6.6
Fort Resolution	20.8	20.8	6.3	8.3	5.1	2.9	5.7	6.6
Fort Smith	13.5	8.8	9.1	8.3	4.9	5.4	4.0	3.5
Hay River	7.8	6.2	4.6	5.7	4.4	4.2	4.9	5.2
Hay River Reserve	-	25.0	27.3	14.3	13.3	16.3	16.7	11.7
Lutselk'e	44.4	30.0	28.6	17.6	21.4	10.4	9.1	8.1
N'Dilo	-	-	22.2	23.1	20.0	21.7	-	-
Whatì	57.1	50.0	61.5	29.4	35.0	24.2	22.7	26.3
Wekweètì	-	-	-	-	-	27.8	28.6	22.9
Yellowknife	5.7	4.9	5.4	5.1	4.2	4.1	3.3	4.3

Source: GNWT Bureau of Statistics 2010a.

"-" indicates information not available.

Average family and personal incomes have been steadily increasing since the late-1990s and early 2000s when development started to intensify in the NWT. The average employment income in the NWT increased by almost 16% from 2002 to 2006 (GNWT Bureau of Statistics 2010a). The North and South Slave region communities that experienced an average employment increase of over 20% during the same five-year period were Fort Providence (24%), Behchokò and Hay River (23% each), and Fort Resolution (21%). Although people in these communities saw an increase in their average employment incomes, most still had incomes well below the NWT average of \$47,856 in 2006 (with the exception of Hay River with an average employment income slightly above the territorial average).

From 1996 to 2006, the percentage of NWT families with an income of less than \$25,000 declined from 25% (1996) to 14% (2006) (GNWT Bureau of Statistics 2008b). This trend of declining low-income families was also found in all the North and South Slave region communities, with the exception of Łutselk'e (still relatively high at 44%). For example, almost half (44%) of families in Whati earned less than \$25,000 in 1996, as compared to only 17% in 2006 who earned less than \$25,000. In other words, there were fewer low income families in 2006 compared to previous years. This was most likely due to greater employment opportunities and increased income levels in the non-renewable resources sector during the 2000s, particularly mining and oil and gas exploration and development.

During 1996 to 2006, the percentage of NWT income tax filers who reported an annual family income greater than \$60,000 increased from 49% (1996) to 65% (2006). This trend to increasing wealth also occurred in the North and South Slave region communities, with the exception of Łutselk'e, Fort Providence, and Fort Resolution. This increase in family incomes was particularly evident in Behchokò where the proportion of high-income earners increased from 18% to 47% during the 10-year period (GNWT Bureau of Statistics 2008b).

The data also show other notable changes in income distribution in the NWT since 1996 (GNWT Department of Industry, Tourism and Investment 2006a). The data suggest an increase in disparity of income until 2000, followed by an apparent trend toward a more equal distribution of income among households. Contributing factors are likely the result of heightened activity in resource exploration and extraction, including diamond mining, construction, and overall growth in the NWT economy.

12.3.4.1.5 Cost of Living and the Consumer Price Index

The cost of living is a concern in the NWT. Table 12.3-3 shows the Consumer Price Index³ (CPI) and annual inflation rate for Yellowknife and Canada. From 2007 to 2009, Yellowknife experienced a higher inflation rate than that of Canada, particularly in 2008 when the inflation rate was 4.0% for Yellowknife compared with 2.3% for Canada. In 2009, however, the inflation rates for both Yellowknife and Canada were comparable.

Table 12.3-3 Consumer Price Index and Inflation Rate in Canada and Yellowknife from 1998 to 2009

Calendar Year	Canada		Yellowknife	
	CPI (2002=100)	Inflation Rate (%)	CPI (2002=100)	Inflation Rate (%)
1998	91.3	1.0	93.0	-0.1
1999	92.9	1.8	94.0	1.1
2000	95.4	2.7	95.6	1.7
2001	97.8	2.5	97.1	1.6
2002	100.0	2.2	100.0	3.0
2003	102.8	2.8	102.3	2.3
2004	104.7	1.8	103.8	1.5
2005	107.0	2.2	106.2	2.3
2006	109.1	2.0	107.7	1.4
2007	111.5	2.2	110.8	2.9
2008	114.1	2.3	115.2	4.0
2009	114.4	0.3	115.9	0.6

Source: GNWT Bureau of Statistics 2009b.

CPI = Consumer Price Index; % = percent

A comparison of the different categories of goods and services that make up the overall CPI reveals where the greatest price pressures are originating for Yellowknife. Table 12.3-4 includes the CPI for the various categories of goods and services and shows that two cost categories, shelter, and alcohol and tobacco, have risen more than any other category.

Table 12.3-5 shows the disparity in food costs between Yellowknife and other NWT communities. Food prices for those communities lacking year-round road access, including Gamètì, Łutselk'e, Whatì, and Wekweètì, were higher than anywhere else among the communities and regions listed. Market size largely drives the remaining price differences when compared to Yellowknife.

³ Consumer Price Index is the common basket of goods and services for the average consumer that allows comparison of prices over time.

Table 12.3-4 Consumer Price Index for Yellowknife (Monthly Average, 1998 to 2009)

Yellowknife									
Year	All Items	Food	Shelter	Household Items, Operations, and Furnishings	Clothing and Footwear	Transportation	Health and Personal Care	Recreation Education and Reading	Alcohol and Tobacco
1998	93.0	93.4	93.3	94.0	94.8	90.7	95.6	98.4	80.6
1999	94.0	93.5	93.4	96.3	96.5	93.4	96.1	98.5	81.2
2000	95.6	94.6	96.5	96.8	96.3	94.4	98.4	99.5	84.5
2001	97.1	98.3	97.0	98.5	97.7	97.1	99.3	98.8	87.3
2002 (base year)	100								
2003	102.3	100.2	103.9	100.1	98.3	102.0	102.6	100.5	116.1
2004	103.8	99.5	108.1	100.1	97.6	102.1	104.5	100.8	121.6
2005	106.2	104.8	112.0	100.6	98.5	103.9	103.8	100.3	124.1
2006	107.7	106.6	115.2	101.1	94.9	105.2	103.7	100.0	127.3
2007	110.8	108.3	122.0	103.4	94.8	107.7	104.1	100.8	129.1
2008	115.2	110.7	133.5	103.7	95.5	110.5	106.8	100.2	131.7
2009	115.9	116.9	132.8	106.4	93.9	105.3	110.9	99.4	142.8

Source: GNWT Bureau of Statistics 2009a.

Table 12.3-5 Food Price Indexes, North and South Slave Communities from 1987 to 2004 (Yellowknife=100)

Community	1987	1991	1997	2000	2001	2004
Behchokò	103	107	119	131	127	137
Detah	-	-	-	-	-	-
Gamètì	164	136	139	136	124	153
Enterprise	-	-	-	-	-	109
Fort Providence	97	105	106	119	113	126
Fort Resolution	103	111	127	138	128	131
Fort Smith	90	97	108	114	108	113
Hay River	89	98	108	118	110	113
Hay River Reserve	-	-	-	-	-	107
Łutselk'e	165	156	169	175	163	175
N'Dilo	-	-	-	-	-	-
Whatì	-	154	168	156	141	153
Wekweèti	-	169	159	166	141	170

Source: GNWT Bureau of Statistics 2009a.

"-" indicates information unavailable.

Based on a 2007 household spending survey (GNWT Bureau of Statistics 2008c), the average home in the NWT spent 21% more than the average Canadian household. Residents in the NWT spent 25% more on shelter, 20% more on food, and 23% more on clothing than the average Canadian. This pattern of spending is even more pronounced in Yellowknife. Residents in Yellowknife spent 41% more on shelter, 19% more on food, and 39% more on clothing than the average Canadian.

12.3.4.2 Employment

Employment rates in the NWT have remained consistently high since 2000, exceeding the Canadian average and most provinces (GNWT Department of Industry, Tourism and Investment 2009). The unemployment rate in the NWT declined slightly during the mid-2000s, from 7% in 2003 to 6% in 2008, with a low of 5% from 2005 to 2007. These low rates reflected the recent boom in the non-renewable resource sector, as related to diamond mine construction and operations and the recent upswing in exploration activity in the natural gas sector (GNWT Strategic Planning Branch, 2006a,b). In September 2010, the NWT unemployment rate was 6.4%, which was less than that of Canada overall (8.0%) (GNWT Bureau of Statistics 2010f).

The overall labour pool is relatively small in the NWT. An estimated 31,300 residents 15 years of age and over (i.e., those of working age, although this also includes older age groups) lived in the NWT in 2008 (GNWT Bureau of Statistics 2008d). Of these, about 23,400 NWT residents were in the labour force, with an overall participation rate of 75%. Overall participation rates decreased slightly in the NWT between 1994 and 2006. Yellowknife had the highest participation rate in the NWT at 84.2% and the lowest unemployment rate at 5.7%. The unemployment rate in the smaller communities ranged from 14% to 39%, and most of those employed were full-time.

While the above job numbers generally appear promising, notwithstanding the global downturn in 2008 to 2009, some factors affecting employment in the NWT bear mentioning. Several barriers to employment exist in the NWT, including education levels, training opportunities, willingness to relocate, seasonality, gender, and other demographic and social barriers or advantages.

Low education levels in the NWT continue to be a challenge for older age groups or those living in small communities. Many people in smaller remote communities do not want to move away for work, yet opportunities for long-term, full-time employment remain in the larger regional communities or Yellowknife (GNWT Department of Education, Culture and Employment 2008).

Despite a global economic downturn in 2008, the long-term need for a trained and skilled workforce in the NWT is at an all time high (MTS 2009). A human resource needs assessment conducted across the NWT mining industry in 2008 identified the need for as many as 5,000 new semi-skilled, skilled, and professional workers over the next five years (MTS 2009). This number reflects employee turnover and retirements as well as growth (new jobs), and is almost double the previous forecast of 2,700 (MTS 2008; 2009).

Employment rates for Aboriginal people in the NWT also increased from 42% in 1989 to 46% in 2009; still, this 2009 percentage was down considerably from 55% in 2006. Non-Aboriginal employment rates continue to be higher and more stable in comparison; around 85% during the years from 1989 to 2009 (GNWT Bureau of Statistics 1999, GNWT Bureau of Statistics 2010a). Nonetheless, more Aboriginal people have been seeking wage employment and training opportunities compared to previous years.

The employment rate of male and female workers has been roughly consistent in recent years. Overall, the employment rate discrepancy between males and females has declined, from about a 9% difference in 1989 to less than 3% in 2009. The employment rate in 2009 for males and females was 68% and 65%, respectively (GNWT Bureau of Statistics 2010d).

12.3.4.3 Education

Education is not uniform in the NWT, particularly in the smaller communities where annual numbers of students enrolled and graduating fluctuate from year to year. Even so, some generalizations can be noted from the available data.

According to the GNWT, there has been an overall decrease in the number of students enrolled from kindergarten to grade six in all NWT communities, possibly due to a declining population from lower birth rates and out-migration of certain age groups (GNWT Department of Education, Culture and Employment 2007a). Part of the decrease can also be attributed to a change in the attendance requirement for the calculation of student enrolment, from 40% to 60% (GNWT Department of Education, Culture and Employment 2007a).

Research shows that there is a strong relationship between school attendance and academic achievement (GNWT Department of Education, Culture and Employment 2007a). The student attendance rate during the 2006-2007 school year (kindergarten to grade 12) within the small communities was 79%, well below the Yellowknife average of 91% (GNWT Department of Education, Culture and Employment 2007a). For small community students attending grades nine to 12, the average attendance rate was under 76% during 2006 to 2007, a slight (4%) decline from 2004 to 2005 (GNWT Department of Education, Culture and Employment 2007a).

During the past decade there has been an increase in the number of students graduating from high school in the NWT. In the 2002-2003 school year, 283 students graduated (45% of those enrolled) and 370 students graduated (56% of those enrolled) in 2006-2007. However, a trend of students dropping out of school after grades 10 and 11 persists. For example, of the 1,214 students

enrolled in grade 10 in the 2004-2005 school year, only 634 enrolled in grade 12 in the 2006-2007 school year.

On the positive side, from 1986 to 2006 the total number of Aboriginal graduates in the NWT increased almost fourfold. In 2004, 40% of grade 12 graduates were Aboriginal, as compared to 48% and 51% in 2005 and 2006, respectively. About 31% of all students graduated from high school in 1986, which had increased to 51% by 2006 (Koslowski 2007, pers. comm.).

12.3.4.4 Health and Well-Being

Conditions of health and well-being encompass the physical and mental states of people within a community, and include individual, family, and community well-being. Health and well-being indicators includes premature death rates, disease and illness, diet and nutrition, behaviour and lifestyle choices, mental health, community involvement, and leisure and recreation. These are closely linked to factors such as employment, income, education, domestic conditions, and family and community support (GNWT Department of Health and Social Services 2005a).

12.3.4.4.1 Diet and Nutrition

Good nutrition plays an important role in reducing health risks. Eating well has many benefits, such as reducing incidence of heart disease, cancer, high blood pressure, diabetes, and obesity (GNWT Department of Health and Social Services 2005a). According to the NWT Health Status Report, in 2003, 66% of NWT residents aged 12 and over did not meet the guidelines set out in Canada's Healthy Eating Recommendations (i.e., consume the minimum five or more servings of fruit and vegetables daily). Men were identified as less likely to eat the recommended daily level of fruits and vegetables as compared to women (GNWT Department of Health and Social Services 2005a).

Traditional country foods are an important part of a healthy and nutritious diet and provide benefits not found in other food sources (GNWT Department of Health and Social Services 2005a). Table 12.3-6 lists the household consumption rates of country foods by community in 2009. Łutselk'e had the highest country food consumption rate in the NWT (82%), followed by Wekweètì and Gamètì (both 75%). The consumption rate of country food in Yellowknife was only 10%, as compared to the NWT average of 28%.

Table 12.3-6 Percentage of Households Consuming Country Food, 2009

Community	% of Country Food Consumed
NWT	28.4
Behchokò	62.6
Detah	67.2
Enterprise	14.8
Fort Providence	64.2
Fort Resolution	67.8
Fort Smith	26.4
Gamèti	75.0
Hay River	14.1
Hay River Reserve	71.3
Lutselk'e	81.6
N'Dilo	69.6
Wekweèti	75.0
Whati	72.6
Yellowknife	9.5

Source: GNWT Bureau of Statistics 2010b.

% = percent

12.3.4.4.2 Cause of Death

The most common cause of death of individuals in the NWT in 2009 was circulatory disease (28%), followed by cancer (24%) and respiratory disease (14%) (Statistics Canada 2010a). For men, the leading causes of death in 2009 were circulatory diseases (34%), followed by cancer (23%) and respiratory disease (15%). For women, cancer was the leading cause of death (27%), followed by circulatory disease (20%) and respiratory disease (13%) (Statistics Canada 2010a).

Overall, the premature death rate in the NWT has declined since the 1990s, although the rate is still higher than in other provinces (GNWT Department of Health and Social Services 2005a). Men are more likely than women to die before the age of 75, and premature death rates are higher in smaller communities than in regional centres or in Yellowknife (GNWT Department of Health and Social Services 2005a).

12.3.4.4.3 Disease and Illness

Many factors influence disease and illness, including genetics and family history, living and working conditions, lifestyle choices, and the environment. Increased rates of disease can affect health care systems and services, families, and

communities, as well as education and employment (GNWT Department of Health and Social Services 2005a).

According to the NWT Health Status Report (GNWT Department of Health and Social Services 2005a), respiratory diseases are a major contributing cause of death in the NWT. These include respiratory viruses, tuberculosis, lung cancer, and other related diseases.

Tuberculosis

Tuberculosis is a disease that attacks the lungs, as well as other parts of the body and brain. The data reveal that while tuberculosis rates among non-aboriginal Canadians have decreased from one per 100,000 in 2003 to 0.8 per 100,000 in 2008, the rates among Aboriginals are rising. For example, among the Inuit, the rate climbed from about 22 cases per 100,000 in 2003 to 158 cases per 100,000 in 2008 (The Globe and Mail 2010, internet site). Occasional outbreaks have been common in some NWT communities, with 10 to 40 annual cases of tuberculosis (GNWT Department of Health and Social Services 2005a).

Diabetes

If undiagnosed or untreated, diabetes can lead to serious health issues such as blindness, limb amputations, kidney failure, stroke, heart attack, and ultimately, premature death (GNWT Department of Health and Social Services 2005a). An estimated 2,300 people in the NWT had diabetes in 2005 (Canadian Diabetes Association 2005). However, it is unclear if diabetes is increasing in recent years in the NWT. For example, in 2008, about 4% of those aged 12 and older in the NWT reported a diagnosis of diabetes, compared to 5% in Canada overall (Statistics Canada 2010a).

Obesity

Obesity is another growing health concern in the NWT. The 2003 Canadian Community Health Survey showed that 38% of NWT adults 18 years and over were overweight and that another 25% were obese (GNWT Department of Health and Social Services 2005a).

Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome

Human immunodeficiency virus (HIV) is the virus that causes acquired immunodeficiency syndrome (AIDS), as it attacks the immune system in an individual. This results in a chronic and progressive loss of function, leaving infected people vulnerable to other infections and cancers. The virus is transmitted through unprotected intercourse, needle sharing, and exposure to contaminated blood in health care and other settings (GNWT Department of

Health and Social Services 2005a). Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome are of some concern in the NWT, with 46 reported cases between 1985 and 2008; of these, 35 cases involved men and 11 involved women. The number of HIV infections, however, remains relatively low in the NWT compared to Canada overall.

Hepatitis C

Hepatitis C is a blood-borne infection spread by a virus through direct exposure to infected blood. This virus can cause serious liver infections, failures, liver cancer, and can result in the need for a liver transplant. Individuals who inject drugs or who have multiple sexual partners are likely to be at a higher risk of contracting hepatitis C. The number of hepatitis C infections in the NWT has decreased by 58% from 2001 (40 cases) to 2007 (17 cases) (GNWT Department of Health and Social Services 2005a and 2008).

12.3.4.4.4 Behaviour and Lifestyle Choices

Teen Pregnancy

Due to their age, pregnant teens are at greater risk of health problems such as anemia, hypertension, renal disease, and depressive disorders. Babies of teenage mothers are also at a greater risk, and are likely to have low birth weights or other associated health problems. Teenage mothers also face other challenges and demands associated with parenting, and are often unable to pursue an education. However, the extended family structure prevalent in the NWT may provide young mothers and infants with more support, as compared to nuclear family structures (GNWT Department of Health and Social Services 2005a).

While more recent data are unavailable, the NWT had the second highest teenage pregnancy rates in the country in 2003, at a time when teenage pregnancies in Canada were declining (Statistics Canada 2008a, internet site). The NWT had about 79 births per 1,000 women in 2003, more than double the national average of 32 (Statistics Canada 2008a, internet site). In the regional centres (Fort Smith and Hay River), from 1990 to 2002, the teen birth rate dropped 49% (from 93 to 48 births per 1,000 women aged 15 to 19) and 47% in the smaller communities (from 140 to 74 births per 1,000). During the same period, the teen birth rate for Yellowknife decreased marginally, from 45 to 39 births per 1,000 women (GNWT Department of Health and Social Services 2005a). The overall decrease in teenage pregnancies can be attributed to increased access to reproductive health services and information, and improved economic conditions (McKay 2006).

Fetal Alcohol Spectrum Disorder

Fetal Alcohol Spectrum Disorder (FASD) is a disorder that occurs when an unborn baby is exposed to alcohol through the mother who drinks while she is pregnant. This exposure can cause brain damage, as well as other physical, mental, behavioural, and learning disabilities and delays.

There are no statistics available on FASD in the NWT. However, an estimated 30% of women in the NWT drink while they are pregnant (GNWT Department of Health and Social Services 2006a). Aboriginal communities are affected by FASD, with the incidence rate in some First Nations communities as high as 16%. Nearly 50% of FASD children are placed in the care of child welfare, because families are unable to care for them (National Children's Alliance 2006).

Sexually Transmitted Diseases

Certain sexual behaviours, including not using a condom, having a higher number of sexual partners, and engaging in other related high-risk behaviours, such as drinking and substance abuse, carry a higher risk of negative health consequences. The results can lead to sexually transmitted diseases (STDs) including chlamydia, gonorrhoea, trichomonas, pubic lice, scabies, genital herpes, genital warts, hepatitis B, syphilis, and HIV/AIDs (GNWT Department of Health and Social Services 2005a).

The reported cases of STDs in the NWT increased for chlamydia and gonococcal from 1998 to 2007, with much higher incidences compared to the rest of Canada. These infections can lead to long-term pelvic inflammatory diseases, infertility, and miscarriages, and can be passed on to unborn babies, affecting their eyes and lungs. Overall, between 1999 and 2003, women were nearly twice as likely as men to be diagnosed with a STD, and women between the ages of 15 to 24 had the highest rate (GNWT Department of Health and Social Services 2005a).

Cases of STDs are highest in some smaller Aboriginal communities and are substantially lower in the larger centres such as Yellowknife. The Tłıchǫ communities had the highest number of STD reported cases between 1994 and 2002. Yellowknife had experienced a slightly increased rate during the 8-year period. Declines were only evident in Fort Resolution and Fort Providence (GNWT Department of Health and Social Services 2003).

12.3.4.4.5 Mental Health and Well-being

Mental health issues encompass a broad range of symptoms. Mental health issues can include alcohol or drug-related disorders, depression, eating disorders, stress, schizophrenia, and mood disorders such as bi-polar illness.

Many people with mental illness are treated in their communities, or are not diagnosed and may not be accounted for in the statistics collected.

More recent data are unavailable, but the number of mental disorders treated by physicians in the NWT did not change substantially between 1994 and 2002. However, individual communities have seen both increases and decreases. For example, Gamètì experienced a dramatic increase in mental disorder cases: from 48 per 1,000 cases in 1996 to 220 per 1,000 cases in 2002. By contrast, the number in Wekweètì declined from 279 to 105 cases in the same time period (GNWT Department of Health and Social Services 2005a).

Between 1999 and 2002, there was a decrease in patient intakes in NWT hospitals for the treatment of mental illnesses (GNWT Department of Health and Social Services 2005a). Alcohol and drug use disorders resulting from mental illness were the leading causes of hospitalization (36%), followed by depression and other mood disorders (30%) (GNWT Department of Health and Social Services 2005a).

Depression

Depression is a mental condition sometimes linked to alcohol and drug abuse, which may lead to suicide (GNWT Department of Health and Social Services 2005a). Depression is often characterized by feelings of deep sadness, helplessness, and hopelessness. It is also reflected in weight loss or gain, lack of energy, disruptions in sleep, and difficulties in concentrating.

Again, while newer data are unavailable, in 2003 a Canadian Community Health Survey showed that 5% of NWT residents over the age of 12 had reported a major depression. Another 3% of residents reported characteristics related to depression. These statistics remained unchanged since 1994 (GNWT Department of Health and Social Services 2005a).

Depression is also identified as one of the leading causes of mental health hospitalization, accounting for 30% of patient intake from 2001 to 2004. Most of those admitted for depression during this period were between the ages of 15 to 24 (GNWT Department of Health and Social Services 2005a).

Suicide

Suicide is often the result of social conditions, involving family, relationships, work, school, and community life, as well as poor mental health and depression (GNWT Department of Health and Social Services 2005a). The NWT average rate of suicide between 1999 and 2003 was 2.6 people per 10,000, which was

twice the 2001 national average of 1.2 per 10,000 (GNWT Department of Health and Social Services 2005a).

A substantial gender difference in suicide rates exists. Between 1999 and 2003, males were over five times more likely than females to commit suicide (4.2 versus 0.8 per 10,000) (GNWT Department of Health and Social Services 2005a). While males are more likely than females to commit suicide, females are more likely to be hospitalized due to self-inflicted injury (GNWT Department of Health and Social Services 2005a). Residents of smaller communities had higher rates of suicide than residents of Yellowknife between 1999 and 2003. Factors for this are unclear (GNWT Department of Health and Social Services 2005a).

12.3.4.4.6 Community Well-being

Volunteering Organizations and Volunteers

The voluntary sector, including both volunteer organizations and volunteers, is important to community building and strengthening. Volunteering can create and develop healthy social networks that benefit communities and foster individual well-being (GNWT Department of Health and Social Services 2005a). It is also a means of sustaining community initiatives and providing a portrait of Canadian values, interests, and compassion (Statistics Canada 2006).

In 2004, there were 620 registered voluntary or non-profit groups, and 119 registered charities in the NWT. The majority of these groups were located in the communities of Yellowknife, Fort Smith, and Hay River. Governments were the main source of revenue funding for these organizations, which provided services and programs related to recreation, culture and religion, human services (health and well-being), and the environment. Most of these organizations were involved in wellness, education, or training activities (33%), and in delivering sports and recreation services (20%). Almost 50% served the general public, while 28% targeted children and youth. Most of these organizations served Aboriginal people (86%) (Little et al. 2005).

According to the NWT Health Status Report 2005 (GNWT Department of Health and Social Services 2005a), 51% of residents over the age of 15 participated in some type of volunteer activity in 2004. Most of these individuals ranged in age from 25 to 64. Of surveyed non-governmental organizations (NGOs) within the NWT, Yukon, and Nunavut, 61% reported difficulties in retaining volunteers, 44% suggested challenges in recruiting appropriate staff, and 60% reported difficulties in obtaining funding from either government, foundations, or corporations.

For Aboriginal peoples, sharing, helping out, volunteering, or other forms of participation in community life are important aspects of family, culture, and community values, as well as traditional practices (Little et al. 2005). An estimated two-thirds of volunteer organizations in 2004 in the NWT involved Aboriginal volunteers, comprising about one third (35%) of the total volunteer sector.

From various interview sources and relevant documents, concerns exist about the decline of voluntary efforts within Aboriginal communities, thereby signalling a loss of traditional culture and values. Participants of a 2005 research survey looking into the Aboriginal voluntary sector have concluded some of the following points related to this decline.

- Aboriginal communities are larger and less homogenous than in the past and may not feel as strongly connected or responsible for the well-being of others.
- The wage economy has become more important than traditional land-based economies; consequently, individual well-being has become more important than that of collective or community well-being.
- Confusion exists between paid and non-paid work as the result of the transition from subsistence harvesting to an industrial wage economy.
- Helping out is more structured and organized today, as well as the skills required to do so; many Aboriginal people feel they lack the necessary skills.
- Government-run or structured programs have diminished collective responsibility that Aboriginal people traditionally undertook (Little et al. 2005).

Social Support

According to the NWT Health Status Report (GNWT Department of Health and Social Services 2005a), an important element of individual and community well-being is support from families, friends and communities. Community support can include, and is not limited to, informal networks in which people engage, or formal groups to which people belong, both of which are meaningful and important. The 2003 Canadian Community Health Survey in its 2001 to 2002 survey cycle asked participants to identify if their social support needs were being met from family, friends, and community. Respondents to this questionnaire identified that, overall, they felt that they had the support of family, friends and community (GNWT Department of Health and Social Services 2005a).

Physical Activity and Participation

Physical activity reduces health risks and some illnesses. It is also closely linked to leisure time, social engagement activities, and well-being. According to the NWT Health Status Report (GNWT Department of Health and Social Services 2005a), 45% of the population was considered to be physically inactive in 2003.

The *NWT Community Recreation Needs Assessment Report* (World Leisure Professional Services 2004) reported that 59% of those surveyed felt that participation in recreation activities was very important to them. Of those surveyed, favourite recreation activities included soccer, volleyball, ice hockey, basketball, and swimming.

The survey also asked respondents to identify activities in which they would like to participate. These were identified as dog sledding, kayaking, snowshoeing, broomball, and cross-country skiing. Recreational activities and sports related to the land also had a high number of participants, followed by more organized recreational sports activities.

The activities with the lowest participation rate were those associated with arts and cultural activities. This may have something to do with the lack of these programmes in the communities. Respondents identified interest in seeing more cultural and arts programmes at the community level. Smaller communities tended to have a higher number of individuals participating in arts and cultural activities (World Leisure Professional Services 2004).

Recreation and Leisure Activities

Several activities, clubs, and programs offered in and around recreation facilities in the NWT are aimed at building healthy communities for both young and old. Recreation facilities available in the North and South Slave region communities are listed in Table 12.3-7.

Table 12.3-7 Recreation Facilities Available to Residents in the North and South Slave Communities, 2007

Community	Community Centre/Hall	School Gymnasium	Arena	Swimming Pool	Park (Ball Diamond or Soccer or Basketball Field)	Play-ground	Other (Golf Course, Bowling, Tennis)
Behchokò	■	■	■	■	■	■	
Detah	■	■				■	
Gamètì	■	■	■		■	■	
Enterprise	■	■				■	
Fort Providence	■	■	■		■	■	
Fort Resolution	■	■			■	■	
Fort Smith	■	■	■	■	■	■	■
Hay River	■	■	■	■	■	■	■
Hay River Reserve	■	■			■	■	
Łutselk'e	■	■	■		■	■	
N'Dilo	■	■			■	■	
Whati	■	■	■		■	■	
Wekweètì	■	■	■		■	■	
Yellowknife	■	■	■	■	■	■	■

Sources: GNWT Bureau of Statistics 2006, internet site; Moss 2004, pers. comm.

The NWT Community Recreation Assessment 2004 suggested that only about half of the communities surveyed felt that they had enough recreation resources, whether these were parks, fields, trails, or facilities, as well as volunteers, programs, and leaders or coaches. Moreover, some 47% of those surveyed felt that these facilities were either insufficient or inadequate. Smaller communities surveyed tended to express that they were dissatisfied with the adequacy of facilities (World Leisure Professional Services 2004).

12.3.4.4.7 Community Health and Safety

Accidents and Physical Injuries

Although more recent data are unavailable, between 2000 and 2002, accidents and injuries were the third leading cause of death in the NWT, accounting for 19% of all deaths (GNWT Department of Health and Social Services 2005a). Available statistics about accidents and injuries showed that NWT residents were two times more likely to die from injury than individuals living in the rest of Canada. The NWT average injury mortality rate for the period 1990 to 1999 was 82 per 100,000, as compared to the 1996 Canadian mortality rate of 35 per 100,000 (GNWT Department of Health and Social Services 2004a).

The leading causes of injury mortality in the NWT between 1990 and 1999 were suicide (24%), motor vehicle accidents (17%), and drownings (11%) (GNWT Department of Health and Social Services 2004a). House fires, motor vehicle

accidents, and drownings were the main causes of death for children younger than 15 years of age. Suicide ranked as the highest cause of death for age groups between 15 and 64 (GNWT Department of Health and Social Services 2004a). The total number of collisions involving alcohol has remained relatively constant since 1998, although the number of injuries has declined over time (GNWT Department of Transportation 2009a,b).

Addictions and Substance Abuse

Like other provinces and territories in Canada, the NWT is facing alcohol, substance abuse, gambling, and other addictions. Factors that contribute to these addictions include increases in family and municipal income, and the influx of transient workers (Canadian Centre on Substance Abuse 2009, internet site). Addictions have led to an associated rise in child welfare investigations, family violence, sexual abuse, crime, depression, post-traumatic stress disorder, suicide, delinquency, criminal offences, and medical conditions such as diabetes, FASD, STDs, and HIV/AIDs (Canadian Centre on Substance Abuse 2009, internet site).

Alcohol

According to the 2006 NWT Addictions Survey, an estimated 37% of NWT residents 15 years of age or older who were current drinkers engaged in high-risk alcohol use (GNWT Department of Health and Social Services 2006b). The prevalence of hazardous drinking (e.g., inability to remember what happened the night before because of drinking, or injury due to drinking) was about two times higher in the NWT in 2006 than in other provinces and territories (GNWT Department of Health and Social Services 2006b). Heavy drinking was most common among males and younger residents, and among those with lower levels of education and income.

The positive news is that heavy drinking has declined during the past 10 to 15 years. From 1996 to 2006 in the NWT, the proportion of heavy frequent Aboriginal drinkers declined from 17% to 12%, while that of light frequent drinkers increased from 8% to 14%. In contrast, the proportion of heavy frequent non-Aboriginal drinkers increased from 9% to 13% (GNWT Department of Health and Social Services 2006b). Weekly binge drinking declined from 23% to 18% among males and from 27% to 16% among Aboriginals (GNWT Department of Health and Social Services 2006b).

The 2006 NWT Addictions Survey also examined the negative consequence of alcohol consumption. For example, an estimated 22% of current drinkers have experienced at least one, or several negative consequences resulting from this activity (GNWT Department of Health and Social Services 2006b). The 2006 survey results concluded that about one in three NWT residents had been insulted or humiliated by someone who was drinking; had a serious argument as

a result of someone else's drinking; or was shoved or pushed by someone who was drinking. An estimated 53% of the population over 15 years of age in the NWT were harmed (physically or sexually) due to someone else's drinking in the year before the 2006 survey (GNWT Department of Health and Social Services 2006b).

Communities and Alcohol

Under the *NWT Liquor Act*, communities in the NWT have three options for their liquor status (NWT Liquor Commission 2009):

- Unrestricted: no restrictions to the sale and distribution of alcohol as defined by the *NWT Liquor Act* or *Regulations*.
- Restricted: a restriction may limit the quantity or frequency of liquor being brought into a community, or the hours of sale. It may also apply to the community or an Alcohol Education Committee to seek approval to bring in alcohol.
- Prohibited: there is a complete ban on alcohol being brought into the community.

The liquor status of the North and South Slave region communities in 2008 to 2009 is listed in Table 12.3-8.

Table 12.3-8 Community Liquor Status in the North and South Slave Communities, 2008 to 2009

Community	Status
Behchokō	Prohibited
Detah	Restricted
Gamètì	Prohibited
Enterprise	Unrestricted
Fort Providence	Unrestricted
Fort Resolution	Unrestricted
Fort Smith	Unrestricted
Hay River	Unrestricted
Hay River Reserve	n/a
Łutselk'e	Prohibited
N'Dilo	n/a
Whati	Prohibited
Wekweètì	Prohibited
Yellowknife	Unrestricted

Source: NWT Liquor Commission 2009.

Note: n/a refers to the status of those communities that were not identified in the NWT Liquor Commission Annual Report 2008–2009.

Communities can request special prohibition orders if they do not wish to have alcohol consumed, purchased, sold, or transported during special community events or occasions (NWT Liquor Commission 2009). According to the RCMP, enforcing restrictions on alcohol is difficult to achieve. Another policing challenge is illegal bootlegging of alcohol in some communities (Scott Clark Consulting Inc. 2006a,b).

Motor Vehicle Accidents and Alcohol

Traffic accidents appear to be on the rise in the NWT. According to the Department of Transportation's 2008 Traffic Collision Facts, there were 861 collisions on Territory roads in 2008, about 17% more than in 2007. Most accidents took place in the communities (677), as compared to those on the NWT highway system (179), or in rural areas outside of community boundaries (5). Most collisions (73%) were the result of driver error (GNWT Department of Transportation 2009a).

Five traffic fatalities reported in 2008 is close to the 20-year average, while the 173 persons injured in 2008 is less than the 20-year average. Total collisions and property damage only collisions have generally been increasing since 1997. The small number of fatal collisions in the NWT makes trends difficult to identify (GNWT Department of Transportation 2009a).

In 2008, there were 52 collisions involving alcohol in the NWT, resulting in 24 injured people. There were also two alcohol-related fatalities that year. These numbers were below the 20-year average.

Off-road vehicles, including snowmobiles and all-terrain vehicles (ATVs), are a common form of transport in remote communities in the NWT. Of the off-road collisions in 2008, one third of drivers were under the influence of alcohol. In addition, most of the off-road vehicle accidents resulted in injuries (GNWT Department of Transportation 2009a).

Drugs and Substance Abuse

According to the 2004 NWT Addictions Survey, drug and substance abuse at that time was on the rise in the NWT, and cannabis (marijuana) was the most popular illicit drug (GNWT Bureau of Statistics 2004). The 2006 survey (GNWT Bureau of Statistics 2008a) indicated that over half of those surveyed have used cannabis or hash during their lifetime.

Among other illicit drugs used, hallucinogens and cocaine or crack cocaine (12% each) were the most popular, followed by speed, ecstasy, and inhalants (glue, gasoline, or other solvents) all at 3% each. Men predominantly used

hallucinogens, cocaine or crack, ecstasy, and speed, while women used inhalants more often than men (GNWT Department of Health and Social Services 2006b).

The 2006 NWT Addictions Survey estimated that 26% of current drug users in the NWT reported at least one incidence of harm or injury from their own drug use, down from 39% in 2004. Harm to home life or marriage (14%) was the most common type of harm reported by users, followed by the harm to friendships or social life (12%), physical health (12%), work or study (8%), and learning (7%) (GNWT Department of Health and Social Services 2006b).

Tobacco

Smoking is a concern in the NWT. In 2006, an estimated 41% of residents 15 years of age and older smoked cigarettes, over double the 2008 national rate of 18%. The number of Aboriginal smokers (8,261) was twice that of non-Aboriginal smokers (4,710) in 2006 (GNWT Bureau of Statistics 2008a and Health Canada 2010, internet site). Tobacco has high health risks such as lung cancer, and cancer of the mouth, throat, bladder, kidney, pancreas, and cervix. It is also the leading cause of pulmonary diseases including emphysema and chronic bronchitis, and can increase risk of heart disease, stroke, peptic ulcers, back pain, and various other diseases and conditions (GNWT Department of Health and Social Services 2005a).

Recent data are not available, but a 2002 NWT School Tobacco survey showed that nearly one in five children between the ages of 10 and 14 had smoked, which was three times higher than the national average. In the smaller communities, an estimated 30% of youths aged 10 to 14 smoked, as compared to 17% of youths in regional centres, and 9% in Yellowknife (GNWT Department of Health and Social Services 2005a).

Gambling

The amount of money spent on gambling may be increasing in the North, but gambling itself seems to be declining. Annual spending on gambling in the NWT, Yukon, and Nunavut combined increased from \$80 million to \$105 million from 1992 to 2001 (CBC Online News 2005, internet site). However, the 2006 NWT Addictions Survey reported that the prevalence of current gambling declined from 78% to 72% between 1996 and 2006. The survey showed that respondents spent a weekly average of \$44 or more on gambling (GNWT Department of Health and Social Services 2006b).

In 2006, approximately the same percentage of males and females engaged in gambling over \$20 weekly. Gambling was highest among youth and younger

adults aged 15 to 39. Of those young people between the ages of 15 and 24 who gamble, 36% spent over \$20 per week. In the small communities, most of those surveyed who gambled spent over \$20 per week (58%). A higher percentage of individuals gamble in the smaller communities (75%) compared to the regional centres (73%) and Yellowknife (68%).

Crime and Policing

Crime is directly linked to many social and economic issues and conditions within societies and communities. The NWT has been facing short- and long-term challenges associated with crime (Criminal Intelligence Service Alberta 2007). The labour force has grown during the past decade, which has been associated with an increasing number of transient workers, and people with larger disposable incomes. The NWT law enforcement is dealing with increased drug and alcohol issues, violence, vandalism, and property crimes.

Increases in crime and violent crime rates have been accompanied by a period of increasing mineral exploration and deposit appraisal activity. It is unclear if the money that mining has brought to community members has led to an increase in crime. Mining has brought jobs and increased incomes to the community, leading to a greater quality of life for many residents. What has been challenging for some residents is the added financial responsibility that comes with steady, high incomes.

Crime is a serious problem in the North. In a recent article in *Maclean's Magazine*, among all Canadian territories and provinces based on 2009 data from Statistics Canada, the NWT ranked second in Canada's Crime Severity Index, which includes six indicators: homicide, sexual assault, aggravated assault, robbery, breaking and entering, and auto theft. Nunavut ranked first (Maclean's Magazine 2010). In 2009 there were 717 break and enters in the NWT versus 711 in Red Deer, Alberta, a community which is double the population of the NWT (Maclean's Magazine 2010). Although the national crime rate decreased between 2000 and 2006, the overall crime rate in the NWT increased by 46% between 2000 and 2006. The overall NWT crime rate was 41,468 per 100,000 people in 2006, six times higher than the national average rate (Statistics Canada 2008b, internet site). Criminal code offences such as mischief, bail violations, prostitution, arson, and use of offensive weapons accounted for 69% of total offences.

Violent and property crimes in the NWT represented 16% and 15%, respectively, of all offences committed in the indicated year (Statistics Canada 2008b, internet site). The violent crime rate in the NWT overall has increased by 41% between 1996 and 2008. In Yellowknife, it has fluctuated from year to year but has remained, on average, below 40 per 1000 people. The violent crime rate in

some small communities has increased substantially (e.g., in Behchokò it more than doubled between 1996 and 2008), whereas in others it has declined (e.g., in Whatì it declined to below 1999 levels after reaching a high of 86 per 1,000 people in 2004) (GNWT Bureau of Statistics 2009c).

In 2006, a public consultation process about crime and policing was held in several NWT communities (Scott Clark Consulting Inc. 2006a). Community participants frequently expressed the view that alcohol and drug abuse underlie much of the criminal and anti-social behaviour they witness in their communities. In particular, property crime, domestic violence, assault, and creating a disturbance are seen as directly linked to alcohol or drug abuse in almost every case. Police generally agree with the community assessments that substance abuse is strongly linked to property crimes and personal violence (Scott Clark Consulting Inc. 2006a).

Youth Gangs

Youth gangs are organized groups of adolescents or young adults who rely on intimidation, violence, or criminal acts to control areas of unlawful activity. The 2002 Canadian Police Survey on Youth Gangs suggested that Aboriginal youth was more vulnerable to gang recruitment and organized crime than non-Aboriginal youth, and that gangs were increasing in numbers (Public Safety Canada 2007).

The Criminal Intelligence Service of Canada 2006 Annual Report showed that members of Alberta-based street gangs have been involved in the street-level trafficking of various drugs in Yellowknife and the NWT (Criminal Intelligence Service Canada 2006). Gangs such as Alberta's Crazy Dragons have begun to recruit youths in the NWT, involving youths in Yellowknife gangs and in selling drugs (CBC Online News 2007, internet site). Drugs in the NWT are believed to originate from the British Columbia (BC) lowlands and are distributed out of Yellowknife (Criminal Intelligence Service Canada 2005).

Spousal Assault

Family violence is a critical issue in the NWT, affecting women, men, and children, as well as the health and sustainability of communities. Family violence can develop out of historical traumas such as the residential schools, resulting in the breakdown of family, traditional culture, and community life (Status of Women Council of the NWT 2007). Other factors such as poverty and substance abuse also contribute to family violence. Spousal violence and sexual assault are most often directed at women, and are often more severe than violence against men (Status of Women Council of the NWT 2007). Violence can result in serious physical injury and emotional and mental harm, and may include alcohol and

drug abuse, domestic violence, physical and sexual abuse, depression, rage, increased levels of interpersonal violence, and suicide. In 2006, about 12% of adult residents in the NWT experienced some form of spousal violence, as compared to 7% in other jurisdictions (Johnson 2006, internet site).

The NWT faces a series of challenges in addressing family violence, including the remote location of many of its 34 communities. Some communities do not have social/counselling services, medical services, or shelters available for victims, and often depend on fly-in fly-out services. Many women leave their homes and communities to access shelters or treatment centres elsewhere, thereby facing additional challenges such as lack of housing, temporary treatment, and lack of community support. Women often end up returning to abusive relationships in their home communities (Status of Women Council of the NWT 2007).

In response to the social issues of family violence, the GNWT put into effect the *Protection against Family Violence Act*, instituted on April 1, 2005. The *Act* provides for 24-hour access to emergency protection orders, where there is an act or threat of family violence. The *Act* also provides victims of family violence with long-term protection orders (GNWT Department of Justice 2005).

Sexual Assault

In 2004, the Royal Canadian Mounted Police (RCMP) reported 241 sexual assaults on women, almost eight times the national rate of reported sexual assaults. In the NWT and nationally, about 80% of the victims are female under the age of 18 (Status of Women Council of the NWT 2005b). In 2000, the RCMP received 24 reports of sexual abuse of children less than 12 years of age and 50 reports of sexual abuse of teens aged 12 to 18. It must be noted that these were only reported cases; sexual abuse was likely much more prevalent (Status of Women Council of the NWT 2005b). This trend of high sexual abuse in the NWT is still occurring, along with high rates of spousal assault. In the Maclean's study, the NWT ranked second for both sexual assault and aggravated assault in 2009 across Canada (Maclean's Magazine 2010).

Children and Abuse

Children are most vulnerable to family violence, and to physical, sexual, and mental abuse. According to the 2008 Communities and Diamonds Report, the number of children reported as having received child services and protection has increased from 2000 to 2007, especially in the small communities and regional centres (GNWT Departments of Health and Social Services, Education, Culture and Employment, Industry, Tourism and Investment, Justice, Bureau of Statistics, and Housing Corporation 2009).

A 2003 University of Calgary study showed 1,516 reported cases of child maltreatment and abuse in the NWT, with an incidence rate of maltreatment of 66 per 1,000 children. Neglect was the most common form of maltreatment, representing just over half (51%) of the cases being reported. This type of maltreatment involved 358 substantiated investigations (proven cases). Exposure to domestic violence was the second most frequent form of maltreatment, accounting for 188 cases, or 27% of the substantiated investigations. The third reported form of maltreatment was physical abuse (82 cases or 11% of substantiated investigations). Fourth, emotional abuse accounted for 6% of proven cases and sexual abuse represented 5% (MacLaurin et al. 2005).

In the 2003 study, 60% of the victims of maltreatment were girls. Of these, 57% were victims of sexual abuse, 65% of neglect, and 64% were exposed to domestic violence (numbers do not total 100% as each victim may have been exposed to more than one form of abuse). Boys were more often victims of physical abuse (57%) and emotional maltreatment (58%). Most victims of sexual abuse and emotional maltreatment were older children (e.g., 12 to 15 years). Younger victims aged eight to 15 were predominantly exposed to domestic violence and emotional abuse (MacLaurin et al. 2005). Of the child maltreatment cases in 2003, 90% (628 cases) involved children of Aboriginal heritage (MacLaurin et al. 2005).

Poverty

Poverty is an issue across Canada, especially where children and vulnerable groups are concerned. Poverty is the inability for people to meet their basic needs, and to be able to participate in economic and social opportunities that are available to them. Poverty is not just an economic issue, but linked to poor health, lower education levels, employment access, violence and behavioural issues, crime, and inadequate housing and poor water quality or availability (GNWT Department of Education, Culture and Employment 2007b).

In the NWT, the most vulnerable groups are seniors, persons with disabilities, single parent households (especially those headed by women), and single people in general. Those that fall into any one of these categories are at greater risk of living in poverty (GNWT Department of Education, Culture and Employment 2007b).

The NWT uses the Low Income Measure as a poverty indicator. It is calculated as 50% of adjusted median income of an equivalent household. Table 12.3-9 identifies the Low Income Measure for the NWT, according to aggregated geographic areas as defined by Statistics Canada under the following classifications: small communities, regional centres (Fort Smith, Hay River, and Inuvik), and Yellowknife. Most low-income groups in the NWT are in the small

communities (23%). Children are most vulnerable to the effects of low income and constitute the largest proportion of affected people in all community types.

Table 12.3-9 Percentage of Low Income Measure, Northwest Territories and North and South Slave Communities, 2005

Community Type	Persons %	Children- Age 0-17 %	Persons - Age 65 and Over %
NWT	15.0	20.7	9.8
Small Communities	23.1	28.1	14.6
Regional Centres	14.3	19.7	3.8
Yellowknife	9.8	14.4	8.3

Source: GNWT Department of Education Culture and Employment 2007e.

Note: Small Communities refer to all other communities excluding those of Yellowknife and the Regional Centres; Regional Centres correspond to the communities of Fort Smith, Hay River and Inuvik; Yellowknife includes Detah and N'Dilo; Statistics are based on all families and non-family persons.

% = percent.

The NWT Income Assistance program is aimed at assisting individuals lacking adequate funds to pay for basic food, shelter, and utilities. The amount of money provided to individuals is based on various factors, such as the amount required to meet basic needs, size of family, geographic location, number of children, and utility and rent costs (Human Resources and Skills Development Canada 2006, internet site).

The number of income support beneficiaries in the NWT has increased by 16% over a five-year period, from 2,073 (2004) to 2,402 (2009). However, it needs to be qualified that the numbers were relatively constant from 2001 to 2008, and most of the increase occurred during the last year, from 2008 to 2009. While most communities in the North and South Slave region saw a gradual decline of income support beneficiaries leading up to 2008 (except for Fort Providence and Fort Smith), some communities such as Behchokò, Hay River, and Gamètì increased in 2009. The number of income support beneficiaries in Yellowknife and the NWT overall increased from 2008 to 2009. Reasons for this general increase are unclear, but one year's difference from the "norm" does not indicate a trend; still, it is likely that the general economic downturn over the past two years is at least partly responsible for the growing demand for income support (GNWT Bureau of Statistics 2010a.)

Most income support beneficiaries in 2005 were single individuals (33%), followed by single parents (14%), couples with dependents (5%), and couples with no dependents (3%) (Human Resources and Skills Development Canada 2006, internet site). It is unlikely that a similar trend has occurred since then. Of the child beneficiaries of income support, most came from single parent

households (25%), while 11% came from couple parent households. The remaining 9% were composed of dependents 19 years of age and over.

Food Banks

The 2009 Hunger Counts report stated that 1,429 people in the Yukon, Nunavut, and the NWT used food banks in March 2009, of which 37% (529) were children (Canadian Association of Food Banks 2010). This percentage of food bank users is up substantially from 2006. The Hunger Counts 2006 report indicated that in March 2006, approximately 457 people representing 143 households in the Yukon, Nunavut, and the NWT used the food bank, with a similar proportion of adults and children (Canadian Association of Food Banks 2007). In other words, over three times as many people (a 313% increase) made use of food banks in March 2009 compared to three years earlier. This increase was likely associated with the global economic downturn, as well as in-migration.

Homelessness

The GNWT Department of Health and Social Services has identified homelessness as an issue of growing concern (GNWT Department of Health and Social Services 2005b). Single men and women who are homeless often have underlying addictions and/or mental health issues that deter them from being able to maintain a permanent place to live, or hold down a steady job. In 2005, some were identified as having been through the penal system, thereby facing challenges accessing programs or maintaining access to them.

The 2007 YWCA report *Being Homeless is Getting to be Normal* identified the following characteristics as contributing to homelessness in the NWT:

- the remote geography;
- cost of living;
- limited employment opportunities;
- inadequate access to appropriate social services;
- domestic violence and intergenerational dependency on income supports;
- underdeveloped infrastructure; the lack of accessible and affordable transportation systems; and
- high cost of labour and materials needed to increase available housing.

Even during the mid-2000s, when jobs were more plentiful, shelter use in Yellowknife was high. In 2005, the Salvation Army had, on average, 45 men per night in their overnight shelter in Yellowknife, or triple the number compared to

1999. The Centre for Northern Families, which provides shelter to single women in Yellowknife, reported that about 25 to 30 women use their shelter per night (GNWT Department of Health and Social Services 2005b).

More recent reports suggest that homelessness continues to be a growing problem in Yellowknife. In 2008, 936 individuals stayed in a city shelter at least one night. Of these, 49% were single men and the remainder were single women, youth (25 and under), and families; about three-quarters (67%) stayed from one to 30 days; 26 individuals or families are on a supportive living waitlist (Yellowknife Homelessness Coalition 2009).

Women in the NWT are among the most vulnerable and most affected by homelessness (YWCA 2007). In 2007, there were an estimated 500 homeless women in Yellowknife alone and over 1,000 homeless women across the NWT, accounting for 5% of the entire female population in the NWT (YWCA 2007).

Youth in the NWT between the ages of 16 to 19 are also vulnerable to homelessness, and there are very limited services available to address their needs. In early 2005, the Side Door Youth Centre in Yellowknife reported over a dozen youths between the ages of 16 to 18 who used the shelter during a five-week period (GNWT Department of Health and Social Services 2005b).

With the exception of Fort Smith, which has an emergency shelter for children and women, there are no emergency shelters or transitional housing options in the smaller communities within the North and South Slave region. Shelters in Yellowknife identified that many of their clients are recent migrants from the smaller communities (GNWT Department of Health and Social Services 2005b).

12.3.4.5 Economy

Natural resource development is important to the overall domestic economy of the NWT. In addition to its direct impact on the territory's production through mineral production and mine services, natural resource development is also having an impact on transportation, wholesaling, and construction. It adds thousands of jobs to the NWT's economy, has directly and indirectly raised income levels, and led to a surge in residential construction, retail activity, and government spending.

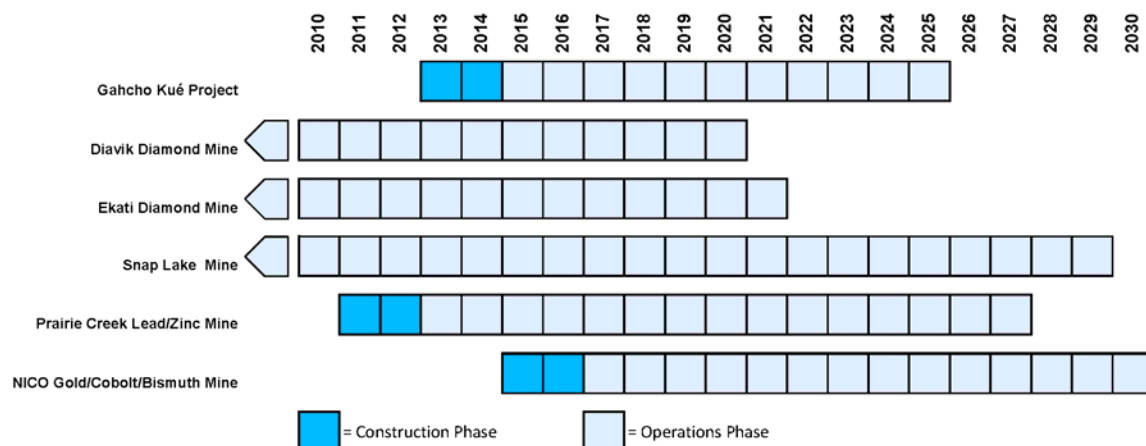
While fur trade posts were the foundation for non-native settlement, and other sectors have also played a role in the NWT's economy, mining has arguably had a major influence the NWT ever since prospectors arrived in the 1890s. Prior to the advent of the diamond industry, gold was the most important mineral. Other

minerals such as uranium, radium, silver, lead, zinc, copper, bismuth, cobalt, and tungsten have also been mined in the NWT.

Besides mining, the oil and gas sector has been an important contributor to economic development of the NWT. The first well was drilled by Imperial Oil in Norman Wells in 1920; oil production began during World War II when oil was moved to a refinery at Whitehorse and then to Alaska. A major oil discovery in the 1980s led to the development of a pipeline from Norman Wells to Alberta. Exploration for natural gas increased in the 1960s, with the Pointed Mountain gas field near Fort Liard coming into production in the early 1970s and onshore and offshore drilling activities occurring in the Beaufort Delta area in the late 1960s through to the mid-1980s. A natural gas pipeline system along the NWT's Mackenzie Valley is being proposed that would connect its northern gas fields with North American markets. The proposed Mackenzie Gas Project is currently under regulatory review.

Besides the continued interest in gas production and distribution, the main natural resource story of the past 20 years has been the development of three diamond mines, Ekati, Diavik, and Snap Lake, which have more than offset the closure of the two major gold mining operations, the Con and Giant mines. After the discovery of kimberlite in 1991, exploration continued and the first diamond mine (Ekati) began production in 1998. Together, the three diamond mines will meet the halfway mark of their expected mine life before 2015 followed by five to 10 years of gradual decline (Figure 12.3-3).

Figure 12.3-3 Projected Operating Life of Existing and Proposed Mines in the NWT, 2010 to 2030



Note: Estimated construction start dates dependent on all permits and approvals, and are subject to change.

The first diamond mines to open provided employment and secondary industries for local populations in the communities located closest to their operations, and revenues for governments in the form of transfer payments. Some growing pains have occurred concerning employment of northerners and Aboriginal workers in the NWT. It has been challenging for De Beers to achieve NWT Residency hiring targets at the Snap Lake Mine since it was the third diamond mine to open in the NWT, and many of the skilled and qualified workers were already employed at the other mines (De Beers 2009). In another example, the NWT government diamond policy, which was updated in late 2010, requires NWT producers to make a portion of diamonds mined in the NWT to be made available to GNWT approved local manufactures. As of October 2010, only one out of four diamond polishing plants that opened in Yellowknife during the past decade was operating. This operation employs 11 workers and polishes \$17 to 18 million worth of diamonds annually (Northern News Services 2005).

Despite the recent downturn in resource commodities such as oil, gas, and minerals, proposals to develop natural resources in the NWT still exist, including the Mackenzie Gas Pipeline and the Taltson Hydroelectric Expansion Project. Resource development in the NWT provides employment for Aboriginal and non-Aboriginal residents, as well as for people from other regions in Canada and even other countries. It generates revenues for government and provides individuals with income that adds to consumer spending in the NWT and throughout Canada.

While the NWT's economic growth set record levels prior to 2008, future growth will face some large challenges. With the recessionary effects felt throughout the world during 2008-2009, mining has experienced some slowing as indicated by recent layoffs and curtailing of production. The economic downturn has impacted demand for diamonds, which are the primary export for the NWT. Likewise, interest in the oil and gas sector has been slow to recover. Oil prices are recovering, but natural gas prices remain low.

In the following subsection sections, various economic measures and sectors of the NWT are examined.

12.3.4.5.1 Economic Measures

Gross Domestic Product (GDP)

One of the more common measures of economic activity and wealth creation is gross domestic product (GDP). With the increased mining and oil and gas activity during the past 10 to 15 years, the GDP of the NWT has grown substantially, for example, from \$3.3 billion in 2003 to \$3.7 billion in 2008. The mining and oil and gas sectors accounted for \$1.4 billion of GDP in 2003 and \$1.3 billion in 2008. During this period, diamond mining has been (and continues

to be) the main natural resource extraction activity (Table 12.3-10). Still, economic growth of the NWT has been virtually flat since 2004, the year Diavik came into production, with the exception of 2007, which coincides with major capital developments taking place at all three diamond mines.

Table 12.3-10 Gross Domestic Product by Industry, Northwest Territories, 2003 to 2008 (millions of dollars)

	2003	2004	2005	2006	2007	2008
All industries	3,343	3,438	3,420	3,580	3,983	3,735
Goods Producing Industries – Total	1,693	1,735	1,683	1,814	2,127	1,888
Agriculture, forestry, fishing and hunting	17	18	19	19	17	17
Mining, and oil and gas extraction	1,383	1,345	1,216	1,248	1,503	1,281
Utilities	49	50	57	58	61	60
Construction	230	313	378	480	539	524
Manufacturing	14	10	14	9	7	7
Service Producing Industries – Total	1,125	1,197	1,279	1,306	1,380	1,407
Wholesale trade	58	60	82	76	96	98
Retail trade	94	98	97	101	114	118
Transportation and warehousing	171	203	240	247	267	274
Information and cultural industries	75	76	74	75	78	78
Finance and insurance, real estate, etc.	349	369	379	387	394	402
Administrative and support, waste management, etc.	38	40	44	47	48	48
Educational Services	130	132	134	137	141	143
Health care and social assistance	148	157	169	176	181	184
Accommodation and food services	63	63	60	61	62	63
Other Service Industries – Total	451	453	445	450	458	466
Other services (except public administration)	66	66	61	62	66	67
Public administration	385	388	384	389	392	399

Source: GNWT Bureau of Statistics 2009a.

Royalties

Mining royalties are payments made by individual mining companies to the federal government to compensate for the use and extraction of non-renewable resources (minerals) on Crown Lands. These payments are made on a yearly basis by the mining industry and are based on the annual value and output of the mine. All royalty funds are administered through Indian and Northern Affairs Canada (INAC) (2010, internet site).

Royalties are levied at a graduated rate that increases by 1% for each additional \$5 million in the mine output value. Royalty issues range from 0% to 14%. The graduated royalty rate in the NWT generally increases with the size and scale of the mine (INAC 2004, internet site). Fluctuations in market prices for diamonds are also reflected in the final royalty payments. Federal mining royalties from the NWT increased 45% annually from \$9 million to \$78 million between 1999 and

2005, which coincided with the dramatic growth in mining activity in the region (GNWT Department of Finance 2006). Over their lifespan, the existing diamond mines are estimated to collectively generate over \$10 billion in royalties and taxes for the NWT.

Under the land claim agreements, the federal government provides the First Nations and their communities with a portion of the royalties received from the non-renewable resource extraction within the NWT and within the settled land claim areas. For example, the Tłıchǫ land claim agreement entitled the Tłıchǫ Government to a share of the mining royalties collected by the federal government in the Mackenzie Valley. This share equals 10% annually of the first \$2 million of mineral royalties and 2% of any additional mineral royalties collected by the federal government (Tłıchǫ First Nation, GNWT and Government of Canada 2003). Other settled land claim areas within the NWT have similar resource revenue sharing agreements, including the Gwich'in and Sahtu.

For regions with an *Interim Resource Development Agreement*, such as the Dehcho, royalties are paid out in the same manner as settled claims. The Akaitcho First Nations (Detah, N'Dilo, Deninu K'ue Dene [Fort Resolution], and Łutselk'e Dene) have signed an *Agreement-in-Principle* with the federal and territorial governments, but do not have an *Interim Resource Development Agreement* allowing access to royalties.

Taxes and Rents

In addition to mining royalties, the federal and Territorial governments have a series of taxes and rents that are applied to mining companies. Federal taxes are applied through the *Income Tax Act*. The federal corporate income tax represents a percentage of the net corporate income made within a given year. Territorial taxes are also applied to mining operations and are calculated in a similar manner to federal corporate income tax. The combined federal and territorial tax rate is 30.5%. The NWT has no mining tax exemption for new mines as exists in some provinces in Canada.

Companies are also responsible for the payment of the employee payroll tax, which is a 2% annual tax on each employee's annual earnings. This tax is levied to all employees who work in the NWT, regardless of their place of residence and is payable to the GNWT Department of Finance (GNWT Department of Finance 2008).

In addition to these taxes, companies pay capital taxes and other miscellaneous taxes that include fees, licenses, land, and goods and services (NWT and Nunavut Chamber of Mines 2005). During 1999 to 2005, the federal royalties

and other non-renewable resource revenues from fees and licenses grew by 18% annually, from \$84 million to \$224 million in the NWT (GNWT Department of Finance 2007). These figures have been steadily increasing as economic growth and development in the mining industry continues (Santarossa 2004).

Capital Investment

Another measure of economic activity is the level of capital investment over time. Between 2001 and 2008, the mining and oil and gas industries contributed an average of 70% of the total capital investment in the NWT. More specifically, the diamond mining industry invested more than \$1.5 billion in both 2006 and 2007 (Impact Economics 2008).

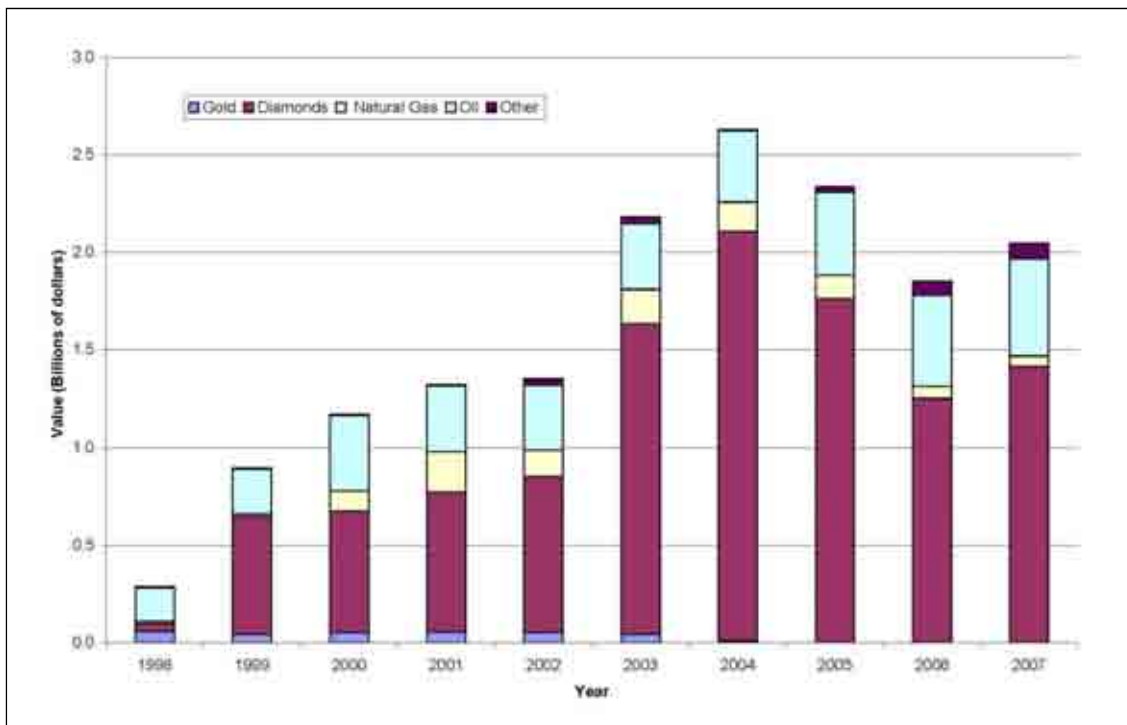
12.3.4.5.2 Non-Renewable Resources

Mining and exploration activities in the NWT have been, and continue to be, the major economic drivers for the NWT's economic growth since the late 1990s and even much of the 20th century. More recently, the global recession of 2008-2009 has had a negative impact on this sector. While mining and oil and gas activities contributed about one-third (32%) of total GDP in 2009, this was a 15% decline from 2008 (GNWT Bureau of Statistics 2010b). In 2009, NWT's GDP fell by 5.9%, the fourth largest decline among all provinces and territories (GNWT Bureau of Statistics 2010b). The nearly 18% decline in the diamond mine industry from 2008 to 2009 accounted for most of the GDP decrease (GNWT Bureau of Statistics 2010b).

Diamond Mines and Other Mining Activity

Diamonds continue to be the main driver in the NWT's economy. Figure 12.3-4 illustrates the dramatic rise in diamond mining production, from practically little to no investment in 1998 to \$2.0 billion in 2004 and \$1.6 billion in 2006. However, the temporary shut-down of two diamond mines in 2008 contributed to a 25% decline in carat production in 2009 (GNWT Bureau of Statistics 2010b).

Figure 12.3-4 Production of Non-Renewable Resources, Northwest Territories, 1998 to 2007



Source: GNWT Strategic Planning Branch 2006a.

The federal government and the GNWT both benefit from the production of diamonds in the NWT. The federal government directly benefits through royalties, business taxes, and personal income taxes. The territorial government benefits through additional revenue taxes resulting from spin-off businesses and goods and services generated by the diamond industry (Santarossa 2004).

Indian and Northern Affairs Canada estimates that the three current NWT diamond mines (Ekati, Diavik, and Snap Lake) will collectively generate \$10.2 billion in royalties and taxes over their lifetime. This breaks down into the following:

- \$1.6 billion in royalties;
- \$2.6 billion in federal business taxes;
- \$1.3 billion in Territorial business taxes; and
- \$4.7 billion in employee and other businesses income taxes (Santarossa 2004).

According to the NWT and Nunavut Chamber of Mines (NWT and Nunavut Chamber of Mines 2005), the Ekati and Diavik mines contributed \$54.4 million in property and fuel taxes to the GNWT from 1998 to 2004.

Oil and Gas

Oil has benefited from price gains during the 2000s, and sales exceeded \$600 million in 2008 (GNWT Department of Industry, Tourism and Investment 2009). Record prices over the first half of 2008 drove the NWT sales to over \$630 million. While oil prices declined during 2008 and 2009, they remain relatively high.

On the other hand, after peaking at over \$200 million in 2001, natural gas sales declined to under \$50 million by 2008 (GNWT Department of Industry, Tourism and Investment 2009). Current low natural gas sales reflect a lack of new investment in exploration and field development, especially in southern NWT. As production from existing properties has declined, no replacement wells have come online in recent years.

Sales and prices aside, both oil and gas production declined in the late 2000s. Total natural gas production in 2009 dropped 5.2% from the previous year, and total oil production in 2009 decreased 4.3% from 2008 (INAC 2010, internet site). The year 2009 also saw a decline in exploration expenditures; it was estimated at \$117 million, about half of the 2008 total (INAC 2010, internet site).

From 1999 to 2004, the oil and gas sector provided fewer royalties, taxes, and rents than the mining sector in the NWT. Royalties received in the calendar year 2009 from oil and gas production on northern frontier lands amounted to approximately \$19 million. This decline of 38% was due to decreased production and a drop in prices from 2008 levels (INAC 2010, internet site).

12.3.4.5.3 Other Sectors

Mining and oil and gas activities in the NWT have resulted in spin-off activities in other sectors such as construction, commercial services, transportation, and storage. Indirectly, this has led to growth in the number of registered corporations, including housing sector investments, hotel accommodation, and full-service restaurants in the region.

Similar to mining, these other sectors in the NWT were also affected by the recessionary effects of 2008 and 2009. As measured by their impact to GDP, support activities for mining and oil and gas (including exploration activity) fell by almost 32%, wholesale trade declined by 12%, and transportation and warehousing fell by 4% during 2009 (GNWT Bureau of Statistics 2010b). These

declines were slightly offset by some industries that expanded during last year. For example, nonresidential construction increased dramatically by 138%, transportation engineering construction grew by 26%, and public administration rose by 2% (GNWT Bureau of Statistics 2010b). Recent non-residential construction projects include the \$180-million Deh Cho Bridge. While the slowdown in the NWT economy has led to a decline in both residential and private sector construction, the NWT government continues to invest in upgrading existing infrastructure and services, and replacing or adding new infrastructure where necessary.

Government Services

Government services, including health and education, along with administration and defence, are the largest employers in the NWT. Growth in government services is largely associated with changes in demographics and changes in overall economic conditions. Most NWT government revenues are generated outside of the NWT through transfers from the Federal government (GNWT Department of Finance 2008).

Retail Trade

The level and rate of retail activity in a region is indicative of the nature of local business activity. As a result of the relatively small economy and its sensitivity to resource pricing and labour costs, the rate of change in retail activity in the NWT tends to fluctuate more than in the rest of Canada. For example, the increase in activity between 2001 and 2002 was 18% in the NWT while in 2004 it was less than 1%. The increase in Canada as a whole ranged from 4.4% to 6.4% from 2001 to 2008 (GNWT Bureau of Statistics 2009a).

Tourism

The tourism sector in the NWT is an economic driver, although much smaller than others in terms of economic impact. While more recent figures are unavailable, the number of visitors to the NWT steadily increased from 2002 until 2006 (Table 12.3-11).

Table 12.3-11 Visitors and Visitor-Days in the Northwest Territories from 2000 to 2006

Year	Visitors (Number)	Growth (%)	Visitor-Days (Number)	Growth (%)
2000-2001	52,388	n/a	371,011	n/a
2001-2002	49,694	-5.1	349,328	-5.8
2002-2003	58,242	17.2	412,186	18.0
2003-2004	60,717	4.2	428,683	4.0
2004-2005	62,002	2.1	436,141	1.7
2005-2006	64,000	3.2	449,328	3.0

Source: GNWT Strategic Planning Branch 2006c, internet site.
% = percent; n/a means not applicable.

Real Estate

The housing market in the NWT experienced rapid expansion in the late 1990s and throughout the early 2000s, and then began to decline. Investment peaked in 2004 at about \$103 million, and then declined in 2005 to about \$87 million. In 2008, due to the economic recession, total housing investment declined by 6% from the previous year. This was largely because investment in single-family dwellings dropped by \$9.3 million from \$16.5 million in 2007 to \$7.2 million in 2008 (GNWT Department of Industry, Tourism and Investment 2009).

12.3.4.5.4 Business Development and Services

The GNWT actively supports economic diversity and development through business development services (GNWT Strategic Planning Branch 2006a). The NWT Business Development Investment Corporation (BDIC) supports and lends to northern businesses where conventional lending institutions are not prepared to participate, and to businesses in communities without a commercial bank (NWT Business Development and Investment Corporation 2006, see also internet site).

To support northern businesses, the GNWT lowered the Corporate Income Tax rate for large corporations from 14% to 11.5% on July 1, 2006. The GNWT consulted stakeholders on also lowering the small business tax, from 4% to 2%; based on feedback it decided to maintain the taxation rate (GNWT Strategic Planning Branch 2006a).

The Strategic Investment in Northern Economic Development Program (SINED) is managed by INAC, and provides money for business development projects such as tourism training, infrastructure enhancement, arts branding, marketing, business training, and business research activities. Funding worth \$23 million was allocated to the NWT under SINED's Target Investment Program. The SINED was approved in May 2005 and funding was to end in March 2009 (GNWT Department of Industry, Tourism and Investment 2008).

The Support to Entrepreneurs and Economic Development (SEED) Policy replaced the existing Business Development Fund and Grants to Small Business Programs. The purpose of this change is to focus more specifically on the smaller communities (GNWT Department of Industry, Tourism and Investment 2010, internet site). The SEED policy is administered by the GNWT Industry, Tourism and Investment. It consists of four programs that include start-up funding, asset acquisition, market and product development and operational support.

Aboriginal Businesses

Several Aboriginal-owned registered businesses are located in or near Yellowknife. Tłıchǫ Logistics Inc. is 100% owned by the Tłıchǫ and primarily focused on the supply of services to the mining sector, with over 350 employees in 2008 (Werniuk 2008; Tłıchǫ Investment Corporation 2010, internet site). Det'on Cho Corporation, the economic arm of the Yellowknives Dene First Nation, currently has 20 business subsidiaries that provide goods and services to their local communities and the mining industry (Det'on Cho Corporation 2010, internet site). In 2010, there were 17 registered Inuit businesses (Pan Arctic Inuit Logistics Corporation 2010, internet site).

Several business funding and service programs have also been developed for Aboriginal people. Indian and Northern Affairs Canada is a provider of the Aboriginal Business Canada program and has an office in Yellowknife. Aboriginal entrepreneurs of Métis, Dene, and Inuit heritage are eligible for financial assistance, business information and resource materials, and referrals to other possible sources of financing or business support. The program supports business in a variety of areas that include manufacturing, tourism, innovation, and youth entrepreneurship (INAC 2009).

Banking Services

Yellowknife, Hay River, and Fort Smith have full banking services. The other communities of the North and South Slave region have limited banking services, which are provided by their local co-ops and northern stores (GNWT Department of Industry, Tourism and Investment 2006b). The five major Canadian banks (Scotia Bank, Royal Bank of Canada, Canadian Imperial Bank of Commerce, Bank of Montreal, and TD Canada Trust) are represented in the NWT.

12.3.4.6 Infrastructure

As of 2010, the NWT consists of 33 communities across a landmass of 1,171,918 km². The communities range in size from 80 residents to 19,711 residents (Yellowknife). More than 15% of the NWT's population live in 15 communities without year-round road access (Alternatives North 2009), and rely on air travel for access to the outside world. As a result, these communities require some services, particularly medical and education, in larger centres, and the seasonal delivery of goods is a crucial part of their survival. When combined with difficult land access and a complex regulatory environment, this remoteness may have an adverse effect on development (GNWT Department of Industry, Tourism and Investment 2009). Improved infrastructure such as new bridges, more paved roads, airport expansions, and increased social services (health and education) have been decreasing this sense of "remoteness" in many smaller communities.

Infrastructure is essential to economic growth, health and well-being, education, and employment, particularly in the smaller communities. Community infrastructure includes a wide range of services and facilities such as schools, roads, airports, communication networks, utilities, and public housing. These are developed, funded, and maintained by the GNWT.

12.3.4.6.1 Education Services

The Department of Education, Culture and Employment manages education in the NWT, and has five long-term strategic objectives: (i) foster pride in culture; (ii) educate youth and children; (iii) educate adults; (iv) provide skill development; and (v) facilitate the full participation of people in society (GNWT Department of Education, Culture and Employment 2007a).

District Education Authorities and the District Education Councils are responsible for coordinating and supporting educational programs and services in the communities (GNWT Department of Education, Culture and Employment 2007c). The Department of Education, Culture and Employment is committed to maintaining excellence by working with the District Education Authorities and District Education Councils to fulfill their mandates and responsibilities (GNWT Department of Education, Culture and Employment 2007c). The NWT consists of nine educational jurisdictions managed by education boards and councils, District Education Authorities, and District Education Councils. These boards are responsible for the management, administration, and implementation of programs and curricula.

In 2009, 553 teachers were employed in the NWT in the North and South Slave region; over half (315) worked in Yellowknife schools (NWT Teachers' Association 2010). Several smaller communities do not have high schools, requiring parents to send their children to other towns or to Yellowknife to finish secondary school.

Early Childhood and Day Care Programs

Early childhood and daycare programs are offered throughout the NWT. These play an important role in child development and family life, by providing childcare support to parents seeking access to education and/or employment (GNWT Department of Education, Culture and Employment 2007d).

The NWT allows both unregulated and regulated childcare. Unregulated childcare, or family childcare, allows up to four children per caregiver. This includes the caregiver's own children up to the age of 12 (Childcare Resource and Research Unit 2008). Regulated childcare includes day care centres, nursery schools, and family day homes. Daycare centres provide group care of

children and supervision for five or more children up to age 12, generally by a person who is not a relative of the children utilizing the facility and its services. Nursery schools provide programs for children younger than six years of age for four consecutive hours or less per day. Family day homes provide care for up to eight children under the age of 12 years, including the caregiver's own children.

In 2008, the NWT had 67 daycare centres with 1,368 available spaces, and 50 licensed family day homes with 400 available spaces for children. The current childcare system in the NWT is operating at full capacity, with two thirds of the centres maintaining waiting lists (Alternatives North 2006).

Childcare programs are also limited in the NWT by several factors. No licensed after-school care programs operate during the summer months in the NWT. There are also no segregated childcare programs for children with special needs in the NWT. Some financial assistance is available for parents and caregivers for care of special needs children.

Aboriginal Head Start Program

The Aboriginal Head Start Program is a pre-school program funded by Health Canada for First Nations, Inuit, and Métis living in urban areas and large northern communities. There are eight Aboriginal Head Start Program centres located throughout the NWT, including centres in Hay River, Fort Smith, Yellowknife, Behchokò, and Fort Providence.

The Aboriginal Head Start Program has six components: (i) Aboriginal culture and language; (ii) education and school readiness; (iii) parental involvement; (iv) health promotion; (v) nutrition; and (vi) social support (NWT Aboriginal Head Start 2010, internet site). The program aims to meet spiritual, intellectual, and physical needs of participants. Dene, Métis, and Inuit pre-schoolers, between the ages of three and five are eligible for the program. Along with parental involvement, Elders' involvement plays a strong role in the program's success. Elders are invited to visit the centres throughout the year to teach pre-schoolers about traditional skills (NWT Aboriginal Head Start 2010, internet site).

Kindergarten to Grade 12

Schooling is mandatory in the NWT for children aged six to 15, and enrolment for grades one through nine closely approximate overall populations for the corresponding age groups (GNWT Department of Education, Culture and Employment 2007a). Kindergarten attendance is not mandatory in the NWT (GNWT Department of Education, Culture and Employment 2007d).

The Department of Education, Culture and Employment is responsible for setting overall standards for curriculum in the NWT. Given the cultural diversity of the NWT, educational programming exhibits a NWT perspective (GNWT Department of Education, Culture and Employment 2005a). It reflects cultural needs and priorities, as related to language and traditional knowledge. The Dene Kede and Inuugatigiit programs developed to incorporate language and culture are two key Aboriginal programs. Bilingual educational programs include first language, second language, and immersion language programs in one or more of the 11 official languages of the NWT.

Ninety-one percent of all students from kindergarten through grade nine in the NWT have access to Aboriginal language programs. These programs average two hours weekly of instructional time. Some high schools offer credit courses in these languages (GNWT Department of Education, Culture and Employment 2007c).

Career Programming

Career development is an important part of the NWT school curriculum. From kindergarten through grade 12, the foundation for a career is developed through school programming and continual monitoring and assessment (GNWT Department of Education, Culture and Employment 2007d). To enhance career development, the GNWT provides students from elementary to junior secondary grades with a Career and Program Plan. The Career and Program Plan permits students to choose appropriate courses for future career opportunities. It is a required credit course for graduation, and the student should complete this course before grade 10 (GNWT Department of Education, Culture and Employment 2007d).

Post-Secondary Education and Training

Students graduating from secondary school in the NWT have a variety of choices in their home territory to further their education, including college, university, and technical training and apprenticeship programs. The GNWT has placed an emphasis on skills training and retaining northern graduates through employment, bursary, or other training incentives (GNWT Department of Human Resources 2008). The main opportunities for post-secondary education in the NWT are through the Aurora College and the Mine Training Society (MTS).

Aurora College is a post-secondary institution funded in part by the GNWT Department of Education, Culture and Employment, with its head office in Fort Smith. In 2010, it was the only college in the NWT and the primary delivery agent for adult and post-secondary education, with three campuses: Aurora Campus in Inuvik, Thebacha Campus in Fort Smith, and the Yellowknife Campus

(Aurora College 2010, internet site). There are 26 Community Learning Centres in the NWT, with 12 Community Learning Centres serving the communities in the North and South Slave regions. The focus of the Community Learning Centres is to provide community-based Adult Literacy and Basic Education.

The MTS is a non-profit organization created in 2004 that seeks to address the need for training and development of a skilled northern workforce. The main objective of this organization is to assist Aboriginal people in finding jobs in the mining industry. The society is a partnership composed of Aboriginal representatives (Yellowknife Dene First Nations, Tłıchǫ Government, Łutselk'e Dene First Nation, and the North Slave Métis Alliance), the GNWT, and industry. Since its inception in 2004, over 400 northerners have been trained (MTS 2009). The MTS hopes to train an additional 576 northerners by 2012 (MTS 2008).

Aurora College had a higher number of total graduates in 2005 to 2006, with a decrease in more recent years. Although certificate, diploma, and apprenticeship graduates have decreased, the number of graduates in trades and technology has actually increased since 2005-2006 (Langevin 2010, pers. comm.).

Other Educational Programming

The Department of Education, Culture and Employment provides adult students with long-distance education programs through the Alberta Distance Learning Centre (GNWT Department of Education, Culture and Employment 2005b). The NWT also has an Early Childcare Program, which provides young parents and future parents with an opportunity to learn about child growth and development. In 2009, recognizing that one of the major issues facing some NWT schools is attendance rates, the Department of Education, Culture and Employment launched the Aboriginal Achievement Initiative to eliminate the achievement gap between Aboriginal and non-Aboriginal students in the NWT (NWT Teachers' Association 2010).

Some students in the NWT receive alternate forms of educational programming. In 2004, the Kimberlite Career and Technical Centre was opened through the Yellowknife Catholic School Board (Kimberlite Career and Technical Centre 2010, internet site). The centre offers a multi-station lab with training in electrical wiring, hydraulics, robotics, quality assurance, mechanical, Computer Aided Design and Drafting, and thermal systems courses are offered. This lab is the only one of its kind in Canada. De Beers provided funding for this centre, as well as other mining companies and business partners operating in the NWT (Kimberlite Career and Technical Centre 2010, internet site).

The Schools North Apprenticeship Program is a secondary school program for students who want to begin training as registered apprentices in a designated trade while they are still in high school. While working at an employer's job-site, students earn credits towards their secondary school diploma (GNWT Department of Education, Culture and Employment 2007e).

Other available programs include Tourism Careers for Youth and Training for Occupational Certification, the latter of which provides in-school training for students interested in trades and certified occupation careers (The Interprovincial Standards Red Seal Program 2010, internet site).

12.3.4.6.2 Transportation

Roads

Six all-weather highways serve the communities of the North and South Slave regions (Table 12.3-12). Highway 1 (the Mackenzie Highway), is the NWT's longest highway and the main route from southern Canada. Within the LSA, it joins Highway 2 at Enterprise and Highway 3 south of Fort Providence. Highway 2 links Enterprise with Hay River and Highway 3 links Fort Providence with Behchokò and Yellowknife. Highway 4, known primarily as the Ingraham Trail, extends 70 km east from Yellowknife and winds through Parks, day use areas, and "cabin country." The community of Detah is accessed from Highway 4. Highway 4 also consists of the first section of the Tibbitt-to-Contwoyto Winter Road, described below. Highway 5 links Hay River to Fort Smith and Highway 6 is a 60 km route off Highway 5 to Fort Resolution on the southeast shore of Great Slave Lake.

Table 12.3-12 Transportation Infrastructure in the North and South Slave Communities, 2004

Location	Highway Access	Rail Access	Marine Re-supply Facility	Airport or Airstrip	Air Terminal Building
Behchokò	All-Weather Access Road Yellowknife Highway 3	No	No	Yes	Yes
Detah	All-Weather Access Road Yellowknife Highway 3	No	No	No	No
Enterprise	All-Weather Access Road Mackenzie Highway 1	Freight only	No	No	No
Fort Providence	All-Weather Access Road Yellowknife Highway 3	No	No	Yes	No
Fort Resolution	All-Weather Access Road Fort Resolution Highway 6	No	Yes	Yes	Yes
Fort Smith	All-Weather Access Road Fort Smith Highway 5	No	No	Yes	Yes
Gamèti	Winter Access Road	No	No	Yes	Yes
Hay River	All-Weather Access Road Hay River Highway 2	Freight only	Yes	Yes	Yes

Table 12.3-12 Transportation Infrastructure in the North and South Slave Communities, 2004 (continued)

Location	Highway Access	Rail Access	Marine Re-supply Facility	Airport or Airstrip	Air Terminal Building
Hay River Reserve	All-Weather Access Road Hay River Highway 2	No	No	No	No
Łutselk'e	No	No	Yes	Yes	Yes
Wekweètí ^(a)	Winter Access Road	No	No	Yes	Yes
Whati	Winter Access Road	No	No	Yes	Yes
Yellowknife	All-Weather Access Road Yellowknife Highway 3	No	Yes	Yes	Yes

Source: GNWT Bureau of Statistics 2006.

^(a) This winter road is operated by INAC for conducting reclamation work at the former Colomac Mine.

The trucking industry in the NWT is important. Although more recent data are unavailable, a 2002 survey estimated that 1,659 heavy duty trucks were registered in the NWT and 366,000 tonnes of freight was moved by truck (Northern News Services 2005). The GNWT Department of Transportation reported that the number of heavy trucks steadily increased during the past decade and were expected to increase considerably with the possible construction of the Mackenzie Gas Project and other mining and oil and gas developments. Department officials report that truck traffic causes considerable wear to the roads and leads to frequent and costly maintenance (GNWT Department of Transportation 2005, pers. comm.).

Winter roads are built over frozen lakes and tundra and are only open in winter, usually from approximately January to March. Winter roads are also built annually into remote exploration and mine sites. Industry depends heavily on the Tibbitt-to-Contwoyto Winter Road for transporting construction equipment, building materials, equipment parts, power generators, fuel, and food to the existing diamond mines. Annual use of the Tibbitt-to-Contwoyto Winter Road fluctuated between 1997 and 2009. Peak use was in 2007, when 11,656 trucks traveled one way along the road.

Airports

Airlines play a major role in the North and South Slave regions, carrying passengers and freight far beyond the reach of roads and barges. All of the communities, with the exceptions of Detah and N'Dilo, have runways. All communities have scheduled services with the exception of Fort Resolution and Fort Providence (GNWT Department of Transportation 2007, internet site). First Air and Canadian North are the largest airlines in the NWT; Air Canada initiated scheduled trips to Yellowknife from Edmonton and Calgary in 2006, and Westjet began scheduled service from these cities to Yellowknife in 2009. The Yellowknife Airport Passenger Terminal is the NWT's principal airport and an

important transshipment centre. In 2003, approximately 23,000 tonnes of air cargo passed through Yellowknife, and this number was expected to increase to between 32,000 and 40,000 tonnes by 2013 (GNWT Department of Transportation 2004, internet site). Cargo includes couriered packages and mail, food and groceries, and supplies and equipment for the exploration camps and mines.

The Yellowknife Airport Development Plan addresses future airport infrastructure needs to meet forecasted passenger aircraft movement and air cargo demands. The plan allocates over \$100 million in upgrading and improvement costs over the next 20 years. An initial expansion of the airport was completed in 2006 (GNWT Department of Transportation 2006, internet site). Plans for a staged runway expansion, reconfiguration of existing terminal facilities, and development of a new terminal complex on the west side of the airport lands are underway. Table 12.3-13 lists the airport facilities and infrastructure within the North and South Slave region.

Table 12.3-13 Airport Information for the North and South Slave Communities

Location	Weather and Communication Type	Runway Length	Runway Surface	Scheduled Air Services	Navigational Aids	Owner
Behchokò	-	3,372 ft	Gravel	Yes	-	Tłı̨chǫ Government
Detah	-	-	-	-	-	-
Enterprise	-	-	-	-	-	-
Fort Providence	-	4,000 ft	Gravel	No	-	GNWT
Fort Resolution	CARS	4,000 ft	Gravel	No	NDB	GNWT
Fort Smith	CARS	6,000 ft and 1,800 ft	Asphalt/Gravel	Yes	DME	GNWT
Gamèti	CARS	3,000 ft	Gravel	Yes	-	GNWT
Hay River	CARS	6,000 ft and 4,000 ft	Asphalt/Gravel	Yes	NDB, ILS	GNWT
Hay River Reserve	-	-	-	-	-	-
Łutselk'e	CARS	3,000 ft	Gravel	Yes	-	GNWT
N'Dilo	-	-	-	-	-	-
Wekweèti	-	3,000 ft	Gravel	Yes	-	GNWT
Whati	-	3,000 ft	Gravel	Yes	-	GNWT
Yellowknife	FSS	7,500 ft and 5,000 ft	Asphalt	Yes	NDB, ILS	GNWT

Sources: GNWT Department of Transportation 2005, 2007 and 2008.

ft = feet; GNWT = Government of the Northwest Territories; CARS = community aerodrome radio station; DME = distance measuring equipment; FSS = flight service station; NDB = non-directional beacon; ILS = instrument landing system; n/a means not applicable or unknown.

12.3.4.6.3 Communications

Since at least 2006, the smaller communities have been well connected to the outside world with multiple communication services, including postal services, Internet, satellite television, and telephone (Table 12.3-14).

Table 12.3-14 Communication Infrastructure in the North and South Slave Communities

Location	Postal Service	Internet Connectivity Speed	Satellite or Land Line	Television	Telephone Features Available
Behchokò	Full	T1	Land Line	Satellite	Most
Detah	None (Yellowknife)	T1	Land Line	Satellite	Full
Enterprise`	Non-Accounting	512k	Land Line	Satellite	Some
Fort Providence	Full	T1	Landline	Satellite	Full
Fort Resolution	Full	T1	Landline	Satellite	Full
Fort Smith	Full	Fibre	Landline	Cable	Full
Gamèti	Non-Accounting	64k/128k	Satellite	Satellite	Some
Hay River	Full	Fibre	Landline	Cable	Full
Hay River Reserve	Non-Accounting	n/a	Land Line	n/a	Full
Łutselk'e	Non-Accounting	256k	Satellite	Satellite	Full
Wekweèti	Non-Accounting	64k/128k	Satellite	Satellite	Some
Whati	Non-Accounting	256k	Satellite	Satellite	Some
Yellowknife	Full	Fibre	Land Line	Cable	Full

Source: GNWT Bureau of Statistics 2006, internet site.

Note: Non-accounting postal service is pick-up only; i.e., no transactions such as money orders and COD service; T1 denotes a high-speed connection for the Internet that has equal upload and download speeds; k denotes kilobytes per second.

12.3.4.6.4 Garbage and Sewage

All but the largest communities in the in the North and South Slave regions rely entirely on trucking for sanitation. In the City of Yellowknife, sewage treatment is done at Fiddlers Lake Lagoon with flows assisted by ten lift stations.

The City of Yellowknife is studying the expansion of the current landfill, which includes construction of new landfill cells to provide service for five years. This will allow the city to jointly use an adjacent quarry and close out cells in a timely and effective manner. A transfer station operation will be established at the existing landfill site (City of Yellowknife 2010, internet site).

12.3.4.6.5 Water

The management of drinking water is the shared responsibility of all levels of government. Community governments are responsible for operating and maintaining water treatment plants (WTPs). The GNWT is responsible for the regulation of water supply systems, and providing certification, training, and support to WTP Operators. The GNWT also inspects WTPs and reviews water

quality data from communities to ensure the treated water is safe to drink (GNWT Department of Municipal and Community Affairs 2010, internet site).

Most of the North and South Slave region communities have either a Class 1 or Class 2 water treatment system. The exceptions are Gamètì, Wekweètì, and Łutselk'e, which have small system chlorination treatment. Detah and Enterprise rely on trucked water from Yellowknife and Hay River, respectively.

12.3.4.6.6 Power and Utilities

Electricity is provided by both diesel and hydropower via two main operators, Northwest Territories Power Corporation and Northlands Utilities Ltd.

As of 2006, the Northwest Territories Power Corporation operated two hydro-powered generation systems, the Snare system north of Yellowknife, which supplies Behchokò, Detah, and Yellowknife (including N'Dilo) with up to 30 megawatts (MW) of power, and the current Taltson system near Fort Smith, which supplies Fort Smith, Fort Resolution, Hay River, and Enterprise with up to 18 MW of power (Northwest Territories Power Corporation 2010a, internet site). Four separate hydro power plants are on the Snare River: Snare Rapids (commissioned in 1948), Snare Falls (commissioned in 1961), Snare Forks (commissioned in 1975) and Snare Cascades (commissioned in 1996). The Snare Cascades facility, brought into service in 1996, is a 4.3 MW run-of-river plant owned by the Dogrib Power Corporation (Northwest Territories Power Corporation 2010a, internet site).

Yellowknife's electricity is generated mainly from Snare River, and complemented by the Jackfish diesel generation and the Bluefish hydro generation plants. Behchokò is supplied with electricity generated from the Snare Hydro System.

The Northern Canada Power Commission built the existing Taltson hydro electricity system in 1965 to supply electricity to the Pine Point mine. The Twin Gorges hydro station is located on the Taltson River some 56 km northeast of Fort Smith. After closure of the mine in 1986, the Taltson system continued to supply power to Fort Smith and Fort Resolution, and extended distribution into the communities of Hay River and Enterprise (Northwest Territories Power Corporation 2003).

Łutselk'e, Gamètì, and Whatì rely entirely on diesel generation. The diesel plant in Łutselk'e consists of three diesel generators rated at 180, 320, and 320

kilowatts (kW). The diesel plant in Gamètì has three generators rated at 100, 212, and 300 kW. Whatì is powered by a 480 kW generator, and a residual heat recovery system supplies heat to the school (Northwest Territories Power Corporation 2010a, internet site).

Plans to develop additional hydropower in the North and South Slave regions have been underway for several years with work focused on assessing the existing Taltson power system. The \$700-million Taltson Hydroelectric Expansion Project, proposed by Dezé Energy Corporation, would enhance existing power generating facilities at the Taltson hydroelectric station. The proposal also includes the construction of a new power transmission line to the Project, then branching to the Snap Lake, Diavik, and Ekati mines (Deze Corporation Ltd. 2009, internet site). The Taltson Hydroelectric Expansion Project DAR was under review with MVEIRB in 2010. However, on December 10, 2010, INAC rejected the board's recommendations based on the assessment submitted, and asked the board to resubmit its recommendations once a corridor for the transmission lines has been determined and properly evaluated (CBC CBC Online News 2010a, internet site).

Northwest Territories Power Corporation also plans to construct a replacement dam for the old Bluefish Dam. This facility has been in service for 70 years, and has been serviced in 1972, 1983, and 2007. The proposed location for the replacement dam is 400 m downstream from the current site (Northwest Territories Power Corporation 2010b, internet site).

12.3.4.6.7 Accommodation

With changing population and demographics in the NWT, the housing market has been facing substantial pressures, including a lack of affordable housing and rising housing prices. This is especially true in Yellowknife and other regional centres. Economic conditions have played a large role in the cyclical nature of the housing market in the NWT. Investment in residential construction has varied in recent years (e.g., increasing from \$53 million in 2001 to \$88 million in 2005, then declining to \$62 million in 2008 [NWT Bureau of Statistics 2009a]).

Housing markets are typically slow to react to rising demand. This is especially true in the North, where construction companies face additional challenges of difficult geographic terrain, high cost of materials, lack of local supplies and skilled labour, and the high cost of serviced land. Most building materials are brought from the south, adding to the high costs. The cost of building homes outside of Yellowknife and the regional centres is even greater. Many

communities are remote with limited access to services and supplies (Conference Board of Canada 2002).

The NWT has 14,522 housing units as of 2009. Of these, 11,223 were private housing units, and 2,249 were public housing units owned by the GNWT Housing Corporation (GNWT Bureau of Statistics 2010e). There were also 1,050 staff housing units in the NWT, owned and paid for by government to accommodate government staff. Over 50% of these units were in Yellowknife (GNWT Bureau of Statistics 2010e).

Several challenges face residents of the NWT when it comes to housing. These range from insufficient housing and poor or sub-standard construction to high costs associated with construction and maintenance. Other social conditions and issues include overcrowding, increasing family violence and sexual assault, and poverty. These factors increase the challenges of attaining and maintaining home ownership. Up to 25% of NWT households with a housing problem had occupants that live at lower income levels in 2004 (GNWT Department of Education, Culture and Employment 2007b).

Overcrowding

Overcrowding in homes can lead to a series of social and health challenges and risks. These include conflict, domestic violence, abuse, physical illness, and mental illness. Among other factors, low incomes, lack of affordability, inadequate housing, culture, and lifestyle all play a large role in overcrowding.

Since 1981, the percentage of households with six or more people in the Tłıchǫ region has decreased by 24%. In Detah and N'Dilo this figure has decreased by 19% and 9%, respectively, over the nearly 20-year reporting period. In Yellowknife there was a slight decline, and in the NWT the percentage of households with six or more people declined by 7%. Factors contributing to declines in households with six or more people include falling birth rates, increased incomes, which expand housing options for family members, and greater youth migration for educational and work opportunities (GNWT Department of Education, Culture and Employment 2004).

In general, more people live in a given household in the smaller NWT communities. In 2009, of the households in Behchokò, 28% had over six people, as did 27% of households in Gamètì, 26% in Whatì, and 23% in Wekweètì. This contrasts with only 4% in both Yellowknife and Fort Smith, and 5% in Enterprise and Hay River, of households with more than six occupants (GNWT Bureau of Statistics 2010e).

While overcrowding has declined in the NWT, the diamond mining sector has not had as positive an impact on housing as was initially expected. Overcrowding in Yellowknife and the smaller communities has continued along with a lack of suitable housing (GNWT Departments of Health and Social Services, Education, Culture and Employment, Industry, Tourism and Investment, Justice, Bureau of Statistics, and Housing Corporation 2006). Northerners often speak about the hidden homelessness issue, or “couch surfers”; those who stay and sleep in people’s homes. This, along with inflation, may also be a contributing factor to overcrowding (GNWT Departments of Health and Social Services, Education, Culture and Employment, Industry, Tourism and Investment, Justice, Bureau of Statistics, and Housing Corporation 2006).

Rental Costs

The NWT, particularly Yellowknife, is experiencing low vacancy rates for apartment rentals combined with relatively high rental costs compared to previous years, and compared with many other regions of Canada. According to the results of the Canada Mortgage and Housing Corporation (CMHC) 2010 Rental Market Survey, the vacancy rate for privately-initiated apartment units in Yellowknife declined from 2.8% in April 2009 to 1.3% in April 2010. Reasons for the decline in the apartment vacancy rate include a robust demand for rental accommodations, a low level of rental construction, and low apartment availability (Canada Mortgage and Housing Corporation 2010).

Since 1998, rental fees have increased for all sizes of apartments in the NWT, and more specifically in Yellowknife. The average monthly apartment rent for all unit types increased slightly from \$1,359 in 2009 to \$1,394 in 2010 (Canada Mortgage and Housing Corporation 2010). While the annual increase may not seem high, it must be considered in the context of declining employment and incomes during the past two years.

Housing Costs

The average resale cost of a home in the NWT in 2008 was \$318,000, an increase of 4.6% from the previous year. However, a decline was expected in 2009. Home sales in Yellowknife fell 8% in 2008, and further reductions were expected in 2009. The year 2008 also recorded the lowest level of new housing activity since 1998 (Canada Mortgage and Housing Corporation 2009).

The Housing Cost Index determines the variations in the cost of housing among communities in the NWT and demonstrates the price differences as an index using Yellowknife as a base. According to the Housing Cost Index, the cost of a home in Yellowknife was the highest in 2003 (100), followed by Hay River (71),

and Łutselk'e (62). The cost in other smaller communities of the North and South Slave regions in 2003 averaged 55% of Yellowknife's costs (GNWT Bureau of Statistics 2003a).

Short-Term Accommodations

A 2004 inventory identified short-term accommodations in the NWT, which included hotels, motels, inns, executive suites, lodges, bed and breakfasts, cabins, and cottages (University College of the Cariboo 2005). This study reported 83 businesses that provided accommodation as their primary business and nine that provided accommodation as their secondary business. In 2004, of 1,352 guest rooms available in the NWT, 72% were in the in the North and South Slave region, with 44 businesses dedicated to short-term accommodation. Many smaller communities have limited accommodation for visitors, and in some communities daily room charges may exceed \$200 per person.

12.3.4.7 Services and Programs

In this section, available services and programs in the North and South Slave regions are described. These have been divided into three main subsections: health services and programs, protective services, and community services and programs.

12.3.4.7.1 Health Services and Programs

The GNWT Department of Health and Social Services Authority manages and delivers a broad range of community and facility-based health care and social services. These services fall under eight Regional Health and Social Service Authorities, of which five cover the North and South Slave regions (GNWT Department of Health and Social Services 2010a, internet site).

Under each Regional Health and Social Service Authorities, local residents are able to access medical and community services through primary health care clinics, public health services, homecare, and school/community health and education programs (GNWT Department of Health and Social Services 2010a, internet site).

Several non-governmental organizations and private professionals (including dentists) provide additional health care and services through agreements with NWT authorities (GNWT Department of Health and Social Services 2005c, pers. comm.).

Residents of the NWT are covered under its Health Care Plan. The NWT Department of Health and Social Services administers this plan and provides access to a broad range of health services and programs (GNWT Department of Health and Social Services 2004b). Medical Travel Benefits (MTB) is part of this plan and covers travel expenses to the nearest medical treatment centre. Aboriginal residents of the NWT are covered under Canada's Federal Non-Insured Health Benefits Program. The Non-Insured Health Benefits program covers dental, pharmaceutical, eye and vision care, and medical supplies (Health Canada 2003). The NWT is the only jurisdiction in Canada to provide Métis residents with a supplementary health benefits program similar to Non-Insured Health Benefits (GNWT Department of Health and Social Services 2009a, internet site).

Hospitals and Medical Clinics

The NWT hospital system relies on four hospitals to provide services to its residents: Stanton Territorial in Yellowknife, Inuvik Regional in Inuvik, H.H. Williams Memorial in Hay River, and the Fort Smith Hospital in the town of Fort Smith. In addition, some medical clinics are operated within the communities of the North and South Slave regions. Specialized and advanced health care treatment is provided outside of the NWT, particularly in Edmonton, Alberta. The Health and Social Services Authority and other partner hospitals in the provinces also operate the Telehealth program, which provides long distance health care service through video conferencing to remote communities.

The Tele-Care NWT service, operated by the Department of Health and Social Services, is a toll-free family health and support line that provides information and advice 24 hours/day, 365 days/year. From 2005 to 2006, Tele-Care NWT handled an average of 425 calls per month (GNWT Department of Health and Social Services 2007).

The distance and isolation between communities in the NWT limits people's access to health care in their own community. Consequently, heavy reliance is placed on the health care system in Yellowknife and out-of Territory specialists, especially in Edmonton. In 2006, according to the GNWT Department of Health and Social Services June 2006 report, there was limited access to a range of services that included rehabilitation services (speech/language), physiotherapy, occupational therapy, and audiology (GNWT Department of Health and Social Services 2006c). Discussions in 2010 with various health service professionals and the data below indicate that, in general, the situation has not much improved.

The NWT Health and Social Services Report for June 2006 indicated that there was a need to improve access and patient wait times to surgical services for residents of the NWT (GNWT Department of Health and Social Services 2006c). Overall, the number of patients waiting for surgeries decreased from 2005 to 2006; however, patient wait times were still high. To decrease wait times there has been a push to increase the volume of surgical procedures and to better manage existing resources (GNWT Department of Health and Social Services 2006c).

Ambulance Services

Ambulance services are delivered by the GNWT Department of Health and Social Services. Six different types of ambulance services are provided by the NWT and these are summarized in Table 12.3-15.

Table 12.3-15 Type of Ambulance Services, Northwest Territories

Type of Ambulance Service	Definition
In-Town Services	Transportation of a patient to a local hospital/health centre within community boundaries, usually medical emergency response
Highway Services	Out-of-town services and transportation of a patient to a hospital or health care facility
Inter-Facility Services	Transportation of a patient from a hospital/health care centre to or from an airport and then to a hospital /health care facility
Medevac Services	Air ambulance services, including a Medevac aircraft with Medevac staff
Highway Rescue	Emergency response to a trapped accident victim. Usually requires specific equipment and skilled medical professionals to release victim
Non-medical Transportation	Transportation that does not involve the transportation of a patient or victim, but applies to the transportation of medical health professionals

Source: GNWT Department of Health and Social Services and GNWT Department of Municipal and Community Affairs, 2006.

The key challenge facing ambulance services in the NWT is the lack of designated GNWT funding for ambulances, equipment, operations, and training. Some communities such as Behchokò have limited capacity to deal effectively with a potential major emergency. Another challenge is the lack of ground ambulance services in the communities of Fort Resolution, Fort Providence, Gamètì, Łutselk'e, and Whatì.

Another issue facing ambulance services is the difficulty to recruit and retain staff and volunteers. Unskilled or under-resourced ambulance crews are unable to deal effectively with serious trauma situations (GNWT Department of Health and Social Services and GNWT Department of Municipal and Community Affairs 2006).

Physicians, Nurses and Medical Staff

In 2006, there were 845 Regional Health and Social Services Authority medical employees providing services to the communities of the North and South Slave regions (GNWT Department of Human Resources 2008). These numbers include registered nurses, medical lab technicians, certified nursing assistants, and other medical related professionals.

The NWT faces the challenge of recruiting and retaining medical physicians, nurses, and other health care professionals. In 2003, about 7,000 residents (16% of the population) received medical services from an out-of-territories physician or specialist (GNWT Department of Health and Social Services 2006c); in 2008, the average turnover rate for Health and Social Services Authorities in the in the North and South Slave region communities was 18% (GNWT Department of Human Resources 2008).

To assist in recruiting nurses and health care practitioners to work in the NWT, the GNWT has developed a series of programs and services, including an Advanced Nurse Mentorship Program, Community Health Nurse Development Program, and Nurse Graduate Employee Programs. Several academic and practicum bursaries are also offered (GNWT Department of Human Resources 2008).

Health Programs

Several government (federal and territorial) programs promote and meet the health and well-being needs of territorial residents. The NWT 2007-2008 Directions for Wellness Report identified five key programs and their functions (Table 12.3-16). These programs address the key health and well-being concerns facing the NWT and LSA communities, including accidents and injuries, diet and nutrition, diabetes, HIV/AIDS, Hepatitis C, FASD, children at risk, and addictions. Holistic health factors such as culture, language, recreation, environment, and leisure are considered.

Table 12.3-16 Government of the Northwest Territories Health and Wellness Programs between April 1, 2007 and March 31, 2008

Program	Function	Objectives	Beneficiaries
Brighter Futures	Assist First Nations and Inuit in developing community-based approaches to health programs	Improve the quality of, and access to, culturally sensitive wellness services in the communities	First Nations and Inuit children from ages 0 to 6 years, their families and communities
Canada Prenatal Nutrition Program	Helps communities develop improved and comprehensive services for pregnant women (Special First Nations and Inuit program)	Promote breastfeeding, improve diets and nutrition, help women feed their infants	For all pregnant women who may be at risk for their own health and development of their babies
Aboriginal Diabetes Initiatives	Raise awareness, build capacity in regards to risks related to diabetes	Reduce incidents and risks related to diabetes, specifically related to First Nations and Inuit	All residents, specifically First Nations and Inuit
Fetal Alcohol Spectrum Disorder (FASD)	Funds programs for those at risk of having FASD babies, support programs for parents of FASD children, and assessment and diagnosis of FASD; also educational awareness and training	Reduce FASD and improve quality of life for individuals with FASD and families, communities coping with FASD	Funding is targeted at First Nations and Inuit
National Aboriginal Youth Suicide Prevention Strategy	Addresses high rates of youth suicide and its risk factors among Aboriginal youth	Provides opportunities for Aboriginal communities to design, develop and participate in projects to reduce suicide within their communities	First Nations, Inuit, and Métis youth, their families and communities

Source: GNWT Department of Health and Social Services 2009b.

Protective services in the NWT include policing, fire protection, coast guard, search and rescue services, and correction services.

Policing

The Royal Canadian Mounted Police (RCMP) provides services that include crime protection and public safety, emergency preparedness, delivery of healthy choices for youth programs, policing organized crime, and intelligence. The RCMP (G Division, Northwest Territories) is also responsible for international policing, which includes the conduct of sovereignty and border security patrols, as well as terrorism control.

As of 2009, 21 RCMP detachments serve 34 communities in the NWT. The RCMP (G Division) headquarters are in Yellowknife, and the following communities have detachment offices: Fort Providence, Fort Smith, Hay River, Łutselk'e, Rae and Whati (RCMP 2009, internet site). All of the other

communities have services provided to them either through Yellowknife or by officers flown into the communities when required.

Fire Protection

All communities in the NWT have fire protection services, which are staffed by volunteer firefighters.

Coast Guard

The Canadian Coast Guard base is in Hay River and the Canadian Coast Guard auxiliary base is in Yellowknife. The Canadian Coast Guard is responsible for providing the following key services in the NWT:

- water rescue, safety, and environmental response;
- icebreaking; and
- communications and traffic services.

The search and rescue services include monitoring or rescuing mariners that are in distress, and coordinating with the volunteer marine rescue program. Education and boat safety is also an important service.

The Environmental Response team has the largest federal inventory on marine pollution equipment in Canada. Services provided by the Environmental Response team includes monitoring and responding to marine oil spills and chemical emergencies, improving preparedness and response regime, initiating and supporting new spill responses, and enforcing the *Arctic Waters Pollution Prevention Act*.

Icebreaking services include organizing convoys and escorting ships through ice-covered waters; freeing vessels trapped in ice; and keeping open shipping channels, wharf and port facilities in commercial and fishing harbours. They also monitor ice conditions and water levels in anticipation of flooding, and prevent ice jams.

The Canadian Coast Guard is also responsible for maintaining Arctic Sovereignty in Canadian waters with such activities as guiding foreign vessels through the northern arctic and providing a Canadian presence. The Canadian Coast Guard also provides communication and traffic control for the marine community to ensure safety at sea (Canadian Coast Guard 2010, internet site).

Search and Rescue

Search and rescue are coordinated efforts in the NWT. The service provided depends on what is being searched for, or who needs rescuing. The RCMP is the primary coordinator of such missions and works closely with the Coast Guard and its auxiliary base in Yellowknife. The RCMP also work with the Federal Fisheries and Oceans Canada who provide search and rescue services during the summer and winter commercial fishing season (GNWT Department of Municipal and Community Affairs 2005, pers. comm.).

Correctional Services

The NWT has four adult correctional facilities (one in Hay River, two in Fort Smith and one in Yellowknife) and two youth correctional facilities (one for male youth in Yellowknife and one for female youth in Inuvik) (GNWT Department of Justice 2009, internet site).

12.3.4.7.2 Community Services and Programs

The GNWT Department of Health and Social Services is the primary provider of social services in the NWT and the communities of the North and South Slave regions. These services include adoptions, adult services, child and family services, family enhancement (Healthy Family Program and Voluntary Services), foster care, family counselling, and special health benefits (Yellowknife Health and Social Services Authority 2008). The New Horizons Centre provides drop-in services to adults with mental health challenges, substance abuse issues, and homelessness. The New Horizons program provides a safe haven for people with serious needs (Yellowknife Health and Social Services Authority 2008).

Several non-governmental organizations also provide additional social services, such as alcohol and addiction support groups, women's shelters, food banks, and other needed community services.

Shelters

There are four shelters in the North and South Slave regions, located in the communities of Fort Smith, Hay River, and Yellowknife. Services provided by each of these shelters are described in Table 12.3-17. In communities without shelters, people have to leave their communities if they wish to use these services. A small change in circumstances (e.g., loss of employment, illness) may result in "hidden homelessness" (i.e., staying with friends or family or anyone who will provide shelter). If this situation becomes untenable (e.g., they are no longer welcome, they are experiencing abuse), they can end up in a

shelter if one is available or on the streets (absolute homelessness) (YWCA 2007).

Table 12.3-17 Women's Shelters in North and South Slave Communities

Location	Name	Services Provided
Fort Smith	Sutherland House	Provides shelter, education One-on-one counselling
Hay River	Hay River Family Support Centre	Provides shelter Outreach program for abused Elders and Youth
Yellowknife	Alison McAteer House	Provides Shelter for Victims One-on-one Counselling
Yellowknife	Centre for Northern Families	Provides Temporary Shelter Weekly Walk-in Clinic Healthy Baby Club Toddler's Club

Source: GNWT Department of Health and Social Services 2010b, internet site.

12.3.4.8 Cultural Environment

12.3.4.8.1 Governance

The NWT joins Nunavut and the Yukon as one of three Territories within Canada. The NWT is governed by a 19-member legislative assembly, elected every four years. Decisions are reached within the NWT government by consensus.

At present, four land claim agreements have been reached in the NWT:

- the Inuvialuit Final Agreement in 1984;
- the Gwich'in Comprehensive Land Claims Agreement in 1992;
- the Sahtu Dene and Métis Comprehensive Land Claim Agreement in 1993; and
- the Tłıchǫ Lands, Resources and Self-Government Agreement in 2003.

The *Land Claims and Self-Government Agreement Among the Tłıchǫ and the Government Of The Northwest Territories and the Government Of Canada* (Tłıchǫ Agreement) was the first agreement completed in this region. The Project is located in the Akaitcho region, which includes a portion of Treaty 8 that extends into the NWT. The Project is also located in a region where at least three land claims could be settled. The federal and Territorial governments are engaged in claim negotiations with the Akaitcho Dene First Nations and the Northwest Territories Métis (NWT) Nation. It is also located in Mǫwhì Gogha Dènght'łèè, an area recognized in the Tlıcho Agreement.

12.3.4.8.2 Ethnicity

The ethnic origin of NWT residents is a mix of Aboriginal people and those of predominantly-European ancestry. According to the 2006 Census (Statistics Canada 2010b, internet site), 50% of its estimated 2009 population of 43,439 were Aboriginal, consisting of 7% Métis, 11% Inuit, and 36% First Nations or North American Indian. As the largest community in the NWT, Yellowknife is the exception; 23% of the 2009 population of 19,711 were Aboriginal and 77% were non-Aboriginal.

12.3.4.8.3 Language

In the NWT, the percentage of the Aboriginal population 15 years and older who could speak an Aboriginal language fell from 59% in 1984 to 38% by 2009 (GNWT Department of Education, Culture and Employment 2004; GNWT Bureau of Statistics 2010f). Data from Statistics Canada (2008c, internet site) suggest that the trend in language loss may, however, be reversing. Between 2001 and 2006, use of Tłıchǵ as the mother tongue (first language learned at home in childhood and still understood) increased by 10% and knowledge of Tłıchǵ (refers to its use as a second language) increased by 17%. The same survey does not explicitly distinguish Chipewyan, but it does identify Dene speakers of which Chipewyan is a sub-set Athapaskan language. Likewise, Chipewyan language as a mother tongue has increased by 9% and knowledge of Chipewyan by 8%.

Teaching and Learning Centres were established in 1982 to develop materials for Aboriginal Languages (Western and Northern Canadian Protocol for Collaboration in Basic Education 2000). Likewise, all Dene community schools in the NWT use a cultural curriculum entitled “Dene Kede”, designed and developed by educators and Dene elders, which aims to improve competency in the Dene languages.

12.3.4.8.4 Customs and Traditions

The “Dene Kede” curriculum is designed to aid in the development of relationships among youth, the spiritual world, the land, other people, and oneself. These relationships foster values such as enjoying and respecting the land, respecting Elders, and being aware of how one’s own behaviour affects others.

Caribou hunting is one of the core elements of the Dene culture and there are a myriad of opportunities that allow for passing of cultural values and beliefs

through this activity. These opportunities include how to hunt and skin caribou, where to hunt caribou, stories of the land, personal histories, and legends and myths. As part of the West Kitikmeot Slave Study (Parlee and Marlowe 2001), researchers in Łutselk'e surveyed all community members aged 10 years and over. This survey determined that over a six-month period in 2000 and 2001, depending upon the time of year, 18% to 27% of the youth went out on the land for caribou hunting at least once.

In response to a decline in the Bathurst caribou herd, an interim emergency hunting ban was established on January 1, 2010, which prohibits all hunters from harvesting caribou in a no-hunting zone: the Bathurst herd's winter range, north of Great Slave Lake to the boundary with Nunavut (CBC Online News 2010b, internet site). It is unclear at this time what the implications of this recent hunting ban might have on traditional culture.

Besides hunting, trapping, and fishing, other traditional activities are carried out in the North and South Slave regions. For example, traditional games and sports are often played in elementary and high school classrooms across the North (Dene Games 2005, internet site). Games such as the Finger Pull, Pole Push, and Stick Pull help individuals to perfect hunting and fishing techniques, which have been crucial to survival.

12.3.4.8.5 Participation in Traditional Activities

In 2002 and 2009, the GNWT conducted a survey of participation of persons over 15 years of age in harvesting activities. A comparison of the two surveys (Table 12.3-18) shows that between 2002 and 2009 participation increased in the South Slave region while there was little change in the Tłıchǫ region. Information on plant and berry gathering was not available from the 2009 survey (likewise, data were unavailable in terms of numbers; only percentages were provided).

Not shown here, the 2002 survey found that most hunters and fishers were male, 40 to 59 years of age (46.1%) and more likely to be Aboriginal than non-Aboriginal (58.3% versus 46.2%). In the NWT, 51.4% of the males participated in hunting and fishing. In contrast, female Aboriginals were the primary plant gatherers (15.5%) and berry gatherers (30.9%). Across all the classifications, participation generally increased with age, except for hunting and fishing, where it decreased after age 60. Overall, individuals in prime income earning years (i.e., aged 25 to 59) were most likely to participate in traditional activities.

Table 12.3-18 Persons 15 Years of Age and Over Involved in Harvesting Activity by Area (Northwest Territories, 2002 and 2009)

Region	Year	Trapped	%	Hunted or Fished	%	Gathered Berries	%	Gathered Plants	%
NWT	2002	1,514	5.0	12,245	40.2	5,551	18.2	2,060	6.8
	2009	-	6.2	-	39.4	-			
South Slave (Hay River, Fort Smith, Other Communities)	2002	257	5.0	1,892	36.7	1,271	24.6	434	8.4
	2009	-	7.6	-	39.5	-			
Tłıchǵ (Behchokǵ, Other Communities)	2002	290	14.1	819	39.9	542	26.4	293	14.3
	2009	-	13.2	-	40.0	-			
Yellowknife	2002	166	1.2	5,301	38.8	1,777	13.0	331	2.4
	2009	-	1.2	-	34.5	-			

Source: GNWT Bureau of Statistics 2003; GNWT Bureau of Statistics 2010b, 2010c.

"-" indicates information unavailable; % = percent.

12.3.4.8.6 Cultural Landscapes

The LSA holds different meanings for different peoples, which is largely defined by the peoples' interaction with the environment. For Aboriginal people, the physical environment shapes cultural values and beliefs (Collignon 2006). For the various non-Aboriginal users of the LSA, it is the cultural value and concept of wilderness associated with the landscape that predominates. Surveys by the GNWT indicate that visitors come to the NWT for a wide range of wilderness-related activities, and one of their primary motivations is for a wilderness-based experience.

Lutselk'e Denesǵline's Cultural Landscape

The Denesǵline have described their traditional territory as Denesǵline Nēne (Chipewyan Land) (Figure 12.3-5). The Denesǵline Nēne is the heart and spirit of the Denesǵline way of life. It is within this area that the cultural and environmental features of value to the Denesǵline people manifest themselves (LKDFN 2003, internet site).

Within the Denesǵline Nēne is the *Kakinēne* (also referred to in the literature search as *Katthinēne* or *Kakingne*) which is a more defined area reflective of the traditional seasonal movement of the Lutselk'e Dene. The Denesǵline have identified eight regions, each reflecting a differing cultural importance across the Kakinēne (Figure 12.3-5):

- Bedaghé Tué;

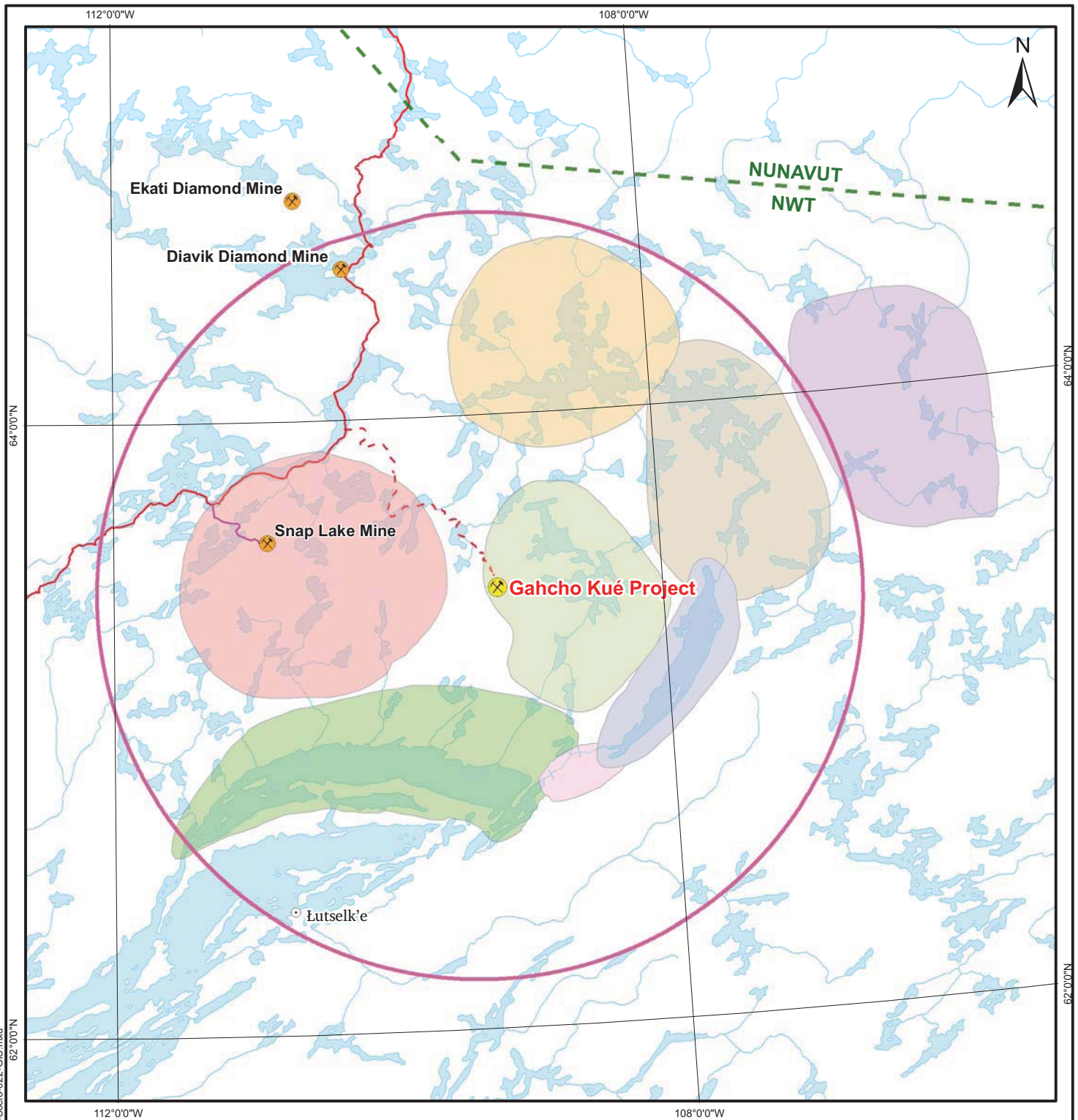
- Desnedhe Che;
- K'ásba Nýné;
- Kaché Kué;
- Na Yaghé Tué 1;
- Na Yaghé Tué 2;
- Tla Gai Tué; and
- Æedacho Kué.

Some regions such as Æedacho Tué and Kaché Kué were important for harvesting, especially caribou from hunt camps as they move through these regions during their seasonal migrations. Others, such as Desnedhe Che, host numerous spiritual areas for the Denesöline.

The North Shore area of Great Slave Lake has a mix of sites that hold social, cultural, ecological, and spiritual significance. Many of these sites can be found along the well-traveled winter trails and summer portage and canoe routes that led the Denesöline throughout the Kakinëne and into the barren lands. There are four main trail routes radiating northward from the area: T'atha Ła Deze, Des Delghai Deze, Des Tsël Che Deze, and Desnethch'e Deze. Each of the trail systems begins at a camp along the shore of Great Slave Lake and stretches North to the waters of the Lockhart River at Nidítagh Tué (MacKay Lake) and Tla Gai Tué (Aylmer Lake) (LKDFN 2001). Evidence of this history includes the presence of graveyards, trail markers, arrowheads, and campsites distributed along the paths and portages of these routes (Parlee et al. 2005a). In recent times, the extent of travel routes used for hunting and trapping has declined. Travelers are staying closer to Great Slave Lake than in earlier years. Previously, greater travel was probably associated with following both the Bathurst and Beverly caribou herds for survival (Kendrick et al. 2003). The nearest camp used was likely at K'ézus Tué (Cook Lake).

Tłıchǫ Cultural Landscape

The Tłıchǫ traditionally occupied the area between Tideè (Great Slave Lake) and Sahti (Great Bear Lake), extending from Kôk'èetì (Contwoyto Lake), Ts'eèhgootì (Aylmer Lake) and Æedacho Tué (Artillery Lake) in the barren lands, to Dehtso (Mackenzie River) in the west (Figure 12.3-6) (Legat et al. 2001).



LEGEND

- | | | | |
|--|----------------------------------|--|---------------------------------|
| | Gahcho Kué Project | | Waterbody |
| | Existing Mine | | Territorial/Provincial Boundary |
| | Territorial Capital | | Kaché Kué |
| | Populated Place | | Desnedhe Che |
| | Highway | | Aedacho Kué |
| | Existing Winter Road | | Bedaghé Tué |
| | Tibbitt-to-Contwoyto Winter Road | | K'ásba Nýné |
| | Winter Access Road | | Tla Gai Tué |
| | Watercourse | | Na Yaghé Tué 1 |
| | | | Na Yaghé Tué 2 |
| | | | Denesôline Nýné |

NOTES

Base data source: The Atlas of Canada
Land classification from "Results and Implications of 2002-2003 Monitoring Activities in the Traditional Territory of the Autsel K'e Denesoline - Final Report (2003).

GAHCHO KUÉ PROJECT

Denesôline Land Region Classifications in the Kakinëne

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:2,000,000
25 12.5 0 25
Kilometres



FILE No:
B-Socio-022-GIS

DATE:
December 3, 2010

JOB NO:
09-1365-1004

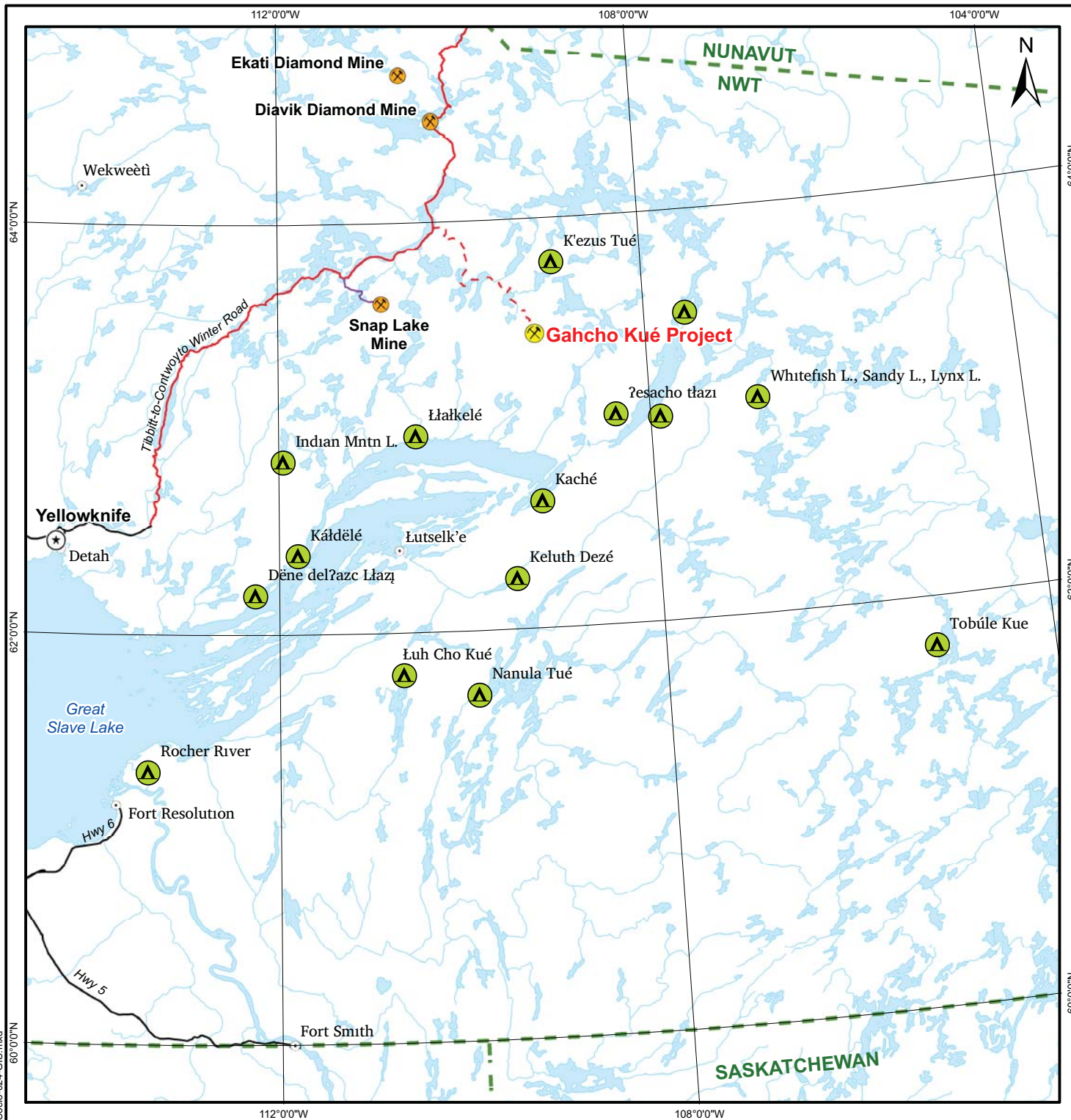
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1

OFFICE:
GOLD-CAL

DRAWN:
CW

CHECK:
RM

Figure 12.3-5



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary
- Traditional Hunting Camp

NOTES

Base data source: The Atlas of Canada
Hunting Camps reproduced from: Caribou co-management and cross-cultural knowledge sharing, Anne E. Kendrick (2003).

GAHCHO KUÉ PROJECT

Network of Selected Hunting Camps

PROJECTION: Canadian Lambert Conf. Conic
DATUM: NAD83

Scale: 1:3,000,000
40 20 0 40
Kilometres



FILE No:

B-Socio-024-GIS

DATE:

November 30, 2010

JOB NO:

09-1365-1004

REVISION NO:

1

OFFICE:

GOLD-CAL

DRAWN:

JH

CHECK:

RM

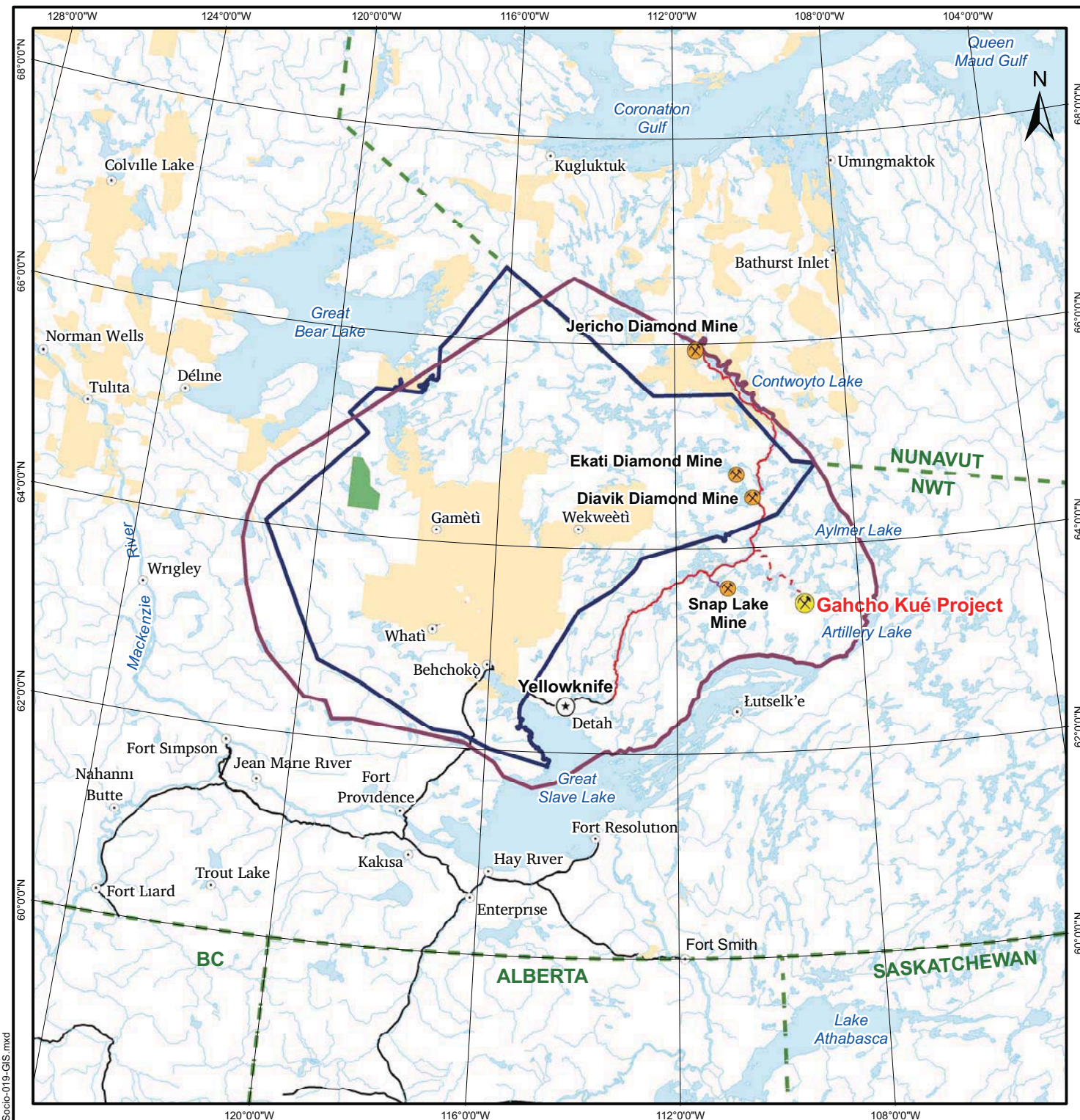
Figure 12.3-6

Like the Kakinène of the Denesoline, the Mowhi Gogha Dènjht'èè of the Tłıchǫ can be categorized into four main environmental regions of traditional importance (Figure 12.3-7). The names of these areas are: Nqđıı, Detsıta, Detsılaa, and Hozıı. Nqđıı is a large plateau, west of Camsell River that includes the Horn Plateau where both woodland and barren-land caribou are hunted from hunt camps. Fur-bearing animals are also trapped, and several important medicinal plants are found in this area. Detsıta is a general term used for a forested area consisting of spruce, poplar, and birch, which is east of the Camsell River. The area just below the treeline is known as “detsıts'qneè”. The fourth category is “hozıı”, which refers to the barren lands (Legat et al. 2001).

Important Places

Within the Desnedhe Che, an area of particular importance to the Łutselk'e Denesoline, is Æedacho Tué (Artillery Lake). The Tłıchǫ know it as “Æedaàtsotı”. It has been a place of food and shelter with the resources needed for survival for thousands of years (LKDFN 2001). The Denesoline traditionally would gather at Æedacho Tué to meet the fall caribou migration and then continue on to the barren-lands. Areas of particular importance within Æedacho Tué are Ts'anTui Theda (or the “Old Lady of the Falls”) and Hagoche's Shovel.

Another area of special significance to both peoples is Tłı Gai Tué (Aylmer Lake), as the Denesoline call it, or Ts'eèhgootı, as it is known by the Tłıchǫ. Like Æedacho Tué (Artillery Lake), Aylmer Lake represents a diversity of values – cultural, social, spiritual, and ecological importance. As part of the waters of Desnethch'e (the Lockhart River watershed), it is of further value due to its connection to the “Old Lady of the Falls” (LKDFN 2001).



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary
- Ezǫdzítí - Historical and Cultural Importance
- Mǫwhí Gogha Dé Nǫttée - Traditional Use Area
- Wek'éezhíí - Resource Management Area
- Thchǫ Lands - Owned in Fee Simple

NOTES

Base data source: The Atlas of Canada
 Akaitchol Interim Land Withdrawal provided by DIAND are for illustrative purposes only.
 Tlcho land claim area obtained from Her Majesty Queen in Right of Canada, Department of Natural Resources. All rights reserved.

GAHCHO KUÉ PROJECT

Mǫwhí Gogha Dé Nǫttée, Wek'éezhíí, Thchǫ and Ezǫdzítí Lands

PROJECTION: Canadian Lambert Conf. Conic
 DATUM: NAD83

Scale: 1:6,000,000
 50 25 0 50 100
 Kilometres



FILE No: B-Socio-019-GIS

DATE: November 30, 2010

JOB NO: 09-1365-1004

REVISION NO: 1

OFFICE: GOLD-CAL

DRAWN: JH

CHECK: RM

Figure 12.3-7

12.3.5 Summary

The objectives of the baseline study were to develop a clear understanding of the existing socio-economic conditions of the communities included in the LSA, and to describe the current capacity to provide social services to these communities. Information was obtained from both primary and secondary sources, including published research, statistical databases, interviews, and surveys.

The health and well-being of people and communities within the LSA have been closely linked to factors such as employment, income, education, domestic conditions, and community support. Yet these factors are not static. The NWT is being, and continues to be, transformed as a result of changes in economic development, population characteristics, and cultural experiences. The previous diamond projects began operation in the NWT when the focus was on jobs for the local population and revenues for governments. With each additional proposed project and corresponding environmental assessment, issues have been shifting to broader societal matters relating to the social and cultural environment.

There are several distinct features that make the NWT and the communities in the LSA stand out among the provinces, and to a certain extent from the Yukon and Nunavut. There are many positive and negative factors that are driving change in the NWT. Several trends have been identified for subsequent analysis in the rest of Section 12. These trends, both favorable and not so encouraging, are categorized under economy, jobs and training, Aboriginal businesses, population growth, income support, cost of living, education and skills, crime and homelessness, infrastructure and services, and traditional culture.

1. **Continued Economic Growth.** Mining and oil and gas exploration activities in the NWT continue to be major economic drivers for the NWT's economic development. Governments have benefited further as a result of increased revenues generated at the corporate and personal taxation levels, through resource royalties (transfer payments), and through indirect taxes on products. Several proposed developments are currently under review. Nonetheless, the global recession, which began to be felt in the NWT during mid-2008, has had a sobering impact on economic growth. In 2009, the NWT's GDP fell by 5.9%, the fourth largest decline among all provinces and territories.
2. **More Jobs and Training.** Employment rates in the NWT have remained consistently high during the 2000s, exceeding the Canadian average and

most provinces. Participation in the workforce has grown considerably and has attracted new labour into the marketplace. Despite a global economic downturn in 2008, the long-term need for a trained and skilled workforce remains high. While the good news is that training opportunities have been greatly increasing, not just in Yellowknife but also in the communities, the other side of the coin is that women have not benefitted as much as men in obtaining mining and related jobs. In some cases, women are the only caregiver in the family and may be unable to work either full time or outside the community. They may also lack support from partners and family in pursuing rigorous training. Other factors need to be considered that may impact the labour pool in the NWT. For example, the increase in the mining industry in the Kitikmeot and Kivalliq regions of Nunavut may have employment and related impacts on the NWT, such as drawing upon experienced labour from existing and planned mining developments. This could possibly generate additional skilled labour shortages in the NWT, which is already being experienced as many businesses need to recruit new employees from outside of the NWT.

3. **Aboriginal Businesses.** The future for Aboriginal businesses in the NWT appears to be a positive one. Existing businesses have expanded, new ones have been created, and viable Aboriginal development corporations have emerged. This growth has furthered the size and extent of economic benefits flowing from the diamond industry.
4. **Population not Growing.** Economic expansion has not been met by an equally high population growth. Currently at 43,439 (GNWT Bureau of Statistics 2010a), the NWT's population growth has changed little over the past five years. Its population went into a slow decline during the late-1990s; contributing factors may have included temporary shutdowns at the two main gold mines (both permanently closing in the 2000s), government budget cutbacks, and the split from Nunavut. Population growth then slowly picked up again during the first half of the 2000s. Since 2004, however, the NWT has lost more people than it has gained through inter-provincial migration, including a net emigration of 879 people during 2008 (GNWT Bureau of Statistics 2009a). People most likely have been leaving the NWT for employment, education, and other opportunities elsewhere. Out-migration has been occurring despite more employment opportunities and improving living conditions in the NWT, particularly in Yellowknife.
5. **Decreased Need for Income Support.** The larger workforce has resulted in fewer people drawing on social assistance. Data from the mid-1990s until at least 2006 on household income and supplemental income payments

(social assistance) are indicative of a more equal distribution of income among households. Contributing factors are likely the result of heightened activity in resource exploration and extraction, including diamond mining, construction, and overall growth in the NWT economy. Declining need for income support is also related to rising household incomes. The percentage of NWT families with an income of less than \$25,000 declined from 25% in 1996 to 14% in 2006. More money management training has been identified as of primary importance in the LSA, not just for mine employees, but for families and communities of those employed.

6. **Cost of Living Remains High.** While the economy has grown, along with more jobs and income, high living costs remain a deterrent for those considering a move to the NWT. They also have a negative effect on NWT residents. In 2007, the average home in the NWT spent 21% more than the average Canadian household. Specifically, NWT residents spent 25% more on shelter, 20% more on food, and 23% more on clothing than the average Canadian. Housing is one of the main factors here. The NWT housing market is typified by a lack of affordable housing and rising housing prices, including rentals, even with the recent economic downturn. Rising housing prices and rents can contribute to housing insecurity. Housing prices have not declined in parallel with the recession. Rents have steadily increased for all sizes of apartments in the NWT, and more specifically in Yellowknife. To some extent, these costs have been offset by rising average incomes for people in Yellowknife and the smaller communities.
7. **Education and Skills are Improving.** The socio-economic baseline shows that education and skill levels of NWT residents have greatly improved over the past 10 to 15 years with the combined efforts of community leaders, government programming, and the support of mining companies (e.g., secondary schools are now in nearly all of the communities, mining and trades training has increasing enrolments, numbers of scholarships have increased). Still, while high school graduation rates are improving, particularly in Yellowknife, in some of the smaller communities, high school student enrolment and graduation rates have not improved much over the last few years; this may be related to some students moving to Yellowknife to finish their secondary education, some dropping out for unskilled jobs, or other factors. On the positive side, levels of education are higher among women in Aboriginal communities, which may improve their employment opportunities.

Increased education and experience levels also increases choice. Education is not uniform in the NWT, and particularly in the smaller

communities where annual numbers of students enrolled and graduating fluctuate from year to year. However, during the past decade the number of students graduating from high school in the NWT has increased. From 1986 to 2006 the total number of Aboriginal graduates in the NWT increased almost fourfold. The number of trades and technology graduates in programs offered through Aurora College and the MTS have increased since the mid-2000s. Greater training and education and increased incomes have their downsides too, at least from a local perspective. People have lifestyle options, which includes taking their newly acquired skills and applying them elsewhere. For example, new or improved skills and additional money mean that people can assess their options and move to other communities either within or outside of the NWT to various points of hire. However, education in the NWT continues to be a challenge for some groups. Many people in smaller remote communities do not want to move away for work, yet opportunities for long-term, full-time employment remain in the larger regional communities or Yellowknife (GNWT Department of Education, Culture and Employment 2008).

8. **Crime and Homelessness.** Along with a growing labour force during the last decade, an increasing number of transient workers, and larger disposable incomes, the NWT has had increased crime rates and homelessness. Substance abuse, gambling, and other addictions continue to increase in the NWT. Factors that contribute to these addictions in the NWT include increases in family and municipal income and the influx of transient workers. Based on 2009 data from Statistics Canada, the NWT had the second highest Crime Severity Index among all Canadian territories and provinces, and some of the highest crime statistics in the country (Maclean's Magazine 2010). The crime rates differ; however, from place to place and tend to fluctuate annually. Between 1996 and 2008, the violent crime rate in the NWT increased (41%), and in some small communities has increased substantially (e.g., in Behchokò it more than doubled between 1996 and 2008). In other communities it has declined (e.g., in Whatì it declined to below 1999 levels after reaching a high of 86 per 1000 people in 2004) (NWT Bureau of Statistics 2009c). Given these data, it may be a reasonable prediction that crime rates will continue unless a program intervention or other restricting factor is implemented. The problem of crime will not disappear without tackling related problems of poverty and abuse. A related issue is the increasing homelessness in Yellowknife, and the growing trend to "hidden homelessness" or "couch surfing". Youths and young families are increasingly moving between other communities and into Yellowknife in search of opportunities. Although vacancy rates in the city

have declined over the past two years, they are still low compared to the Canadian average. The vacancy rate for private apartment units in Yellowknife declined from 2.8% in April 2009 to 1.3% in April 2010, or almost half of the national rental vacancy rate of 2.9% in April 2010. Out of 1,771 privately-owned rental apartments in Yellowknife in April 2010, only 23 units were vacant and available for rent (Canada Mortgage and Housing Corporation 2010).

9. **Improved Infrastructure and Services.** Infrastructure and services, including schools, roads, airports, communication networks, utilities, and public housing, all play an important role in economic growth, health and well-being, education, and employment within the LSA communities. The size of the NWT and the remoteness of the communities present substantial challenges in infrastructure development, funding, and maintenance. The distance between communities in the NWT, and the difficulties recruiting and retaining professionals (e.g., medical, education) limits people's access to health care and education in their own community. Consequently, heavy reliance is placed on the health care, education, and other social service systems in Yellowknife as well as out-of Territory specialists. Counter to these challenges, several infrastructure changes are occurring in the NWT, including the Deh Cho Bridge, new or improved roads, improved airport facilities, more and better housing, new schools, better community infrastructure, new energy infrastructure, more energy efficient public infrastructure, and improved information technologies, including access to broadband internet services (GNWT Department of Finance 2010).
10. **Traditional Culture Changes.** Concern for changes to a traditional way of life and the environment are not new to the evaluation of resource development projects in the NWT. These have been raised repeatedly since the 1970s and the introduction of environmental assessment processes in the NWT. The traditional cultural environment is changing, but not to the extent that was anticipated at the onset of diamond mining in the 1990s. For example, one highly anticipated change was Aboriginal languages. Although in decline overall in the NWT, Aboriginal language loss is slowing and may actually be increasing in use in certain regions, at least as a second language. Most students from kindergarten through grade nine in the NWT have access to Aboriginal language programs, averaging two hours weekly of instructional time. Some high schools offer credit courses in these languages (GNWT Department of Education, Culture and Employment 2007c). Greater local access to culturally-appropriate education and training has also helped increase educational success and

chances of finding jobs. Hunting and fishing has not declined across the NWT from 2002 to 2009, and in some communities may have actually increased. The reliance on hunting and fishing as a source of food has decreased with the growth of the formal economy and greater access to store-supplied goods. More jobs and increases in income have allowed for greater consumption of store-bought food. The situation is compounded by the 2010 hunting moratorium on caribou. Residents of the NWT are encouraged to switch to other country food sources, but none have been as culturally important as caribou. It is unclear what the implications of the 2010 caribou hunting ban might have on traditional culture.

12.4 PROJECT DESCRIPTION

12.4.1 Introduction

This section summarizes the human resources required for the Gahcho Kué Project (Project), as well as benefits that will be available to the workforce. The full details can be found in Section 3, Project Description. The human resource strategies, policies, plans, and procedures will build upon and be consistent with those of the Snap Lake Mine.

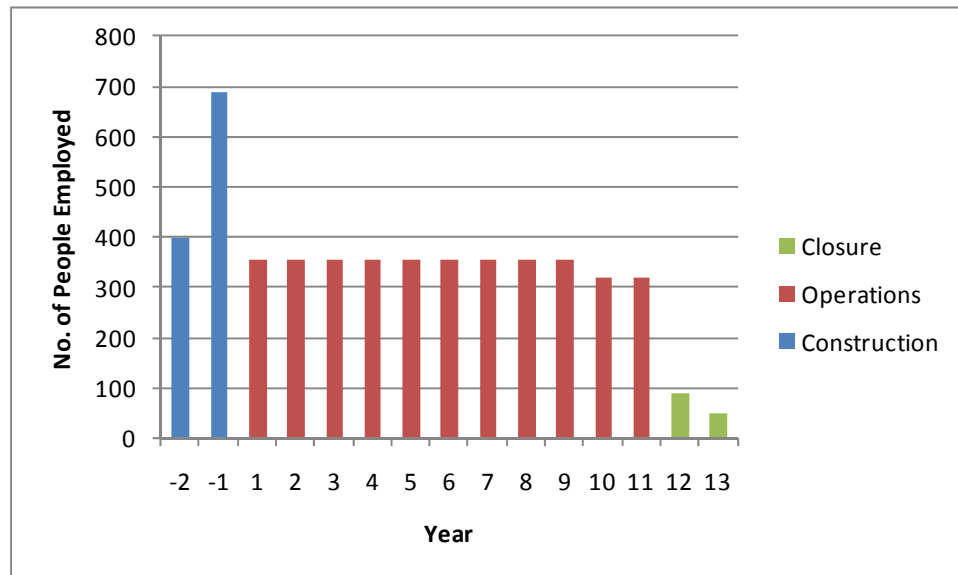
12.4.2 Employment

The Project is expected to employ an average of about 372 full-time equivalents (FTEs); one FTE is the number of hours worked that add up to one full-time employee.

12.4.2.1 Construction

The construction workforce will grow from approximately 400 FTEs in the first year of construction (Year -2) to a peak of 690 FTEs in the following year (Year -1) (Figure 12.4-1). This peak employment includes both on-site and off-site employment, and is not equivalent to the number of on-site personnel at any one time. The number of people on-site is limited by the maximum capacity of the camp, or 432 persons. In addition to an average of 450 construction FTE positions, about 190 operational FTEs will come on-stream over the course of the construction phase to operate all the earthworks equipment for construction and pre-stripping, as well as to prepare for operations.

Figure 12.4-1 Total Employment by Year during Construction, Operations and Closure



12.4.2.2 Operations

The operating mine life is estimated to be 11 years in duration. The mining operation starts with a pre-stripping fleet in the first year (Year -2) of construction and a smaller mining workforce will complete all earthworks activities from the beginning of construction. By the end of construction, the operations workforce of approximately 160 FTEs will be on-site and will include general and administrative staff, camp housekeeping, catering, mill operators, truck drivers, open pit mining, and surface facilities maintenance crews. The total workforce will average 372 FTEs during operations with less than half this number on-site at one time due to rotational work schedule and some Yellowknife-based employees.

12.4.2.3 Closure and Reclamation

Progressive reclamation will occur throughout the life of the Project, and most closure work will be completed during the latter years of the operations. For example, reclamation work such as demolition and dyke breaching will occur during the last year of operations. However, much of the mine closure activities are planned for Years 12 and 13 upon cessation of processing operations, at which time interim closure will be achieved. Employment during interim closure is expected to be less than 100 FTEs, with fewer staff required in Year 13 than Year 12 (Figure 12.4-1).

Much of the interim closure monitoring is planned for the approximately eight year period following end of mining operations when Kennady Lake is being re-filled to original lake levels. The recovery of the aquatic ecosystem in Kennady Lake will also be monitored beyond this period as the remaining activity to achieve final closure. It is expected that fewer than 2 FTEs will be required as activities are limited to the pumping required to accelerate the refilling of the lake and ongoing monitoring requirements. The final year of site activity will be determined based on the results of the monitoring program.

12.4.2.4 Administration

Management of human resources for the Project will be carried out from the De Beers Canada Inc. (De Beers) Yellowknife office using the Northwest Territories (NWT) Projects management and administrative support services. The company will use existing operating systems and administrative procedures that are currently in place for the Snap Lake Mine for the administration support to the Project. It is anticipated that this will increase the number of staff required in the Yellowknife office by approximately 8 to 12 positions for the operations phase of the Gahcho Kué Project. These positions will be in the disciplines of Human Resources, External & Corporate Affairs, Materials Management and Finance. The actual number of positions will be refined closer to construction as the transition to operations from construction is detailed and that the company's NWT organizational structure is updated accordingly.

Within the External and Corporate Affairs division, a Superintendent Community Relations leads and manages the work of two Community Liaison Coordinators, who are employed to work with communities throughout the life of De Beers' NWT Projects. Within these three positions, one is staffed with a Chipewyan speaking employee and the other with an employee who speaks Tłıchǫ. Within the Materials Management department, the Superintendent Materials Management and Business Development is responsible for working with NWT businesses to assist with increasing employment and business opportunities.

12.4.2.5 Workforce Schedule and Mobilization

Before construction begins, the company will determine the rotation schedule required to attract the skilled labour it needs to complete the construction of the mine. Work rotations and shifts will be planned accordingly.

During operations, most of the operational workforce will work 12-hour shifts in a two-weeks-on and two-weeks-off rotation system. Other variations on rotation schedules have been considered for the management and professional positions

required for the operations phase. Traditional pursuits of Aboriginal employees will be accommodated within work schedules, in balance with the operational requirements of the Project where practicable and with appropriate notice.

De Beers will provide return air transportation, at its expense, to employees travelling from designated pick-up points in NWT communities and the Project.

The number of flights and the size of the aircrafts will be determined based on the best options regarding the transportation of people and freight to and from the site. From time to time, De Beers will re-evaluate the effectiveness of the pick-up points and make adjustments to support construction and operations labour requirements. These pick-up points will be selected by De Beers based on the location of its workforce, requirements to recruit and retain employees, and construction and operations schedules.

12.4.2.6 On-site Services and Facilities for Workers

During the construction of the Project, the camp will include the necessary facilities to sustain the workforce at the site. The existing exploration camp will serve as the starter and overflow camp for initial construction. Temporary, two-per-room shared accommodation will be provided to crews during the construction phase. For permanent accommodations, staffing levels will allow for individual occupancy rooms.

Eating and sleeping areas will be non-smoking for all workers, including operations personnel. Food services will include country foods when available. Food workers will be trained food handlers.

Recreational facilities in the camp will be available 24 hours a day, seven days a week. Generally, services may include the following:

- exercise facilities;
- lounge with televisions and DVD;
- access to telephone and email for workers to communicate with family;
- computer facilities; and
- a quiet room for studies, library, reading, or religious/cultural practices.

Workers will be encouraged to establish a recreation committee to supplement on-site activities. De Beers may provide reasonable assistance for other types of

facilities and services may be provided if there is sufficient workforce interest (e.g., visual arts).

Medical personnel will be stationed at the site and the medical aid personnel will be accessible 24 hours a day, seven days a week. This service will be provided throughout the construction, operations, and closure. Medical emergencies will be evacuated to Yellowknife.

12.4.3 Staffing

The key elements of De Beers' approach to employment include:

- recruiting and training that maximizes employment opportunities available to local residents;
- identifying Aboriginal people who meet the minimum entry-level qualifications for hiring preference;
- working with local employment officers, and advertising in northern newspapers and on the company website for positions available at the Project. The company already maintains a 1-800 number in the NWT for employment information and job opportunities;
- identifying opportunities for gathering information and addressing barriers to successful employment;
- promoting and encouraging careers in the diamond mining industry with De Beers;
- promoting and encouraging partnerships with NWT schools that enable students to understand career opportunities available as well as what training and education is required to pursue these opportunities; and
- promoting and encouraging partnerships with Aurora College and other Canadian post-secondary education institutions to establish work experience and job placement programs.

During construction, operations, and closure, De Beers will hire according to preferences and order indicated below for the entire spectrum of Project-based employment:

- Aboriginal people living in the communities within the Socio-economic Local Study Area (LSA);
- Aboriginal people living in the NWT;
- other NWT residents;

- those relocating to the NWT; and
- all others.

Retaining and supporting the development of northern Aboriginals is important to De Beers. De Beers wants to ensure that these employees have the opportunity to grow, develop, and progress in their jobs and careers. To help with this, a range of training, counselling, family support, mentoring, and performance incentives will be provided for staff.

De Beers supports and encourages the participation of women on an equal basis with men in all aspects of work related to the Project. The following will be continued or initiated for the Project:

- work through Skills Canada, the Native Women's Association of the NWT, the Status of Women Council of the NWT, Aurora College, Aboriginal communities, and the Government of the Northwest Territories (GNWT) to promote women in trades and mining occupations;
- offer scholarships to female NWT students who are attending college and university programs;
- promote activities in the NWT that target young women for jobs at the Project;
- make female role models available for school programs to promote women working at the Project;
- support "women in trades" programs in partnership with educational institutions and women's groups in selected communities;
- offer scholarships and awards for women who are in an apprenticeship program with the Project;
- offer coaching regarding personal development strategies to women who may not possess all of the requisite skills and knowledge for particular positions; and
- encourage contractors to participate and support De Beer's commitments related to promoting the participation of women in the workforce.

12.4.4 Skills and Entry Requirements

The minimum qualifications for entry level (unskilled) jobs for construction and operation will include the following.

- High school graduation or General Equivalency Diploma. De Beers does consider the experiences of individuals not meeting minimum education requirements for entry level positions on a case-by-case basis.
- All potential employees will be required to undergo a confidential pre-employment medical examination.
- As a standard risk management practice, credit and criminal history checks will be required for positions.
- With the applicant's permission, reference checks will be undertaken on all prospective employees and will be made prior to any formal offer of employment.

12.4.5 Salaries, Benefits, and Performance

A salary and benefits survey will be conducted regularly so that the Project is competitively positioned in the NWT and Canadian marketplace to recruit and retain a skilled labour force. De Beers will work with its long-term contractors so that salary and benefits for contract employees on-site are also positioned competitively.

Employees of the Project will be offered the same comprehensive and competitive benefits package that all De Beers employees receive, which at this point generally includes the following:

- health benefits, including medical travel assistance;
- life insurance;
- long- and short-term disability insurance for sickness and injury income protection;
- dental care;
- optical care;
- comprehensive employee and family assistance programs;
- out-of-province/ out-of-emergency medical treatment;
- vacation;
- sick and bereavement leave;
- supplemental benefits to maternity leave;
- northern relocation benefits;

- miscellaneous payroll deductions including options for retirement;
- employee incentives for safety, attendance, and length of service;
- professional memberships; and
- social/fitness benefits.

Employees will be provided with a job description, roles and responsibilities, and key performance indicators. Annually, performance measures that ensure targets for safety, environmental performance, and production targets will be set and incentives established for staff to achieve them. Targets will be established, reviewed, and incentive payments approved by management. Workers will also be recognized and rewarded through a recognition program. Incentives may also be provided to employees interested in volunteering their time for social or cultural programs or activities in their home communities.

12.4.6 Training

De Beers has developed a specific training approach for its northern operations:

- maintaining a human resource office in the NWT;
- working with contractors to achieve the goal of training members of Aboriginal communities and NWT residents;
- linking training strategies to support impact–benefit–agreement implementation with Aboriginal communities;
- establishing a mine orientation program for all new employees;
- establishing a recruitment and training strategy for school students that encourages and promotes the completion of secondary school;
- making best efforts to schedule training so that potential employees who have completed the training will be able to take immediate advantage of employment opportunities with the Project, and encourage contractors to do the same;
- participating in career fairs where appropriate;
- conducting a training needs assessment to identify existing educational and/or skill levels of Aboriginal community members and other NWT residents who apply for positions, so that work can be offered to new recruits and opportunities for advancement can be offered to existing employees; and

- training and offering advancement opportunities to existing employees in accordance with the hiring priorities, which will be subject to each employee's performance, training, skills, interest, and career plan.

Orientation training will be provided to all new hires. Employees will be given a realistic and accurate description of the job they are to perform, including the positive and negative aspects of camp life, and accepted performance levels. In addition, all workers will receive the following types of orientation training:

- orientation to the job and camp life;
- information benefits, hours of work, rotation schedule, and so forth;
- money management;
- health and safety training (e.g., First Aid/CPR, WHMIS, SHE);
- camp and work site rules and policies; and
- cultural awareness and cross-cultural training for northern Aboriginal and non-Aboriginal workers.

12.4.7 Supervisor and Mentor Training

A Supervisory Training Program has been developed for supervisory and management staff, which will be mandatory. The program establishes the roles and responsibilities of foremen and supervisors, including coaching and supporting the training and development of their employees.

A mentoring program will be developed by matching Aboriginal workers with those who have the desire and skill to supervise and mentor junior workers. The aim is to encourage career development and advancement for young Aboriginal employees.

12.4.8 On-the-Job Training and Advancement of Entry-Level Workers

De Beers is committed to promoting from within the company. The aim is to fill as many of the skilled positions and as many of the semi-skilled positions as possible with northern Aboriginal workers over the life of the Project. Unskilled workers will receive on-the-job training. As vacancies in skilled and semi-skilled positions occur, concerted efforts will be made to fill these positions with northern Aboriginal workers.

12.4.9 Apprentice Training

Apprentice positions will be developed in accord with the operational requirements of the business and in accord with the requirements of the NWT *Apprenticeship, Trade and Occupations Certification Act* and those positions filled in accordance with the hiring preferences outlined above. Opportunities will be provided for workers to obtain the necessary training hours to achieve their trade's certificates on-site, including heavy equipment operator, electrician, and mechanic and mill operators.

12.4.10 Aboriginal Language and Cultural Support

Retaining and supporting northern Aboriginals is important to De Beers. As such the company strives for a culturally supportive work place. Among the actions that are already supported and plan to continue are:

- providing printed core policies in English, French, Chipewyan, and Tłıchǫ;
- incorporating Dene culture and traditions into key site celebration activities;
- encouraging the practice of Aboriginal languages at the worksite when it does not compromise health and safety. English will be the general working language for conveying instructions related to operations;
- to the extent operationally possible, assign entry-level Aboriginal workers to a supervisor who will provide a mentoring role;
- collaborating with Aboriginal communities on the development and delivery of training programs based on cultural value systems;
- arranging cultural activities as part of the ongoing recreation activities planned at the site; and
- providing and maintaining space at the mine site for spiritual and cultural pursuits.

12.4.11 Alcohol, Drugs, and Harassment

De Beers promotes a healthy and safe work site, and healthy lifestyles off-site. A key aim of the Project is to protect the safety of its workers and employees, as well as to protect De Beers' investment. Among the focal points is the Dry Site Policy, which establishes that all workplaces will be drug- and alcohol-free. This includes workers in transit who will be required to remain sober and drug-free

during their entire transit to and from the mine site. De Beers practices a zero tolerance towards harassment, fighting, or bullying on-site.

12.4.12 Firearms, Hunting, and Fishing

Workers will not be allowed to hunt or fish while at the site at any time during the life of the Project. No personal firearms will be allowed on-site at any time during the life of the Project.

12.4.13 Smoking

A smoke-free work and living place will be provided at the Project site. Suitable areas for those who do smoke will be designated at the Project site.

12.4.14 Workplace and Community Literacy Programs

A learning centre will be located on-site with equipment and resources which will include computers and a learning centre resource library. On-site literacy programs will be linked to recruitment and employment strategies to permit employees to take advantage of career advancement opportunities.

Literacy programs will be provided for employees and will continue in selected communities. De Beers will work with community agencies so that literacy programs will be directly linked to other kinds of upgrading, such as education and training programs that enable participants to further improve their qualifications towards employment.

One initiative that has been implemented in NWT Aboriginal communities in order to foster increased literacy levels is the *Books in the Homes Literacy Program*. With this initiative, De Beers is helping families build home libraries by providing children from preschool to Grade 12 with three free books to take home each school year.

12.4.15 Health and Wellness

Health and wellness of individuals and families is fundamental to the social, economic, and cultural sustainability of communities. De Beers' employees and their immediate family members may access counselling services through the company health care plan.

12.4.16 Access to Project Facilities

The Project facilities will not be made available to the general public. The airstrip and Winter Access Road will be operated as private facilities for mine construction and operation purposes, except in emergency situations. Signs will be posted and reasonable efforts will be made to advise the local communities of these restrictions. However, in keeping with De Beers' goals to be a good neighbour to communities in close proximity, community liaison coordinators will coordinate and welcome special visits to the Project facilities with Aboriginal leaders.

12.4.17 Contracting and Procurement

Policies intended to increase business and value-added opportunities for NWT businesses were established for the Snap Lake Mine. Wherever feasible, and consistent with sound procurement management, these will be continued for the Project. Procurement needs will be sourced from NWT businesses as much as practical during construction, operations, and closure. Special emphasis and priority will be placed on developing business in the selected communities. De Beers will provide support to northern businesses to help them prepare to bid on contracts and to maximize northern Aboriginal content. Opportunities will be provided for sourcing procurements in the following order of priority:

- N'Dilo, Detah, Yellowknife, and Łutselk'e;
- Tłıchǫ Communities;
- NWT businesses, industry and business associations; and
- other Canadian businesses.

All contractors to the Project will be expected to conform to the following general criteria:

- cost competitiveness;
- quality;
- ability to meet the technical specifications of prescribed goods and services;
- ability to supply and deliver the goods and services;
- timely delivery;
- safety, health, and environmental record; and

- degree of northern Aboriginal participation.

De Beers retains the right, at its sole discretion, to make decisions relating to contract performance criteria, qualifications regarding contractors, the assessment of tenders against selection criteria, and the design and implementation of all systems for measuring contractor performance.

12.4.18 Business Opportunity Management Initiatives

De Beers has already undertaken the following initiatives to maximize Project-related business opportunities for Aboriginal and NWT businesses. These will continue for the Project.

- Continue to staff a position with the responsibility to act as a liaison between De Beers, GNWT, Aboriginal groups, and NWT businesses.
- Provide a business development strategy for Aboriginal groups, and communicate the scope and scale of business opportunities and Project requirements in a timely and effective manner.
- Identify the Project components during construction, operations, and closure that should be targets for a business development strategy.
- Identify possible opportunities for joint ventures with Aboriginal businesses.
- Maintain a NWT business policy that supports the objectives and commitments by De Beers.
- Share business-related expertise with NWT mine-related business initiatives.
- Develop a flexible contracting approach by size and scope to match the capacity of Aboriginal businesses and NWT businesses, where feasible.
- Prepare a business opportunities' forecast to identify foreseeable procurement requirements of the Project, and provide it to Aboriginal businesses and NWT businesses in accordance with the purchasing priorities set out above.

12.5 ASSESSMENT APPROACH AND METHODS

12.5.1 Introduction

This section summarizes the approach to assess the key lines of inquiry and subjects of note as related to the social, cultural, and economic impacts from the Project. In this socio-economic impact assessment (SEIA), the term “socio-economic” encompasses social, economic, and/or cultural effects, including traditional activities and heritage. Information from the existing environment (Section 12.3) and Project Description (Section 12.4) provide the basis for analyzing and predicting effects from the Project on the socio-economic environment.

The SEIA uses an issues-driven approach, focusing on valued components (VCs), criteria, and indicators that are important to the communities located near the Project (i.e., in the Local Study Area [LSA]). The Project Terms of Reference (Gahcho Kué Panel 2007) and the *Socio-Economic Impact Assessment Guidelines* (MVEIRB 2007) were reviewed to help prepare the SEIA; in particular, Appendices D and E of the *Socio-Economic Impact Assessment Guidelines* identify some elements of the human environment to be considered. The size, location, and complexity of the Project were other factors in determining the level of effort for the SEIA.

The following sections provide an explanation of the VCs and associated VC assessment and measurement endpoints, spatial and temporal boundaries, socio-economic pathways, effects analysis, and residual impact classification and determination of significance. Further information on the approach and methods for the EIS is provided in Section 6.

12.5.2 Valued Components

Concerns about the Project were described in the Report of Environmental Assessment (MVEIRB 2006), which were raised in meetings with individuals, communities, and government that have an interest in the Project, and through De Beers’ own engagement process (Section 4, Engagement). Taken together, these concerns reflect societal goals, or VCs, that are linked to people’s perspectives on the potential effects from the Project on their lives and communities. The VCs provided the substantive focus for both the socio-economic baseline study and the assessment of Project-related effects.

Valued components have been categorized into the key lines of inquiry and subjects of note, which are features of the socio-economic setting important to potentially affected communities. Predicted socio-economic effects on VCs were also based on results from the assessment of biophysical effects (e.g., water quality, fish, and wildlife). The VCs used in this EIS are listed in Table 12.5-1, along with VC assessment and measurement endpoints, which are explained in Section 12.5.2.1.

12.5.2.1 Assessment Endpoints and Measurement Endpoints

Valued component assessment endpoints are general statements about what is valued over the long term, and encompass the notion of sustainability. For example, protection of heritage resources and continued opportunities for traditional use of wildlife resources may be assessment endpoints for surface water, wildlife, archaeology, and traditional use. Identification of assessment endpoints for VCs in the EIS was determined primarily from the outcome of the community, public, and regulatory engagement process (MVEIRB 2006). For socio-economic VCs, the significance of effects from the Project is determined for assessment endpoints that reflect the collective issues among the key lines of inquiry and subjects of note in the EIS (i.e., persistence of long-term social, cultural, and economic sustainability). One overarching assessment endpoint for the socio-economic VCs reflects the collective issues among the key lines of inquiry and subjects of note in the EIS. This assessment endpoint is the persistence of long-term social, cultural, and economic sustainability.

Measurement endpoints are defined as quantifiable (i.e., measurable) expressions of changes to the assessment endpoint (e.g., changes to educational access, employment, and income). Effects to long-term social, cultural, and economic values are predicted through the analysis of measurement endpoints. Measurement endpoints also provide the primary factors for discussions concerning the uncertainty of impacts to socio-economic VCs, and subsequently, are the key variables for study in monitoring and follow-up programs.

Measurement endpoints for VCs of the socio-economic and cultural environment include employment, income, training, quality and capacity of community and regional infrastructure, family and community cohesion, tourism potential and wilderness character, and heritage resources. These measurement endpoints can be considered as subsets of VCs such as employment and business opportunities, beneficial, and adverse socio-economic properties, social attributes, and cultural attributes.

Table 12.5-1 Socio-economic Valued Components and Endpoints

Key Line of Inquiry / Subject of Note	Valued Component	Assessment Endpoints	Measurement Endpoints
Long-term Social, Cultural, and Economic Effects	<ul style="list-style-type: none"> • Employment • Procurement • Training • Income • Government Payments • Infrastructure 	<ul style="list-style-type: none"> • Persistence of economic sustainability in the NWT • Persistence of jobs and income for individuals and contractors • Continued opportunities for education, training, and development of new skills on Project related trades and careers • Persistence of lifestyle choices and mobility 	<ul style="list-style-type: none"> • Employment and unemployment rates • Average employment income • In-migration numbers • Population changes • Shelter needs • Household size and needs • Government revenues as a result of transfer payments • Gross domestic product • Change in employment rate in communities • Distribution of contract jobs (e.g., northern, Aboriginal, within communities) • Incomes (indirect) • Expenditures (direct) • Income disparity • Lone parent families • Children living in low income families • Numbers accessing social assistance • Apprenticeships • Secondary school enrolment • Secondary school graduation rate • Core household needs • Country food harvesting and consumption • Mobility • Drug and alcohol consumption • Sexually transmitted diseases • Aboriginal language use

Table 12.5-1 Socio-economic Valued Components and Endpoints (continued)

Key Line of Inquiry / Subject of Note	Valued Component	Assessment Endpoints	Measurement Endpoints
Family and Community Cohesion	Family and Community Cohesion	<ul style="list-style-type: none"> • Persistence of family and community cohesion • Continued opportunities for traditional pursuits 	<ul style="list-style-type: none"> • Country food harvesting during time off (percentage of households that report most or all of their meat or fish is harvested) • Loss of volunteers • Language proficiency • Lone parent families • Sexually transmitted disease rate • Drug and alcohol use • Crime rates • Aboriginal language spoken at home • Time spent on traditional pursuits
Social Disparity Within and Between Communities	Social Disparity Within and Between Communities	<ul style="list-style-type: none"> • Continued opportunities for education, training, and development of new skills on Project related trades and careers • Continued opportunities for traditional pursuits 	<ul style="list-style-type: none"> • Employment rate by community • Income disparity (percentage of families having less than \$25,000 annual income and percentage of families having more than \$75,000 annual income) • Volunteer / participation rates in communities • Country food harvesting during time off • Aboriginal language use • Percentage of lone parents • Household size • Population mobility (percentage of people 5 years and older who did not live in the same community 5 years earlier)
Employment, training, and economic development	<ul style="list-style-type: none"> • Employment • Training • Procurement • Government Payments 	<ul style="list-style-type: none"> • Persistence of economic sustainability in the NWT • Persistence of jobs and income for individuals and contractors • Continued opportunities for education, training, and development of new skills on Project related trades and careers 	

Table 12.5-1 Socio-economic Valued Components and Endpoints (continued)

Key Line of Inquiry / Subject of Note	Valued Component	Assessment Endpoints	Measurement Endpoints
Tourism and Wilderness Character	<ul style="list-style-type: none"> • Tourism • Recreation • Wilderness Character 	<ul style="list-style-type: none"> • Persistence of availability and enjoyment of wilderness and wildlife including fish, caribou and other species, for harvesting or viewing 	<ul style="list-style-type: none"> • Wildlife abundance and distribution • Fish abundance and distribution • Tourist numbers • Outfitters using the region • Use of area for hunting, fishing and trapping • Amount of air traffic • Development and use of East Arm National Park • Increased demand on other wilderness areas for tourism and hunting/ fishing/ trapping
Demands on Infrastructure	Infrastructure	<ul style="list-style-type: none"> • Maintenance and improvement of infrastructure 	<ul style="list-style-type: none"> • Road and airport improvements or additions • Interference with community services • Use of Tibbitt-to-Contwoyto Winter Road • Airport use
Culture, Heritage, and Archaeology	<ul style="list-style-type: none"> • Culture • Heritage • Archaeological and sacred sites 	<ul style="list-style-type: none"> • Continued opportunities for traditional pursuits • Persistence of knowledge and pride of culture and heritage • Persistence of historic and sacred sites 	<ul style="list-style-type: none"> • Time spent on traditional pursuits • Aboriginal language spoken at home • Loss of archaeological resources • Gain in knowledge of archaeological resources • Level of information available for communities to tell their story • Publications by communities/ for communities • Cultural programming in schools • Loss of cultural landscape features
Aboriginal Rights and Community Engagement	<ul style="list-style-type: none"> • Aboriginal Rights • Community Engagement 	<ul style="list-style-type: none"> • Continued opportunities for community input 	<ul style="list-style-type: none"> • Attitudes toward Project (e.g., measure by meeting exit questionnaires, number and type of concerns received, community monitoring reports) • Environmental design ideas
Proposed National Park	<ul style="list-style-type: none"> • Tourism • Recreation • Wilderness Character 	<ul style="list-style-type: none"> • Persistence of availability and enjoyment of wilderness and wildlife including fish, caribou and other species, for harvesting or viewing 	<ul style="list-style-type: none"> • Wildlife abundance and distribution • Fish abundance and distribution • Amount of air traffic and noise levels • Air and dust emissions • Change in existing visual landscape from Project infrastructure

NWT = Northwest Territories

12.5.3 Spatial and Temporal Boundaries

12.5.3.1 Spatial Boundaries

12.5.3.1.1 Local Study Area

The spatial boundaries of the Local Study Area (LSA) were designed to measure baseline environmental conditions and then predict direct effects from the Project footprint and activities on the socio-economic VCs and associated measurement endpoints. The LSA for the SEIA includes communities close to the Project, including those identified in the Terms of Reference, and which are located in the North Slave and South Slave administrative regions of the NWT. The LSA consists of the following communities:

- Łutselk'e;
- Detah;
- N'Dilo;
- Behchokò;
- Whati;
- Gamètì;
- Wekweètì;
- Yellowknife; and
- Fort Resolution.

12.5.3.1.2 Regional Study Area

The boundaries for the socio-economic Regional Study Area (RSA) were designed to quantify baseline conditions at a scale that was large enough to assess the maximum predicted geographic extent (i.e., zone of influence) of direct and indirect effects from the Project on VCs and measurement endpoints. Other North and South Slave communities which have been included in the socio-economic baseline (Section 12.2 and Annex K) include the NWT Métis Nation, the North Slave Métis Alliance (NSMA), Hay River, Hay River Reserve, Fort Providence, and Enterprise. These communities, along with the rest of the NWT, comprise the RSA. Project-related effects at the regional scale include potential changes to people that use ecosystem services. Cumulative effects are typically assessed at a regional scale and, where relevant, may consider influences that extend beyond the RSA.

12.5.3.2 Temporal Boundaries

The temporal boundaries of the assessment for the Project are long-term, looking to the distant future, and where possible looking to the distant past in order to understand regional change and the drivers of such change over time. The approach used to determine the temporal boundaries of effects from natural and human-related disturbances on VCs is similar to the approach used to define spatial boundaries. In the EIS, temporal boundaries are linked to two concepts:

- the development phases of the Project (i.e., construction, operation, and closure); and
- the predicted duration of effects from the Project on a VC, which may extend beyond closure.

The socio-economic temporal boundaries of the Project run from the start of construction through closure/post closure. Most socio-economic VCs will likely continue through the closure phase, including employment and procurement due to the skills and experience gained during the life of the Project. Socio-economic conditions at and beyond Project closure, however, will not be the same as before development. For example, damage to archaeological sites is an irreversible effect.

For the socio-economic key lines of inquiry and subjects of note, the temporal boundary includes all phases of development. Due to their long-term nature, most of the socio-economic effects in mining projects occur during the operations period. For example, potential effects on social cohesion such as time spent on participating or volunteering in the community are generally noted over several years of development. Construction, operation, and closure phases for the Project are anticipated to occur over 2 years, 11 years, and 2 years, respectively. The closure phase duration of 2 years refers mainly to employment-related activities.

12.5.4 Pathway Analysis

The EIS uses pathways (Project-environmental interactions) to assess effects (Section 6). Pathway analysis is a screening step that is used to determine the existence and magnitude of linkages from the initial list of potential effects pathways for the Project. This screening step is largely a qualitative assessment, and is intended to focus the effects analysis on pathways that require a more comprehensive assessment of effects on VCs.

Pathways were assessed using scientific and traditional knowledge, logic, and experience with similar developments and environmental design features and mitigation. Pathways for the SEIA were determined to be direct, indirect, or as having no linkage. For the social analysis, direct effects are those changes that can be shown to be directly attributable to the Project (e.g., employment and contracting of Aboriginal and northern residents), whereas indirect effects are indirectly associated with the Project (e.g., cultural and lifestyle adjustments to rotational work schedules). If the Project would result in no detectable environmental change and, therefore, no residual effect to a VC relative to baseline, then it was considered to have no linkage.

Project socio-economics pathways are associated with changes to the land use, culture, social conditions, and economics of communities that are directly or indirectly connected to the region surrounding Kennady Lake, as well as to the local and regional study areas (Table 12.5-2). All socio-economic pathways for the Project had linkages; therefore, most pathways listed in the table are analyzed and assessed in the SEIA. The one exception is engagement. Two effects pathways for this include that the Project may generate some conflict between people with differing views and between generations about how it fits with community culture; and that the process of engagement may generate ideas for Project design more compatible with the expectations of local residents. While engagement has already been initiated by De Beers prior to and during the EIS scoping sessions as well as other Project engagement since then, formal and continued engagement activities will begin upon approval of the EIS. As a process to be largely carried out in the years ahead, engagement is not assessed as the other socio-economic VCs. Instead, results and plans of engagement activities are presented in Section 4.

Table 12.5-2 Socio-economic Project Effects Pathways

Project Components/ Activity	Effects Pathways
Employment and procurement	<ul style="list-style-type: none"> • The Project will provide jobs and income for individuals and contractors. • The Project may result in northern and Aboriginal procurement. • The Project may result in out-migration and / or in-migration. • The Project will encourage opportunities for education and training on Project-related trades and careers. • The Project may provide training / skills up-grading to those employees who are interested. • The Project may result in time away from the family / community. • The Project may result in social disparities among individuals and communities due to the distribution of available jobs and income. • Increased lifestyle choices, including greater mobility, may result from incomes associated with Project employment. • The Project may reduce the need for social assistance (especially Employment Insurance) as a result of increased employment and income.

Table 12.5-2 Socio-economic Project Effects Pathways (continued)

Project Components/ Activity	Effects Pathways
Taxation and royalties	<ul style="list-style-type: none"> The Project may result in a modest increase in NWT tax base as a result of the payment of royalties and taxes.
Infrastructure use	<ul style="list-style-type: none"> The Project may increase demand for existing infrastructure from the transport of material and people to the Project site. The Project may result in pressure on government services. Increased government revenues may be spent on infrastructure and services.
Cultural needs relating to the Project	<ul style="list-style-type: none"> The Project may result in new tourist operations in areas near the Project site. Employees may lose language proficiency and other cultural skills. The Project may result in changes that affect availability and enjoyment of wilderness and wildlife including fish, caribou, and other species, for harvesting or viewing. The Project may increase knowledge and pride as a result of cultural and archaeological studies.
Physical disturbance	<ul style="list-style-type: none"> The Project may result in changes in archaeological resources. The Project may result in changes in cultural landscape features.
Engagement	<ul style="list-style-type: none"> The Project may generate some conflict between people with differing views and between generations about how it fits with community culture. The process of engagement may generate ideas for Project design more compatible with the expectations of local residents.

12.5.5 Effects Analysis

12.5.5.1 Types of Effects Considered

The SEIA considers four types of effects from the various Project components and activities: direct, indirect, induced, and cumulative effects. These are considered within both temporal and spatial boundaries of the assessment.

- Direct effects were considered to be directly caused by Project labour and capital changes, as well as, physical landscape changes.
- Indirect effects were considered to be a result of the direct effects.
- Induced effects were also considered for economic effects. These effects were considered to be the collective result of the direct and indirect effects, and are further explained below.
- Cumulative effects were considered to result from the combination of the direct effects of the Project and effects of other previous, existing, and reasonably foreseeable developments (Section 6.6.2 and Section 12.7).

12.5.5.2 Constraints

The following constraints were considered in the analyses and predictions of socio-economic effects from the Project.

- The socio-economic environment is influenced by many factors including market and political (policy and program) changes over time, population changes and movement (in- and out-migration), anticipated infrastructure developments, and human initiatives in anticipating change. These factors influence the predictability of the outcomes of some of the effects of the Project, and therefore, ultimately the effectiveness of mitigation programs and policies.
- As the socio-economic status of different communities, subpopulations, and individuals may vary, a socio-economic effect may have both positive and negative aspects. The level of uncertainty increases with each additional link (interaction) in a pathway.
- The ability of individuals, families, and communities to cope with and respond to change differs and is influenced by a range of considerations often outside of the proponent's control. Consequently, mitigation is offered to increase the benefits to the population as a whole.
- Consultation and engagement with communities located near the Project- is on-going. As these activities progress, additional concerns may be identified which will be addressed at that time. Should new concerns be raised between the time of EIS submission and throughout life-of-mine, supplemental information will be provided.

To accurately predict and effectively mitigate any socio-economic impacts on the VCs, the primary focus has to be placed on managing for potential effects over the Project lifespan. Management of socio-economic impacts as a result of the Project must include effective monitoring, responsiveness, and adaptability (adaptive management).

12.5.5.3 Effects Analysis Methods

The SEIA uses both quantitative and qualitative methods and analyses, and is underpinned by an understanding of existing (past to current) environmental conditions and trends. In addition to information provided in Sections 12.6, Key Lines of Inquiry, and 12.7, Subjects of Note, a detailed description of the methods and analysis of the predicted economic effects is provided in Appendix 12.II (Economic Impact Report).

Quantitative methods used for predicting economic effects included the following:

- Input-Output Analysis; and
- Trend Analysis.

The qualitative information used in the socio-economic analysis included the following:

- Project scoping meetings;
- community visits;
- literature synthesis;
- review and application of documented similar situations;
- business interviews (Annex K, Socio-economic Baseline; Appendix K.II); and
- expert subject matter interviews.

12.5.5.3.1 Quantitative Methods

Two types of quantitative methods were used to assess economic effects from the Project: an Input-Output Model and a NWT Economic Impact Model. Models are scaled-down representations of something larger. Economic models quantify choices and their outcomes, and provide an approximation of the economic outcomes that flow from the construction and operations of the Project.

Input-Output Model

Potential direct and indirect economic effects from the Project were determined using the Statistics Canada proprietary Inter-Provincial Input-Output Model along with Project input parameters (Section 3.11). Statistics Canada builds and maintains the Inter-provincial Input-Output Model, which can be used to calculate direct and indirect effects. Determining the value and location of the thousands of transactions that occur as a result of Project construction and operations would be virtually impossible to do manually. Input-Output models perform these calculations through a complex system of resource allocation. The models track the value-added components of every round of transactions that occur along the supply chain when a change is introduced to the economy.

Input-Output models provide good estimates of gross production, gross domestic product, employment and labour income, and indirect taxes. The models are predicated on a number of assumptions that alter or influence the results.

- Models are linear, meaning they do not make adjustments for the size, scale, or direction of any change to an economy.
- Models do not reflect limitations of capital and labour.
- Models are static, meaning they are based on the economy as it exists at a single point in time.
- The data used to develop the relationships between industrial sectors are the result of surveys. They are treated as approximations of actual relationships due to unknown variability embedded in the mathematics.

Input-Output models are best suited when investigating the economic effects of a change in production, especially where that change can be thought to occur without substantially altering the structural make-up of an economy. An Input-Output model uses the expenditure patterns from a producer (e.g., De Beers) to depict the effect of those expenditures on an economy. Essentially, this is a comparative study where the control case is defined as the current economy and the text case is simply a change in the existing production schedule of a firm or industry. Adopting this approach allows for an assessment of the economic value of production; in this case, diamond mining, and milling activities.

An Input-Output model was used to predict both direct and indirect economic effects from the Project. Direct economic effects are generated from those goods and services expenditures required to build, maintain, and operate a business (i.e., the Project). Indirect economic effects are those generated by the new expenditures made by the directly affected business sector as a result of their need to deliver their goods or services to the Project. The majority of indirect effects flow from the manufacturer of goods because of their need to purchase more inputs. Indirect effects are typically low in the NWT regardless of the industry being studied because of its limited manufacturing base.

The Project Input-Output model covers estimates of construction, operations, and closure costs including direct labour requirements, wages and salaries, and the cost of consumables (inputs such as fuel and supplies). These data were organized such that Statistics Canada's Interprovincial Input-Output Model could be simulated in order to determine the full extent of the direct and indirect effects.

Northwest Territories Economic Impact Model

A NWT Economic Impact Model (NWTEIM) was developed to help understand and explain the effect of industrial developments on the people of the NWT. More specifically, the NWTEIM was used to determine induced effects as well as the effects on population, labour force and some government revenues. In economic terms, induced effects are the third round of effects (after direct and indirect) that flow from a change in production. These effects include direct and

indirect changes in disposable income and a subsequent change in consumer expenditures. The change in household spending has its own affect on gross production, gross domestic product (GDP), employment, and labour income. Induced effects were calculated by a satellite model within the NWTEIM that was built specifically to deal with these and other issues.

The NWTEIM combines a financial accounting and taxation model with the NWT Input-Output model, which is maintained by the NWT Bureau of Statistics. This model integration provides the basis for additional analytical models, or “satellite” models, including one for demographics and one at the territory level. Each satellite model links to one another to produce a dynamic response to a change in production (output). Each model was specifically designed to do the following.

- The financial accounting and taxation model demonstrates the potential for public revenue streams and computes a project's viability.
- The NWT Input-Output Model calculates impacts on GDP, employment, and labour income and can be supplemented by the results flowing from Statistics Canada's Inter-provincial Input-Output Model. A baseline population forecast provides the information necessary to quantify the potential labour force. Additional details required for this analysis include estimates of employment and participation rates, and graduation rates.
- The results from these two models feed the demographic and territory impacts models that collectively demonstrate effects on the population, labour force, and migration, as well as the induced effects.

The Demographics Satellite Model produces a baseline forecast of the territories population by single-age cohort and gender. It uses historical birth and death rates to calculate a baseline natural rate of population change. These variables can be adjusted over the forecast period to more accurately reflect demographic trends. Exogenous, endogenous, and age-specific migration components are added to complete the demographic projection.

The NWTEIM combines information from the NWT Input-Output Model and the Demographics Satellite Model with a government revenue block, which is based on historical data and current taxation regimes. The NWTEIM also incorporates a consumer activity block, which is based on stochastic projections of consumer behaviour, retail sector data, and the Final Demand profile from within the NWT Input-Output Model.

12.5.5.3.2 Qualitative Methods

The assessment of other socio-economic effects identified in the Terms of Reference for the Project involves the use of a variety of qualitative information.

Community Visits

A detailed description of the methods applied for the Community Visits is summarized in Section 4 of the EIS. The purpose of the community visits was to provide update on the Project and to discuss how to proceed with engaging communities in discussion, as required following the release of the MVEIRB's Terms of Reference.

Literature Synthesis

A literature review was completed for similar Projects and environments to better understand potential effects and outcomes. The literature also provided input into the development of the mitigation strategy.

Business Sector Interviews

Local businesses were interviewed in the fall 2007 and summer 2010 to ascertain how they might be affected by the Project. The interview guide is presented in Annex K, Appendix K.II. De Beers sought representation for the following sectors:

- city administration;
- construction;
- consulting;
- diamond cutting;
- financial services;
- housing/accommodation;
- retail;
- social services; and
- transportation.

Separate years of interviews (2007 and 2010) allowed for comparisons to be made during two distinct periods in the economy of the NWT; namely, high economic growth and downturn recovery. Although several efforts were made to obtain information from each sector, not every sector responded. The interviewees that did respond are provided in Table 12.5-3.

Table 12.5-3 Businesses Interviewed for the Project, Fall 2007 and Summer 2010

Name of Participant	Industry Sector
Arctic Sunwest Charters	Transportation
Arslanian Cutting Works (NWT) Ltd.	diamond cutting
Canadian Tire	retail
Central Mechanical Systems	contractor
Centre for Northern Families	non-profit (emergency shelter, counselling and advocacy)
Coldwell Banker	housing; realty
Det'on Cho Corporation	contracting services
Explorer Hotel	accommodation
Great Slave Helicopters Ltd.	Transportation
Home Building Centre	retail - construction supply
INAC (Indian and Northern Affairs Canada), Mineral Development Division	federal government
Kingland Ford	transportation (sales and service)
Lutra Associates	consulting (socio-economic)
Mayor of Yellowknife	municipal government
Northern Transport Company Ltd.	transportation
Roy's Audiotronics	Retail
Royal Bank of Canada	financial services
Tim Hortons	food service
Wal-Mart	retail
Yellowknife Chamber of Commerce	business

Source: Gartner Lee Limited 2007, Golder Associates 2010.

Expert Subject Matter Interviews

Experts in particular subject matters were interviewed on specific matters. Among the list of interviewees were:

- bank managers;
- business owners, managers, and support workers;
- Chief Executive Officer (CEO);
- Chamber of Commerce directors;
- community directors;
- community wellness workers;
- Director of Education;
- economic development coordinators;
- government (provincial and federal) regulators and managers;

- investment corporation directors;
- mine workers;
- nurses;
- RCMP;
- Senior Administrative Officer (SAO);
- school principals and teachers;
- shelter operators;
- social researchers; and
- social program coordinators.

Other

Given the integrated nature of the questions provided in the Terms of Reference, this SEIA also used the results from the biophysical assessment.

12.5.6 Mitigation

Mitigation strategies to reduce the adverse effects and enhance benefits from the Project on the socio-economic and cultural environment are organized into two categories:

- environmental design features; and
- other mitigations.

Environmental design features are an inherent part of the Project Description and the benefits to which employees are entitled. These are design features that immediately respond to potential effects and have been anticipated. The assessment is based on residual impacts, which are the impacts after the environmental design features have been incorporated. Some examples of environmental design features that De Beers will implement include the following:

- pay royalties and taxes;
- offer employment for those with grade 10 or equivalent skills (i.e., equivalency criteria for employees who do not meet the minimum education levels);
- provide apprentice and trade positions, including necessary training hours for workers to achieve their trade's certificates on-site (heavy equipment operator, electrician, and mechanic and mill operators);
- during operations, most of the workforce will work 12-hour shifts in a two-weeks-on and two-weeks-off rotation. Other variations on rotation

schedules have been considered for the management and professional positions required for the operations phase; subject to operational requirements, provide direct return air transportation to employees travelling from NWT communities and the Project, which will maximize time in the community;

- offer drug and alcohol programming and other counselling;
- allow and encourage Aboriginal languages to be spoken on site when it does not compromise health and safety. English will be the general working language for conveying instructions related to operations;
- traditional pursuits of Aboriginal employees accommodated within work schedules in balance with the operational requirements of the Project, where practicable and with appropriate notice; and
- avoidance of archaeological sites to reduce likelihood of site damage or removal.

Other mitigations are actions undertaken by De Beers or others not related to environmental design features, but are implemented to reduce negative effects and increase the benefit from positive effects. Other mitigation and benefit enhancement measures are typically implemented during the development of the Project (i.e., not before), and involve De Beers and other organizations and businesses. These “other mitigations” can be separated into two components: other actions taken by De Beers and other actions taken by different parties such as government agencies, industry, and not-for-profit organizations. This latter group consists of independent actions implemented by departments and agencies that will have a synergistic influence with the mitigation implemented by De Beers. The assessment of residual impacts (i.e., impacts assuming the environmental design features are in place) does not include other mitigations since they usually involve commitments by other parties. If other mitigations occur, they will further reduce negative impacts or enhance positive impacts.

Some examples of other mitigations that De Beers will implement include the following:

- supporting contractors in achieving the goal to train members of Aboriginal communities and NWT residents;
- promoting and encouraging partnerships with NWT schools that enable students to understand career opportunities available as well as training and education required to pursue these opportunities;
- promoting and encouraging partnerships with Aurora College and other Canadian post-secondary education institutions to establish work experience and job placement programs;

- work through Skills Canada, the Native Women's Association of the Northwest Territories, the Northwest Territories Status of Women Council, Aurora College, Aboriginal communities, and the Government of the Northwest Territories to promote women in trades and mining occupations;
- offer scholarships to female NWT students who are attending college and university programs;
- promote activities in the NWT that target young women for jobs at the Project;
- make female role models available for school programs to promote women working at the Project;
- support "women in trades" programs in partnership with educational institutions and women's groups in selected communities;
- offer scholarships and awards for women who are in an apprenticeship program with the Project;
- offer coaching regarding personal development strategies to women who may not possess all of the requisite skills and knowledge for particular positions;
- encourage contractors to participate and support De Beers' commitments related to promoting the participation of women in the workforce;
- bring money management course to communities through banking establishment;
- provide volunteer incentives to those employees interested in volunteering their time for social or cultural programs or activities in their home communities;
- conduct ongoing communications and engagement activities with community residents and leaders, prospective workers, Aboriginal organizations, and the Federal and Territorial governments;
- participate in the Government of the Northwest Territories (GNWT) Labour Force Strategy to find strategies to increase chance of employment in the NWT;
- promoting and encouraging partnerships with NWT schools that enable students to understand career opportunities available as well as training and education required to pursue these opportunities; and
- collaborating with Aboriginal communities on the development and delivery of training programs based on cultural value systems..

Some examples of other mitigations that may be implemented by government agencies, industry, and not-for-profit organizations include the following:

- Increase availability of training and education for Aboriginal and other northern residents;
- Increase availability and diversity of accommodation choices in Yellowknife and communities;
- Provide training for emergency medical responders and fire-fighters in communities so that volunteers can develop additional skills;
- Development of GNWT Labour Force Strategy to find strategies to increase chance of employment in the NWT;
- GNWT planning and budgeting in response to a changing economy; and
- Parks Canada to complete the establishment of the proposed park on the east arm of Great Slave Lake.

The sources for proposed mitigation strategies include:

- mitigation from previous assessments;
- lessons learned from the Snap Lake Project; and
- suggestions from communities.

12.5.7 Impact Assessment Methods

12.5.7.1 Residual Impact Criteria and Definitions

The Terms of Reference (Gahcho Kué Panel 2007) require that the EIS classify the predicted residual effects (i.e., after mitigation) from the Project using scales of common words and criteria such as:

- direction;
- magnitude;
- geographic extent;
- duration;
- frequency;
- reversibility; and
- likelihood.

While these criteria work reasonably well for classifying biophysical effects, they are not easily adapted for socio-economic effects. For example, most socio-economic effects occur continuously, and most are cumulative (i.e., they interact and are directed and shaped by the broader, continuously evolving, socio-

economic environment). This is why frequency is generally not considered as a socio-economic criterion.

Reversibility is the likelihood and time required to return to a state that is similar to baseline or comparable to similar environments not affected by the Project. It is defined as reversible or irreversible. However, most socio-economic effects are irreversible. Socio-economic effects associated with a project are typically part of an ongoing process of interdependent economic and social change extending into the future, which generally cannot be reversed to return to pre-project development conditions. In fact, it is usually not desirable because to do so implies job losses and other negative socio-economic effects. Consequently, the socio-economic manageability of potential effects is often considered rather than their reversibility, as few means exist to reverse social change that occurs as a result of a project.

Definitions of direction, magnitude, geographic extent, duration, and likelihood are defined below, and summarized in Table 12.5-4.

- **Direction** indicates whether an impact is considered negative (i.e., less favourable), positive (i.e., beneficial), or neutral (i.e., no change from baseline). While the main focus of the impact assessment is to predict whether the development is likely to cause significant adverse impacts on the environment or cause public concern, the positive changes associated with the Project are also reported. Some effects may have both positive and negative dimensions. For example, although increased income from employment will boost purchasing power to improve livelihoods, this increased disposable income can also lead to increasing social disparities among the “haves” and “have nots”. For this assessment, neutral changes are not assessed.
- **Magnitude** refers to the degree of change in a socio-economic parameter or VC (system processes and features). Magnitude may be low, moderate, or high. The definition of the scale of magnitude also depends on the direction of the change. For example, a low magnitude in a negative direction predicts no impact on natural, cultural, and social features and processes of the VC beyond that of a nuisance (annoyance) value. A moderate rating anticipates that socio-economic processes and features continue, but are modified. High magnitude suggests that change is large enough to result in a severe deterioration of processes in the socio-economic environment. Most socio-economic impacts were assigned magnitude qualitatively⁴ on the basis of levels of concern, analysis of the socio-economic reality, future changes in the

⁴ Some exceptions exist such as economic or employment effects.

affected area, and understanding of the Project impacts from other areas such as water, wildlife, and human health risk.

Table 12.5-4 Definitions of Terms Used in the Residual Impact Classification

Direction	Magnitude (Negative Impacts)	Magnitude (Positive Impacts)	Geographic Extent	Duration
Negative: A less favourable change relative to baseline values or conditions. Positive: An improvement over baseline values or conditions. Neutral: No change relative to baseline values or conditions.	Low: The change has no impact on the socio-economic environment beyond that of a nuisance (annoyance) value. Moderate: The change to the VC is predicted to impair quality of life or livelihoods. High: The change to the VC is large enough to seriously impair quality of life or livelihoods of individuals and communities.	Low: The change has a slight but discernible positive impact on livelihoods and socio-economic development. Moderate: The change to the VC creates a noticeable increase in opportunities for improving livelihoods, and enhancing socio-economic conditions. High: The change to the VC alters opportunities for livelihoods and socio-economic development to the extent where sustainability of is considerably improved.	Local: The impact will affect one or more of the communities in the local study area. Regional: The impact will affect communities in the local study area and the NWT. National: The impact will affect individuals or communities beyond the NWT.	Short-term: the impact ceases before the end of construction (within 1 to 2 years). Medium-term: the impact ceases before or near the end of operation (within 3 to 11 years following construction). Long-term: The impact will cease after the operational life of the Project. Permanent: The impact on the receiving environment will effectively be irreversible.

Note: VC = valued components

- **Geographic extent** refers to the area affected, and is categorized into three scales: local, regional, and national. Local generally refers to the area that extends to the limit of the direct effects, and for this Project consists of the communities in the LSA. Regional corresponds to the area associated with indirect effects or cumulative effects, and extends to the entire NWT. National refers to the area outside the NWT. For the purposes of this assessment, most social impacts pertain to the LSA whereas most economic impacts are assessed at the regional level.
- **Duration** is defined as the amount of time from the beginning of an impact to when the impact on a VC has ceased or dissipated to the point of not being detectable from the present conditions, and is expressed relative to Project phases. Thus, duration is a function of the length of time that the VC is exposed to Project activities or phases (e.g., construction, operation, and closure). It is noted that many socio-economic impacts are of long-term duration, as a positive or negative significant impact is likely to alter the course of a person's life or to permanently change the socio-economic dynamic of a hamlet or town.
- **Likelihood** is qualitatively assessed based on knowledge of impacts generated by other projects.

12.5.7.2 Determination of Significance

For socio-economic VCs, direction, magnitude, geographic extent, and duration are the criteria used to classify impacts and evaluate the significance of changes to assessment endpoints. The assessment of significance considers the scale of these criteria (e.g., low magnitude, regional geographic extent, and long-term duration) and professional opinion, which is based on the context of the communities involved, and the informed value and judgements of interested and affected organizations and specialists. Familiarization with the socio-economic environment and, if possible, with the socio-economic impacts of other mines in the LSA or NWT, is also an important factor in significance determination. Likelihood is also described, where applicable.

The classification of residual impacts on VCs provides the foundation for predicting the level and likelihood of environmental significance from the Project on the persistence of long-term social, cultural, and economic sustainability (assessment endpoint). The determination of significance for the socio-economic environment is completed on a subset of VCs (e.g., quality of life, employment, income, education, and community services), and typically, each VC is directly associated with an individual pathway. Each pathway can result in different levels of effects on individuals, communities, and the region. Consequently, it is more practical to independently classify and predict the significance of the impact from each pathway on a socio-economic VC than to classify the entire combined set of pathways. After evaluating the significance of each pathway, the overall significance of the Project on the assessment endpoint for the socio-economic environment is provided.

An impact can be negative or positive, and in some cases, it may be both (e.g., new opportunities for employment are generally considered as positive, especially to those that benefit by them; as employment for some can lead to inequalities in some communities, there could also be negative impacts at the level of the community). While significance for socio-economic impacts is generally assigned based on “level of concern”, not all potential impacts are raised by individuals, communities, and other people or groups interested in the Project. The following definitions were used to determine the significance of the impacts from the Project on valued components of the socio-economic environment.

Not significant - The impact is measurable at the individual, family, or community level, and strong enough to be detectable at the population level, but is not likely to result in substantial changes in the well-being of populations and communities.

Significant - The impact is clearly distinguishable from baseline conditions and results in strong interest or concern, and/or results in substantial changes in the well-being of populations and communities.

The determination of significance also includes the efficacy of the proposed environmental design features (i.e., policies, practices, and investments) and other mitigation to limit negative impacts and foster positive impacts on the continued persistence of long-term sustainable social, cultural, and economic features of the environment.

12.6 KEY LINES OF INQUIRY

This section of the Environmental Impact Statement (EIS) for the Gahcho Kué Project (Project) provides information on potential effects related to the social, cultural, and economic environment. It is organized into three topic areas, identified as “key lines of inquiry” in the *Terms of Reference for the Gahcho Kué Environmental Impact Statement* (Terms of Reference) by the Gahcho Kué Panel (2007):

- Long-term Social, Cultural, and Economic Effects;
- Family and Community Cohesion; and
- Social Disparity Within and Between Communities.

The key lines of inquiry are presented here in the order shown above to provide a logical flow of information to the reader of this section.

Because there is considerable overlap among the three key lines of inquiry, information about each one has been re-organized. Where the Terms of Reference identify an issue that is relevant to, or overlaps, more than one key line of inquiry or subject of note, it is addressed at the most appropriate location (identified in the introduction to each key line of inquiry). Issues in a key line of inquiry that are closely related to similar issues in another key line of inquiry or subject of note have been moved so that the broader topic can be addressed completely in one location. Wherever this occurs, the location where the topic is addressed and the reason why it has been moved is clearly given in the introduction to the key line of inquiry.

12.6.1 Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects

12.6.1.1 Introduction

12.6.1.1.1 Context

The Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects involves a series of social and cultural issues that are more appropriately discussed in other parts of Section 12 because of their similarity with that key line of inquiry or subject of note. The Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects focuses primarily on the economic effects of the Project. No other key line of inquiry or subject of note raises the economic effects to the same extent. The issues discussed in this section set the context for subsequent evaluation.

Social and cultural effects are discussed mainly under the Key Line of Inquiry: Family and Community Cohesion and the Key Line of Inquiry: Social Disparity within and between Communities. To avoid repetition and improve readability, cumulative effects of the Project and other past, present, and reasonably foreseeable developments on this and other key lines of inquiry and subjects of note are presented in Section 12.8.

12.6.1.1.2 Purpose and Scope

The purpose of the Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects is to meet the Terms of Reference issued by the Gahcho Kué Panel (2007; pages 33 and 34). The entire Terms of Reference document is included in Appendix 1.I and the complete Table of Concordance for the EIS is in Appendix 1.II of Section 1, Introduction.

The Terms of Reference describe the Key Line of Inquiry: Long-term Social, Cultural and Economic Effects as including the following:

- cumulative effects and pace of development;
- lack of capacity to monitor effects;
- dependency on one resource;
- demands on services;
- in- and out-migration from communities, including out-migration of skilled labour;
- change in diet;

- increased disposable income and greater reliance on a wage economy;
- vulnerable sub-populations;
- contractor and subcontractor goods and services required and direct and indirect economic effects;
- opportunities for business and ability to respond;
- opportunity for economic diversification;
- other economic opportunities affected by the development and opportunities lost;
- government revenues;
- employment numbers and multipliers;
- changes in local income and disposable income levels;
- inflation and cost of living;
- effect on the traditional economy;
- ideas for a cooperative approach to dealing with issues;
- follow-up program to monitor and verify findings; and
- joint monitoring of cumulative effects.

Table 12.6-1 identifies the location of the effects analysis completed for each the bullets shown above. Most issues are addressed in the three key lines of inquiry in this section; however, the Subjects of Note (Section 12.7) and Cumulative Effects and Sustainability (Section 12.8) also address socio-economic and culture effects of the Project.

12.6.1.1.3 Content

Five main topics are included in the economic assessment, which is the focus of this key line of inquiry: jobs and income, labour force, inflation, local business, and government revenues. Most topics contain a description of the existing environment, an effects analysis, and a summary. All topics are then combined in the remaining sections: mitigation, residual effect summary, and the classification of residual impacts to determine significance of the Project impacts.

12.6.1.2 Jobs and Income

Jobs and income are derived from the Project expenditures whether on direct salary or on procurement. The Project will raise Gross Production and Gross Domestic Product (GDP) in the Northwest Territories (NWT). This section considers the jobs and income generated by the Project, including direct, indirect,

and induced effects. As explained in Section 12.4 direct economic effects are generated from those goods and services expenditures required to build, maintain, and operate a business (i.e., the Project). Indirect economic effects are those generated by the new expenditures made by the directly-impacted business sector as a result of their need to deliver their goods or services to the Project. Induced economic effects are those changes in household spending from production changes which affect gross production, GDP, employment, and labour income.

Table 12.6-1 Locations where the Terms of Reference for Long-term Social, Cultural, and Economic Effects are Addressed

Effects analysis requirement	Section of EIS where covered		
	Key Line of Inquiry	Subject of Note	Other Issues
Cumulative effects and pace of development			Cumulative Effects and Sustainability
Lack of capacity to monitor effects		Demands on Infrastructure	
Dependency on one resource			Cumulative Effects and Sustainability
Demands on services	Social Disparity within and between Communities	Demands on Infrastructure	
In-and out-migration from communities including out-migration of skilled labour	Long-term Social, Cultural and Economic Effects	Demands on Infrastructure; Employment, Training and Economic Development	
Change in diet	Family and Community Cohesion		
Increased disposable income and greater reliance on a wage Economy	Long-term Social, Cultural and Economic Effects Family and Community Cohesion Social Disparity within and between Communities		
Vulnerable sub-populations	Social Disparity within and between Communities		
Contractor and subcontractor goods and services required and direct and indirect economic effects	Long-term Social, Cultural and Economic Effects	Employment, Training and Economic Development	
Opportunities for business and ability to respond	Long-term Social, Cultural and Economic Effects	Employment, Training and Economic Development	
Opportunity for economic diversification	Long-term Social, Cultural and Economic Effects		

Table 12.6-1 Locations where the Terms of Reference for Long-term Social, Cultural, and Economic Effects are Addressed (continued)

Effects analysis requirement	Section of EIS where covered		
	Key Line of Inquiry	Subject of Note	Other Issues
Other economic opportunities affected by the development and opportunities lost		Tourism Potential and Wilderness Character Proposed National Park	
Government revenues	Long-term Social, Cultural and Economic Effects		
Employment numbers and multipliers	Long-term Social, Cultural and Economic Effects		
Changes in local income and disposable income levels	Family and Community Cohesion Social Disparity within and between Communities		
Inflation and cost of living	Long-term Social, Cultural and Economic Effects Social Disparity within and between Communities		
Effect on the traditional economy	Family and Community Cohesion		
Ideas for a cooperative approach to dealing with issues			Engagement
Follow-up program to monitor and verify findings			Monitoring
Joint monitoring of cumulative effects			Monitoring

12.6.1.2.1 Existing Environment

The sectors within an economy can be described as “drivers” or “stabilizers”. Economic drivers are those activities that create or drive growth opportunities for the entire region. These drivers stimulate demand for goods and services directly and indirectly. Industries or specific activities that are deemed to be economic drivers have a fundamental effect on the direction and magnitude of economic activity in the regional economy. An economic driver can affect the socio-economic conditions or landscape of a region. Conversely, economic stabilizers are industries and activities that tend to maintain the steady-state of economic activity, such as government and social services.

Employment in these “stabilizing” activities is not affected by changes in economic conditions to the same extent as employment in industrial jobs. For example, the overall employment within government did not change substantively during the 2008-2009 recession in the NWT.

The NWT economy has been driven this past decade by non-renewable resource development; such as mining, and oil and gas extraction. Recent changes in demographics, and growth in construction, manufacturing (diamonds), transportation, retail, and many public services, can be attributed to the expansion in diamond mining and mineral exploration. These economic drivers have contributed to an overall employment participation rate of about 75 percent (%) and have left the NWT with among the lowest unemployment rates in the country. The unemployment rate in the NWT has declined from 14% in 1999 to a low of 5% from 2005 to 2007. For the past decade, the NWT has led the country in GDP annual growth rates for most years (GNWT, 2009, internet site). By May 2010, the NWT unemployment rate had increased to 7.3%, which was still below the Canadian levels of 8.3% (GNWT Bureau of Statistics 2010, internet source).

12.6.1.2.2 Effects Analysis

Construction Phase

The total direct capital expenditure over the two-year construction phase is estimated at \$535 million. During the construction phase, the Project will generate a total of \$96.6 million in direct and indirect labour income in the NWT. The labour income that remains in the NWT, however, depends on the extent of local participation (NWT) during construction⁵. It is assumed that local participation will be equal to 26.5%; this percentage is based on the local participation record from the construction phase of the Snap Lake Diamond Mine and was applied to calculate changes to direct and indirect employment. The direct labour income for NWT residents for the construction phase will be \$18.9 million, and the indirect labour income for NWT residents will be \$6.7 million, for a total of \$25.6 million.

It is estimated that the construction workforce will grow from approximately 490 people in Year 1 to 600 in Year 2, for an average of 545 people annually. Within Canada, approximately 3,111 additional employment opportunities could be created during the construction phase of the mine. The distribution of these additional jobs throughout Canada includes 1,307 direct jobs and 1,804 indirect jobs. In the NWT, adding the expected induced changes, another 352 full-time equivalent (FTE) direct and indirect jobs and 35 induced jobs should be created as a result of the construction of the Project (Table 12.6-2).

⁵ In the economic assessment, local participation is defined as within the NWT (see Appendix 12.II).

Table 12.6-2 Changes from the Construction Phase on Northwest Territories Resident Employment

	Total (number of FTE jobs)
NWT Mine Construction Jobs	267
NWT Indirect Business Sector Jobs	85
Total NWT Direct and Indirect Employment	352
Induced NWT Employment	35

FTE = full-time equivalent

Operations Phase

During the operations phase of the Project, about \$438.9 million (\$39.9 million annually) in direct labour income and \$127.4 million (\$11.6 million annually) in indirect labour income will be generated in the NWT. Another \$910.9 million (\$82.8 million annually) will be spent on other goods and services required to operate the mine. A total of \$1.3 billion (\$122.7 million annually) will be spent during operations (Table 12.6-3).

Table 12.6-3 Project Operating Expenditures

	Total Expenditures	Annual Average Expenditures	Percent of Total Expenditures
	(\$,'000s)		(%)
Direct Labour Income	438,875	39,898	33
Other Direct Operations and Maintenance Costs	910,854	82,805	67
Total Direct Operating Expenditures	1,349,729	122,703	100
Less Imports	-195,440	-17,767	14
Equals Direct Expenditures in Canada	1,154,289	104,935	86

\$,'000 = thousands of dollars; % = percent

It should be noted that during this phase, all labour will be sourced in Canada. However, other direct expenditures will be subject to foreign imports of \$195.4 million (\$17.8 million per year). This will reduce other direct expenditures that will take place in Canada to \$1.2 billion, or \$104.9 million annually.

The labour income that remains in the NWT depends on the extent of local participation during operations. It is assumed that local participation will be equal to 37.6%; this percentage is based on the local participation record from the operations phase of the Snap Lake Diamond Mine and was applied to calculate changes to direct and indirect employment. The average annual direct labour income for NWT residents during the operation phase is \$15 million. The average annual labour income for NWT residents from the affected business sector will equal a little less than \$4.4 million.

The operations phase will make the largest contribution to employment during the Project lifespan. Table 12.6-4 presents changes to mine employment. In Canada, an estimated annual average of 365 person-years of direct employment will be generated. The economic spin-off from the operations expenditures should generate an initial 259 person-years of employment, with additional indirect employment adding another 180 person-years of employment. During the operations phase, the proposed Project will lead to a total annual average of 804 person-years of employment in Canada.

Table 12.6-4 Changes from the Operations Phase on Employment

	Total Employment		Average Annual Employment	
	NWT	Canada	NWT	Canada
	(number of FTE jobs)			
Employment - Mine Production	4,016	4,016	365	365
FTE Jobs - Initial Business Demand	1,754	2,847	159	259
Indirect FTE Jobs -Business Demand	318	1,978	29	180
Total FTE Jobs - Business Demand	2,073	4,825	188	439
Ratio of Total to Direct FTE Jobs - Business Demand	1.18	1.69		
Total Employment	6,089	8,841	554	804
Percentage Employment occurring in the NWT	69%			

FTE = full-time equivalent; NWT = Northwest Territories; % = percent

On average, in the NWT, the operations phase are estimated to employ the full-time equivalent of 365 people annually. The NWT business community will employ 159 people on a FTE basis, while the additional indirect business activity will create another 29 FTE positions. In total, the proposed Project would provide an average of 554 person-years of employment annually in the NWT.

The NWT would receive 69% of the total Canadian employment created by the operations phase of the Project. The operations phase would provide an estimated 137 direct jobs for NWT residents on an annual basis for the duration of the period. The NWT business sector involvement will provide 71 full-time equivalent jobs annually throughout the operations phase (Table 12.6-5). In total during the operations phase, the proposed Project will provide approximately 208 person-years of employment for NWT residents.

Table 12.6-5 Changes from the Operations Phase on Northwest Territories Resident Employment

Predicted NWT Employment during Operations	Total Employment	Annual Average Employment
	(number of FTE Jobs)	
Mine Operations Jobs	1,510	137
Business Sector Jobs	779	71
Total NWT Employment	2,289	208
Induced NWT Employment	289	26

FTE = full-time equivalent; NWT = Northwest Territories

Closure Phase

Over the life of the operating mine, \$17.5 million will be spent on reclamation activities. These expenditures are included in the operations phase estimates. By the start of 2026, most closure activities such as demolition work will have been completed. From 2026 to 2034 (Years 12 to 20), De Beers will spend \$7.5 million as a part of its mine closure phase. The total expenditure includes the cost of opening the winter road in 2026 in order to bring in enough fuel for the entire phase and back haul the last of the on-site materials.

It is assumed that the camp will be open for approximately 16 weeks each year for the eight-year lake refilling and water monitoring activities. The camp will be dismantled in 2034. Staffing will likely consist of nine people who will combine for approximately 68 weeks of work. Wages for this staff will equal \$188,000 annually. It is expected that this labour requirement will be filled by NWT residents. The winter road construction and transportation needs will be filled by NWT-based businesses. The fuel and most goods needed during the closure phase will be imported from the provinces.

The effects from the \$7.5 million expenditure on GDP when spread over the eight-year closure phase will be small. Additional business demand and induced consumer activities generated during the closure phase are negligible.

12.6.1.2.3 Summary

The following general observations can be made regarding the potential change in economic activity that may be attributed to operations at the Project:

- the increase in job creation from the Project is moderate;
- an estimated 554 FTE jobs will be created annually (direct and indirect combined); and

- the number of positions filled by NWT residents will depend on market conditions, which are expected to change over the life of the mine.

The income generated during operations will result in an estimated induced employment effect of another 26 jobs annually.

12.6.1.3 Labour Force

The Terms of Reference request an analysis of employment numbers, and the development's effect from employment in potentially affected communities. As already discussed above, the Project will have a moderate effect on employment. This section of the evaluation will look at who is available for employment and their mobility, including possible effects on regional and local populations.

12.6.1.3.1 Existing Environment

Labour force is the number of people employed or unemployed who are available to work. There are also other individuals who are not in the labour force and do not count in the overall labour supply (e.g., students, stay at home parents, elderly) and are unwilling or unable to take a job if offered. The labour supply draws from the source population, which is considered to be those people who are 15 years of age or older and who are not incarcerated, unfit for work for certain health reasons or are in military service. Understanding the characteristics of the labour force requires understanding regional demographics, education and skills alignment, and employment and participation rates.

Population and Demographic Projections

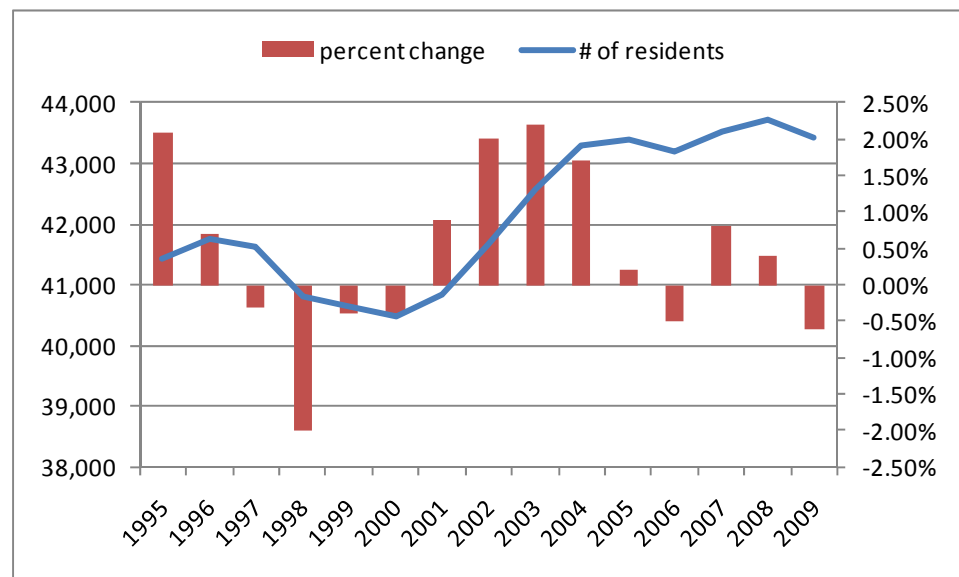
Population changes result from the birth rate, mortality rate, and migration. The natural increase in population (which is the number of births less the number of deaths) will continue to add to the overall NWT population, but at a decreasing rate. This is because the fertility rate is declining and the number of deaths each year is climbing due to the ageing population. This trend will bring about a slower natural increase to the population (Conference Board of Canada 2010).

The history of inter-provincial migration in the NWT shows that the territory is a net contributor to the growth in populations in the rest of Canada; that is, more people leave the region than enter under normal circumstances. There have been three years in the past 15 in which the NWT has gained through net migration, with only two of those years occurring since operations began at the Ekati Diamond Mine in 1998.

The NWT is not a primary destination for new immigrants coming to Canada. Apart from 2003, when the NWT received 159 immigrants,⁶ the average annual immigration over the past ten years has been closer to 60 (see Annex K, Socio-economic Baseline). The Conference Board of Canada in its 2010 Economic Outlook report also noted that the NWT has a persistently negative net migration; on average, an estimated fewer than 200 people will relocate to the territory than will leave in 2010 (Conference Board of Canada 2010). There is no evidence to suggest that there will be a change in the migration patterns for the NWT; people leaving will continue to out-number those choosing to move there (Figure 12.6-1).

Figure 12.6-1 contains the annual population changes since 1995. The population change in the NWT for the past 15 years show three distinct periods. In the years leading up to 2000, the population was on the decline, decreasing to a low of 40,480 that year. This decline was followed by a period of growth until 2004 when the population reached 43,301. Since that time, the overall population has changed little although there has been some variation.

Figure 12.6-1 Population Growth within the Northwest Territories, 1995 to 2009



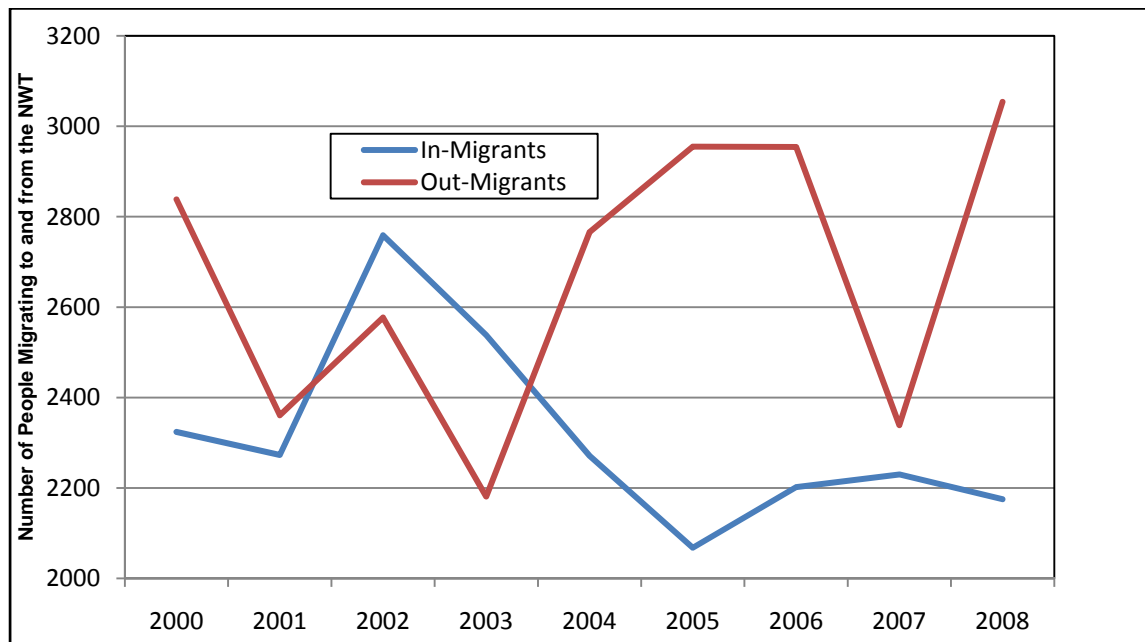
Source: GNWT Bureau of Statistics 2009.

Over the past ten years in the NWT, out-migration has exceeded or been the same as in-migration, as people take advantage of opportunities in other job markets (Figure 12.6-2). The NWT has not experienced in-migration to the

⁶ This was a special case when rules associated with the *Immigration Act* were changed. These changes to the *Immigration Act* occurred at the same time Yellowknife was receiving a large number of immigrants associated with the diamond polishing industry (see Impact Economics 2007 for this discussion).

extent anticipated since the establishment of the Ekati Diamond Mine. Since then, the NWT population has increased only 0.5% and most in-migrants settled in Yellowknife, which has seen a 2% rise in its population. The population increased in Yellowknife during a brief period when the Diavik Diamond Mine was being established, but since 2004, the population has dropped back to near 1999 levels (Annex K).

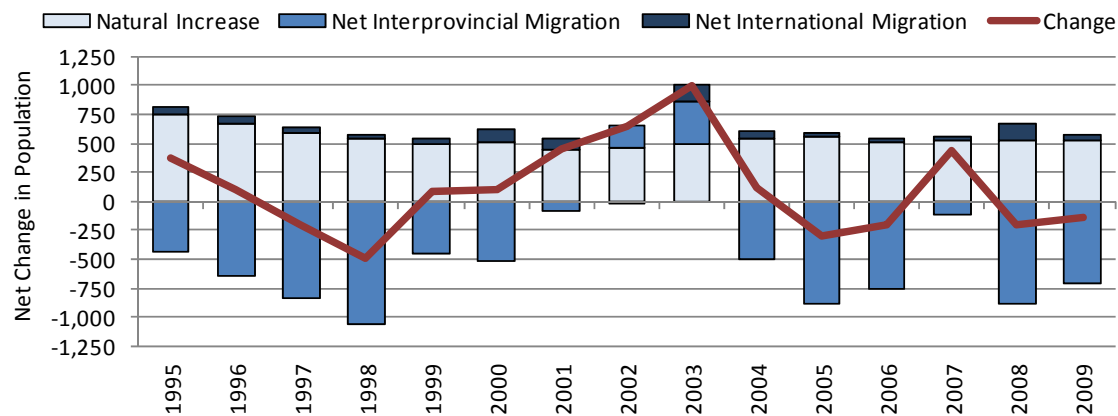
Figure 12.6-2 Migration Trends In and Out of the Northwest Territories, 2000 to 2008



Source: GNWT Bureau of Statistics 2009a.

Figure 12.6-3 is a combined representation of natural population changes (birth and death) and the influence of migration, and sources of migration.

Figure 12.6-3 Sources of Demographic Change in the Northwest Territories, 1999 to 2009



Source: Statistics Canada, Demography Division CANSIM Table 051-0001, Catalogues 84F0210XWE and 84F0211XWE.

A recent mine employee survey (2009) found that 6.8% of non-NWT resident employees of the diamond mines would consider relocating to the territory. However, leaving family and friends, job security, and the high cost of living were cited as major deterrents (GNWT Bureau of Statistics 2009). The cost of living is the main reason why persons who considered an NWT community in the past year from relocating (42.9% of respondents). These determinants outweighed the attraction of being closer to the location of work (GNWT Bureau of Statistics 2009).

The same survey found a variety of reasons why NWT residents (from the NWT) working at the diamond mines might want to leave the NWT. Leaving family and friends was the most often cited reason for considering a move elsewhere in the country. Other reasons included the cost of living, spouse's employment opportunities, and children's education. Nearly half of the surveyed NWT residents indicated that they would likely or very likely consider moving from the NWT if the opportunity arose. Most likely to move are NWT residents who were not originally from the NWT, especially those with university degrees and those living in medium-sized communities.

Education and Skills Alignment

Education and skills alignment influence employment and participation rates (Davison 2004, internet source; Statistics Canada 2005, internet source; Wilson and MacDonald 2010, internet source). Where job requirements and education and skills do not align, unemployment rises or remains high. Where Aboriginal people attain the education levels of the rest of Canada, employment and income gaps narrow, and for Aboriginal women with university education it almost disappears (Wilson and MacDonald 2010, internet source). This misalignment of

education and skills in relationship to the employment available is one aspect of structural unemployment. Frequently, structural unemployment happens when an economy has undergone a fundamental change in the composition of its total production; that is, a structural change (i.e., new and different types of jobs) (Appendix 12.II).

Mining is known to require a highly trained and skilled workforce. A human resource needs assessment conducted across the NWT mining industry in 2008 identified the need for as many as 5,000 new semi-skilled, skilled, and professional workers over the next five years (MTS 2009). This number reflects turnover and retirements as well as growth, and is almost double to previous forecast of 2,700 (Mining Training Society 2008; 2009). Unskilled positions are occupied by people without secondary school completion. Semi-skilled positions generally require a minimum of secondary school completion (Davison 2007, internet source).

In the NWT, individuals with more than high school education consistently are employed at a greater rate than those without, even in the Local Study Area communities (Table 12.6-6).

Table 12.6-6 Employment Rates in the Northwest Territories and Local Study Area Communities based on High School Completion

Community	Employment Rates (2009) ^(a)	
	Less than High School Diploma (%)	High School Diploma or Greater (%)
NWT	35.4	81.2
Behchokò	23.2	64.6
Detah	37.1	72.9
Fort Resolution	17.4	59.5
Gamètì	33.6	80.0
Lutselk'e	37.5	61.9
N'Dilo	--	--
Wekweètì	53.2	64.7
Whatì	34.1	58.7
Yellowknife	48.1	85.7

Source: GNWT Community Profiles 2009; Internet site.

^(a) 2009 Employment Rates: NWT Bureau of Statistics, GNWT. Refers to the employment rate for two groups of people: those who do not have a high school certificate, and those with at least a high school certificate. Employment rate refers to the percentage of persons 15 years of age and over who are working at a job.

% = percent

To understand the characteristics of the unemployed and labour supply, the Government of the Northwest Territories (GNWT) Bureau of Statistics conducts community surveys (Table 12.6-7). A comparison of the 2004 and 2009 surveys

found an increased labour supply, likely a result of the recent economic downturn, but a diminishing interest in doing rotational work. Only Łutselk'e community members show an increased interest in rotational work. Typically, the individuals most available for work were Aboriginal males who had less than secondary school education. Overall, interest in doing rotational work diminished where secondary school education had been achieved, suggesting that when people have options, rotational work is not preferred.

Employment and Participation Rates

The NWT employment rates rose steadily over the past two decades with a marked rise between 1999 and 2007 as the diamond industry grew (Figure 12.6-4). The recession, which began in 2008 and continued through 2009, caused a drop in employment to rates not seen since 1994.

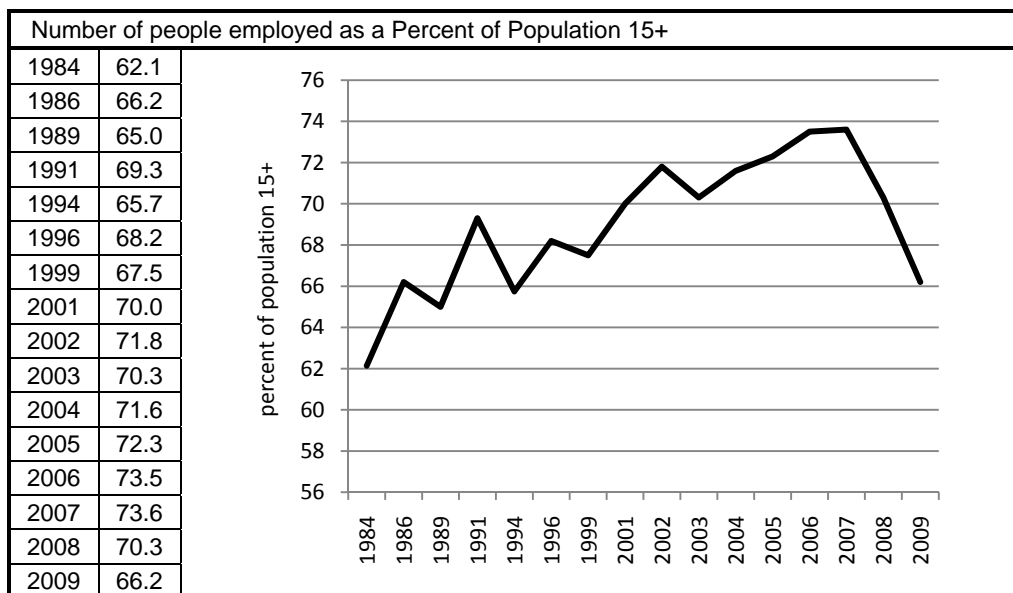
Table 12.6-7 Labour Supply in the Northwest Territories and Potentially Affected Communities, 2004 and 2009

Community		Available Labour Supply	% Willing to do Rotation	% Male	% Aboriginal	% Less Than High School
NWT	2004	2,454	70.3	64.4	77.3	52.3
	2009	4847	57.1	59.1	77.2	55.9
Behchokò	2004	193	90.7	67.9	96.9	54.9
	2009	507	77.3	52.3	99.2	75.5
Detah	2004	29	93.1	65.5	100.0	62.1
	2009	46	41.3	63	100	80.4
Fort Resolution	2004	42	73.8	73.8	100.0	50.0
	2009	89	53.9	69.7	91	47.2
Gamèti	2004	51	70.6	68.6	100.0	66.7
	2009	53	64.2	50.9	100	83
Łutselk'e	2004	28	60.7	82.1	100.0	85.7
	2009	87	64.4	57.5	100	70.1
N'Dilo	2004	33	72.7	63.6	97.0	66.7
	2009	n/a	n/a	n/a	n/a	n/a
Wekweèti	2004	20	55.0	50.0	100.0	60.0
	2009	20	55	65	100	60
Whati	2004	65	90.8	72.3	100.0	76.9
	2009	85	58.8	64.7	100	60
Yellowknife	2004	609	59.4	64.7	31.5	29.7
	2009	1209	46.4	59.5	34	36.1

Source: GNWT Bureau of Statistics 2010b.

% = percent; n/a = not available.

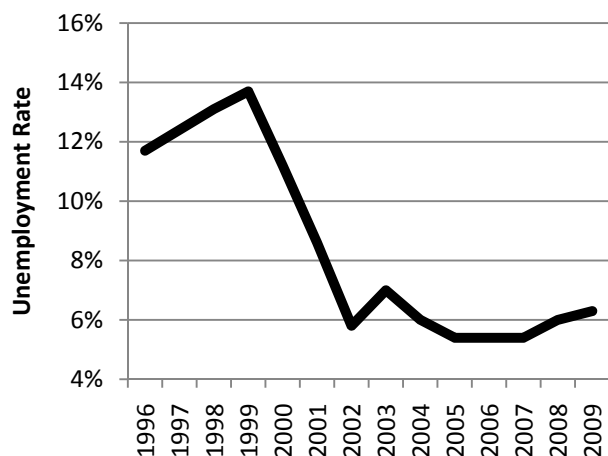
Figure 12.6-4 Employment Rate, 1984 to 2009



Source: NWT Bureau of Statistics, Stats Update 2009, Statistics Canada Census and Monthly Labour Force Survey

More specifically, the unemployment rate in the NWT declined rapidly to 6% in 2002 and more slowly from 7%, with three consecutive years (i.e., 2005 to 2007) at approximately 5.4% (Figure 12.6-5). In June 2010, the NWT unemployment rate had increased again to 7.4%.

Figure 12.6-5 Unemployment Rate in the Northwest Territories, 2000 to 2009

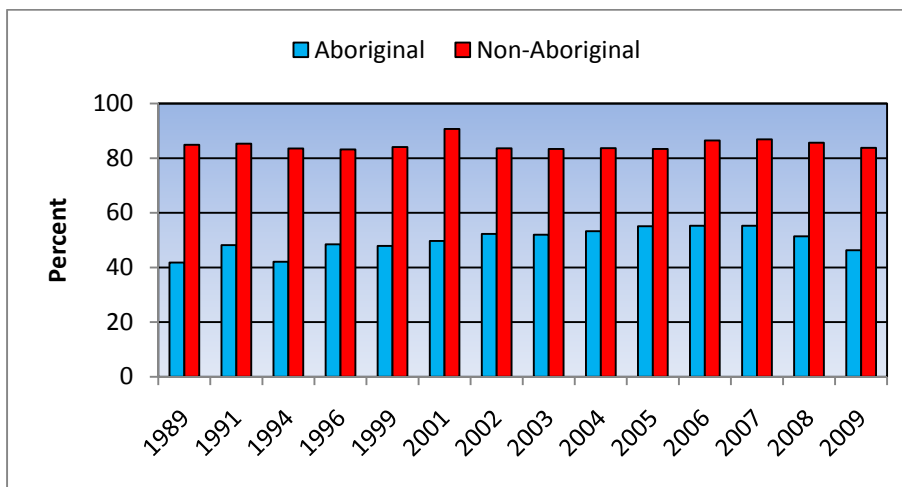


Source: Statistics Canada Monthly Labour Force Survey, NWT Bureau of Statistics Labour Force.

Employment rates for Aboriginal people in the NWT increased from 42% in 1989 to 46% in 2009 (down from the peak 55% in 2006) (Figure 12.6-6). Employment rates for non-Aboriginal people continue to be higher and more stable in comparison, at about 85% during the years from 1989 to 2009, and currently at 84% in 2009 (GNWT Bureau of Statistics 1999 and GNWT Bureau of Statistics 2010b). Nonetheless, more Aboriginal people have been seeking wage employment and are now more likely to be skilled compared to previous years (Section 12.3). This is particularly true for Aboriginal women who are achieving higher levels of education and are seeking and finding work in community government, social services, health services, and educational organizations (GNWT Department of Education, Culture and Employment 2002).

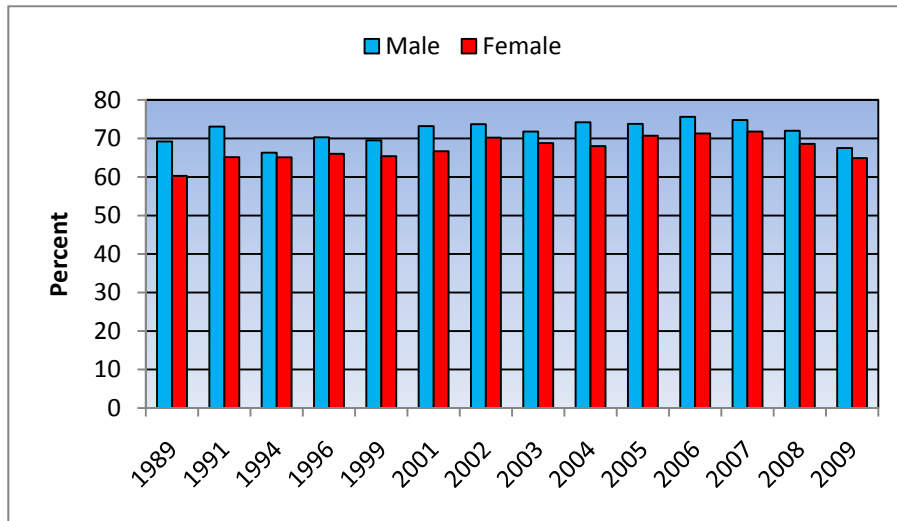
The employment rate of male and female workers has been roughly consistent in recent years (Figure 12.6-7). Overall, the employment rate discrepancy between males and females has declined, from about a 9% difference in 1989 to under 3% in 2009. In 2009, the employment rate was 68% and 65%, for males and females, respectively.

Figure 12.6-6 Employment Rate by Ethnic Group, Northwest Territories, 1989 to 2009



Source: GNWT Bureau of Statistics 2010i.

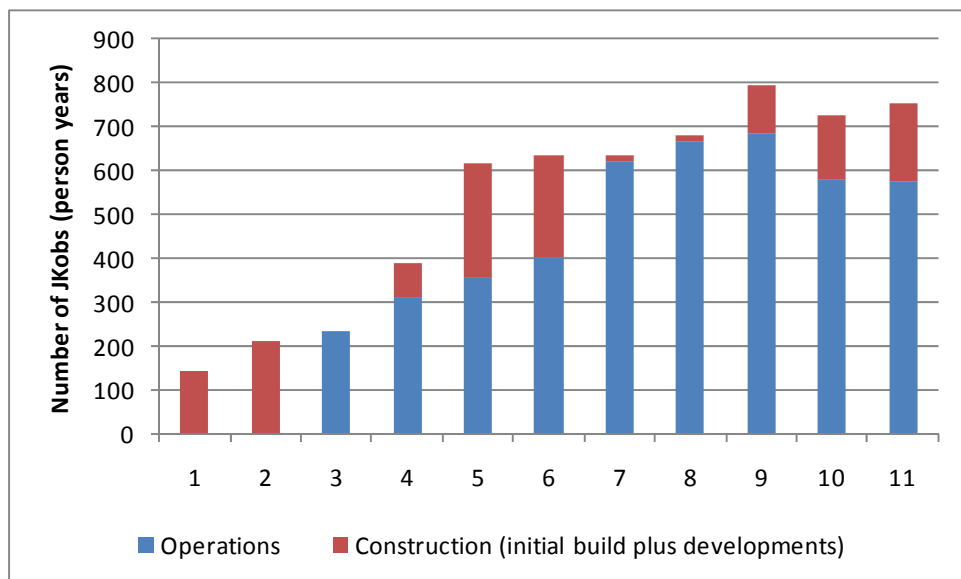
Figure 12.6-7 Employment Rate by Gender, Northwest Territories, 1989 to 2009



Source: GNWT Bureau of Statistics 2010i.

The diamond mines have had a substantial influence on Aboriginal employment. At its peak, the NWT diamond industry brought almost 800 person-years of employment to Aboriginal people (Figure 12.6-8). The level of employment is especially impressive considering a portion of these people live in remote or isolated communities and would otherwise have limited opportunities for employment (Impact Economics 2008).

Figure 12.6-8 Aboriginal Employment at the Northwest Territories Diamond Mines, 1997 to 2007



Source: Impact Economics 2008.

Despite the improvements in the unemployment rate, there are still individuals who are not in the labour force. Table 12.6-8 captures data that provides a snapshot of those not in the work force but wanting a job and shows various barriers to employment such as disability and lack of childcare options.

Table 12.6-8 Reasons Given for Not Looking For Employment, 2004

Reason for not Looking	Population 15 Years of Age and Older
not in the labour force but want a Job	2,718
illness or disability	65
going to school	183
believes no jobs are available	309
caring for child	69
other pers. or family resp.	32
starting new job	49
waiting for recall	96
other	32

Source: GNWT Bureau of Statistics 2004c.

12.6.1.3.2 Effects Analysis

In-migration and out-migration are among the potential effects identified in the Terms of Reference as a topic of interest, including out-migration of individuals with work experience and valued job skills. Given the experience with the other mines over the past decade, in-migration is not anticipated to occur in substantial numbers (Appendix 12.II, Conference Board of Canada 2010). The diamond employee survey (GNWT Bureau of Statistics 2009) corroborates that, while there is an interest in moving closer to the source of employment, the desire to be near family and the high cost-of-living are strong deterrents. Other studies that examined labour migration (Ensign et al. 2010; Gardner 1994) found that the characteristics of movement to more remote regions of the country for employment was highly cyclical and there was a great deal of mobility. Only a select number of individuals chose to relocate either temporarily or permanently. Proximity to family and culture remained strong ties and reasons for not relocating.

While there is an interest among diamond miners to relocate to the NWT, the up-take has been limited and is expected to stay limited. Combined with the fact that this Project's time horizon is relatively short compared to the other mines in the territory, it is not expected to have a lasting effect on the population of the NWT (Table 12.6-9). While demographic modeling done for this EIS does not demonstrate a likelihood of in-migration, there could still be some level of population influx. The creation of jobs and increased business demand may

create an incentive for people to move to the NWT to participate in economic activities. Furthermore, the timeline of this Project is beneficial to the NWT population forecast in that it will prevent an earlier exodus of people who lose their jobs at one of the current diamond mines that are expected to ease production in the latter half of this decade, the same time operations at the Project are expected to be ramping up.

An additional point is that the Project will be an open-pit operation. While the Snap Lake Mine is a completely underground mine, Ekati and Diavik, will be largely underground operations by that point in time. The Project will require a different mix of skilled, semi-skilled, and unskilled workers than the other operations. This could also help delay the rate of out-migration, especially between 2020 and 2025. After 2025, in the absence of any new economic developments, the territory is showing a decline in its population.⁷

Table 12.6-9 Population Projections with and without the Project, 2000 to 2030

Year	Population	Population 15 Years of Age and Older	Population	Population 15 Years of Age and Older
	Without the Project		With the Project	
2000	40,480	29,575	40,480	29,575
2005	43,399	33,041	43,399	33,041
2010	43,759	34,228	43,759	34,228
2015	44,568	34,652	44,644	34,710
2020	44,907	34,980	45,060	35,098
2025	44,676	35,178	44,941	35,385
2030	42,984	34,443	42,827	34,324

Note: Data from 2000 to 2010 are historical.
Data source: GNWT Bureau of Statistics 2010.

Key considerations for the population projection with respect to the Project are as follows:

- natural increase will remain a net contributor to the NWT population; however, the increase will be at a decreasing rate given a declining fertility rate set against a rising number of deaths from an ageing population;
- net inter-provincial migration will, on average, remain negative throughout the forecast period with more people leaving than coming to the territory; and
- in-migration will continue to add an average of 60 people annually to the overall NWT population over the life of the Project.

⁷ The population projections do not represent a complete forecast of the territory's population in that it does not account for any future changes to other industries in the NWT or economic activities elsewhere in Canada. These projections show the changes in population under a specific scenario; that is, one where the only major developments are closures at the Ekati, Diavik and Snap Lake diamond mines between 2021 and 2026, and the openings of the Prairie Creek lead/zinc mine and the NICO gold/cobalt/bismuth mine.

The Project is expected to have a positive influence on employment; and therefore, will reduce the rate of unemployment. A comparison of the NWT with and without the Project shows that the Project lowers the unemployment rate by 1.2% in 2015 as a result of 326 more jobs across the entire NWT economy. In 2020, there are 471 additional jobs in the NWT economy, which lowers the unemployment rate from 9.9% to 8.3%. By 2030, the full effect of the closure of all the mines will be evident. The unemployment rate is projected to be at 13.6% (Table 12.6-10).

Table 12.6-10 Northwest Territories Labour Force Projection, 2005 to 2030

Year	Labour Force	Employment	Unemployment Rate	Labour Force	Employment	Unemployment Rate
	With Ekati, Diavik and Snap Lake			With the Project		
2005	23,895	22,700	5.0%	23,895	22,700	5.0%
2010	22,878	21,200	7.3%	22,878	21,200	7.3%
2015	24,178	22,042	8.8%	24,222	22,370	7.6%
2020	24,587	22,161	9.9%	24,677	22,627	8.3%
2025	24,901	22,007	11.6%	25,059	22,415	10.6%
2030	24,497	21,180	13.5%	24,406	21,095	13.6%

Data source: NWT Bureau of Statistics, Statistics Canada *Labour Force Survey*, Impact Economics

Note: Data from 2005 is historical; % = percent.

12.6.1.3.3 Summary

Young Aboriginal males express the greatest interest in rotation work, but they are also likely to not have completed high school. It was also noted that interest in rotational work is diminishing. Lack of high school education was a clear determinant in successful employment and will continue to contribute to the amount of structural unemployment in the NWT. Education and skills are fundamental to getting mine-related employment, whether directly with the Project or with a contractor.

Other factors affecting the labour force availability include competition for jobs. Currently, competition for positions is low and in-migration is not a major contributor to the local population or to competition for jobs.

The Project will have a positive employment influence through the next two decades and will retain labour force rates in the NWT.

12.6.1.4 Inflation

The Terms of Reference summarized concerns regarding the effect of economic development on inflation in the NWT. Effects from inflation are difficult to predict. To evaluate the effect from inflation, the Consumer Price Index (CPI), Implicit Price Index (IPI), and Final Domestic Demand IPI were considered. The following is fully discussed in Section 12.3 and Appendix 12.II.

12.6.1.4.1 Existing Environment

There are several measures of inflation. The most commonly cited is CPI, which represents the changing prices of a basket of goods and services. In the NWT, as CPI is calculated for Yellowknife only, price changes that occur elsewhere will not be captured. It is nevertheless a good proxy for consumer price movements throughout the territory. The CPI does omit the prices for government and industry that could follow a different growth path.

A second measure of inflation is the IPI for the NWT GDP. It is calculated by finding the difference between GDP and real GDP. Unlike the CPI, the GDP IPI captures price movements of every sector of the economy. This makes the evaluation for inflation more complete, but it also introduces price movements of exports that may not have any effect on NWT residents. For example, a substantial change in the price of diamonds would be captured in this index, which would reflect a false price effect for the territory.

To address this issue of price movement in exports, a third method was used. The IPI for the NWT final domestic demand (FDD) is calculated in the same way as that for GDP. Final domestic demand includes the activities of consumers, government and industry, and excludes exports. In this way, it is sheltered from price changes on the region's major exports that are currently limited to diamonds, oil, and gas. A drawback is that it still includes the price changes affecting government and industry, which may not apply to consumers.

Figure 12.6-9 contains data on the three measures of inflation for the NWT compared to Canada. In the case of CPI, for the seven-year period from 1999 to 2006, consumer inflation in the NWT was below that of Canada, but falling into line with the national average in the past three years. The wide swings shown in the GDP IPI makes it difficult to interpret. The FDD IPI was comparable to the national average until 2005, after which it has been growing at a slightly higher rate than that for Canada.

A closer look at the CPI and annual inflation show that the increase was temporary. From 2007 to 2009, Yellowknife experienced a higher inflation rate than Canada, and particularly in 2008 when the inflation rate was 4.0% for Yellowknife compared to 2.3% for Canada. However, by 2009, the inflation rate for both Yellowknife and Canada were similar (Table 12.6-11).

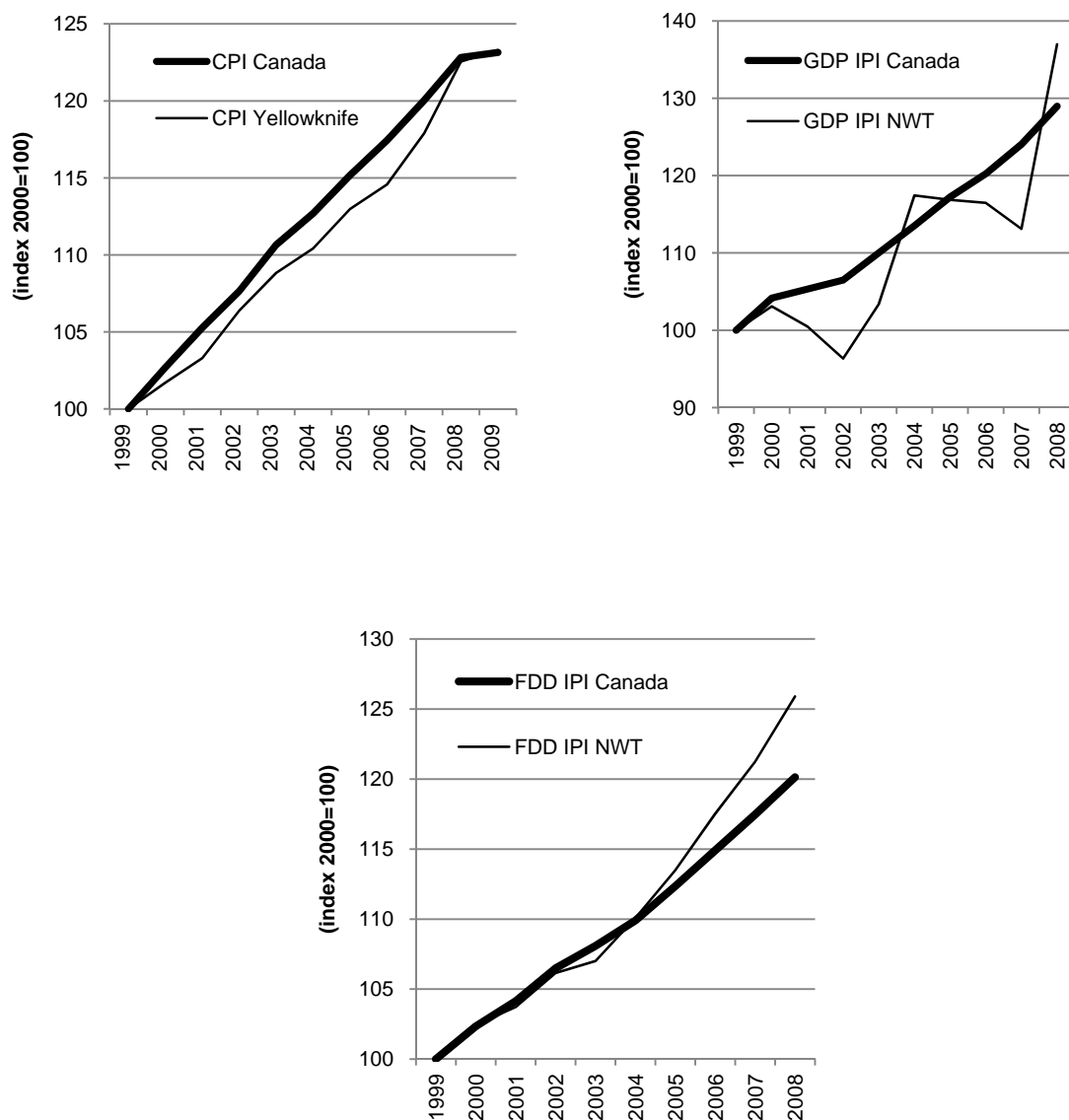
A closer look at which goods and services contribute to the greatest price rises draws attention to the costs of shelter and alcohol and tobacco (Table 12.6-12). Rises in alcohol and tobacco are likely the result of tax increases in the NWT.

12.6.1.4.2 Effects Analysis

The Project will procure items in the NWT and other parts of Canada. Many of the items will be manufactured outside the NWT because the NWT is not a manufacturing base. If there are inflationary pressures related to capital expenditures, it will happen outside the NWT (Appendix 12.II).

Demand for goods and services will not be driven by any population changes as a result of the Project. As shown in Table 12.6-9, the population growth as a result of the Project is projected to be minor and consistent with natural rate of increase.

Figure 12.6-9 Measures of Inflation, Northwest Territories and Canada, 2000 to 2008



Source: Statistics Canada, Consumer Price Index, Catalogue 62-001-XWE and 62-010-XWE;
National Economic Accounts, CANSIM Table 384-0036

Note: All-Items Consumer Price Index, Gross Domestic Product Implicit Price Index, Final Domestic Demand Implicit Price Index

Table 12.6-11 Consumer Price Index and Inflation Rate, Canada and Yellowknife, 1998 to 2009

Calendar Year	Canada		Yellowknife	
	CPI (2002=100)	Inflation Rate (%)	CPI (2002=100)	Inflation Rate (%)
2009	114.4	0.3	115.9	0.6
2008	114.1	2.3	115.2	4.0
2007	111.5	2.2	110.8	2.9
2006	109.1	2.0	107.7	1.4
2005	107.0	2.2	106.2	2.3
2004	104.7	1.8	103.8	1.5
2003	102.8	2.8	102.3	2.3
2002	100.0	2.2	100.0	3.0
2001	97.8	2.5	97.1	1.6
2000	95.4	2.7	95.6	1.7
1999	92.9	1.8	94.0	1.1
1998	91.3	1.0	93.0	-0.1

Source: GNWT Bureau of Statistics 2009a.

CPI = Consumer Price Index; % = percent.

Table 12.6-12 Consumer Price Index for Yellowknife (Monthly Average, 1998 to 2009)

Year	All items	Food	Shelter	House ^(a)	Clothing and Footwear	Transport	Health and Personal Care	Recreation, Education and Reading	Alcohol and Tobacco
2009	115.9	116.9	132.8	106.4	93.9	105.3	110.9	99.4	142.8
2008	115.2	110.7	133.5	103.7	95.5	110.5	106.8	100.2	131.7
2007	110.8	108.3	122	103.4	94.8	107.7	104.1	100.8	129.1
2006	107.7	106.6	115.2	101.1	94.9	105.2	103.7	100.0	127.3
2005	106.2	104.8	112.0	100.6	98.5	103.9	103.8	100.3	124.1
2004	103.8	99.5	108.1	100.1	97.6	102.1	104.5	100.8	121.6
2003	102.3	100.2	103.9	100.1	98.3	102.0	102.6	100.5	116.1
2002 (base year)	100								
2001	97.1	98.3	97.0	98.5	97.7	97.1	99.3	98.8	87.3
2000	95.6	94.6	96.5	96.8	96.3	94.4	98.4	99.5	84.5
1999	94.0	93.5	93.4	96.3	96.5	93.4	96.1	98.5	81.2
1998	93.0	93.4	93.3	94.0	94.8	90.7	95.6	98.4	80.6

Source: GNWT Bureau of Statistics 2009a.

(a) includes household items, operations and furnishings.

Summary

A period of rapid economic expansion can have an influence on inflation. There was an expectation that the demands for labour and capital by the diamond industry would lead to higher costs. This would be particularly difficult for anyone who was not benefiting from the economic growth.

The previous mining operations did not contribute to inflation or other price changes in the NWT in the past decade. Rather, the rate of inflation lagged behind changes in the rest of Canada as evidenced by the CPI. In reality, existing businesses have expanded, new ones have been created, and viable Aboriginal development businesses have emerged furthering the size and extent of economic benefits flowing from the diamond industry. Through all this, inflation has also remained below the Canadian average. This is not unexpected because the economy of the NWT is small and “open” in that there is relatively little domestic production and the demand for most goods and services is filled by imports (i.e., goods are shipped into the NWT, not made in the NWT) (Appendix 12.II).

Notwithstanding the fact that the diamond projects have not resulted in inflation, inflation was raised as an issue by the communities. It is acknowledged that the cost of living is high in NWT communities. The cost increases that communities are experiencing are likely the result of the cost of goods being shipped into the NWT. There have been inflationary pressures in other parts of Canada, which have had an influence on the prices in the NWT.

12.6.1.5 Local Business

The effect of the Project on the NWT business sector is linked to whether these existing businesses have the capacity to service another mine, or respond to increases in expenditures made by people employed in the mine. The Terms of Reference also required an evaluation of employees leaving one job for a new position at the mine.

12.6.1.5.1 Existing Environment

Businesses in the NWT are able to respond to the addition of another mine. Among the businesses who were interviewed for this report, there was a general consensus that the addition of another mine, with all the associated construction and operations activities, will have little effect on their operations. Rather, after the recession it may sustain businesses for the next decade. The views expressed are summarized below:

- The NWT had undergone dramatic economic growth for the past decade, driven in large part by mining exploration and extraction activities. The demand for many local services had also increased over the same period. The key issue and constraint for local businesses in the past decade has been and continues to be the attraction and retention of quality labour.

- Over the past decade, the necessary investments needed to accommodate the demand for products and services have already been made. This means that local businesses have already adjusted their operations and feel that they have capacity and can respond to any increases in demand, at least from an infrastructure perspective.
- Based on their experience with the construction and recent opening of the Snap Lake Mine, most businesses feel that they do not expect any substantial shift in local business activity if and when a new mine starts construction and operation.

Competitive Labour Market

Despite two years of economic downturn, demand for qualified labour at all levels is an issue, but getting labour has become easier. Efforts taken by local businesses to hire and retain staff include the following:

- Focusing their recruitment efforts on people who do not fit the “mold” of typical mining employees. Specifically, businesses adapted their staff mix to include those that require flexible work schedules, such as mothers or part-time workers, and those that do not prefer to work in remote camps on the two-week rotation schedule.
- Generous use of training programs that are extensive and career expanding. For example, one business sends its information technology staff to Ontario for training at their office headquarters for two-week periods. This provides added benefits of travel and interaction with others in the information technology field. Another employer sends his mechanics to Edmonton, or other cities, to learn new skills through technical training.
- Most business respondents attempt to enhance working conditions and benefits that create a stronger collaborative team atmosphere and are respectful of family considerations. For example, one retail employer does not operate on Sundays or on holidays, so as to ensure that his employees are afforded family time.

Business Development

The GNWT has been actively supporting economic diversity and development through business development and services (GNWT Strategic Planning Branch 2006a). With the implementation of the *Business Development and Investment Corporation Act* (April 1, 2005), the GNWT merged the NWT Development Corporation, the NWT Business Credit Corporation, the NWT Development Corporation, and the Canada/NWT Business Service Centre into the NWT Business Development Investment Corporation (BDIC). The BDIC assumed the responsibility of administering and delivering business development programs in the GNWT (GNWT Strategic Planning Branch 2006a). The BDIC lends money to

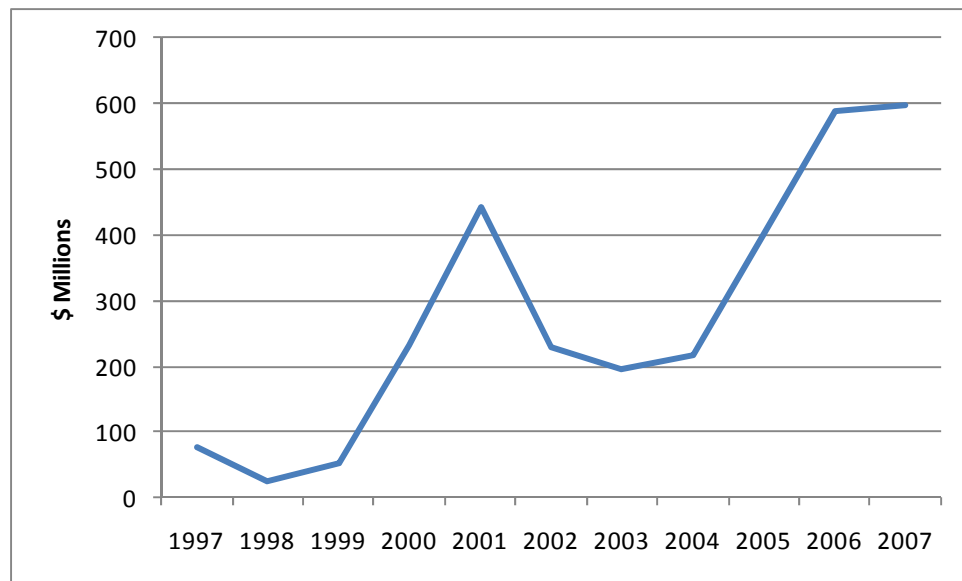
northern businesses where conventional lending institutions are not prepared to participate; it also lends to businesses in communities where a commercial bank is not operating (NWT Business Development and Investment Corporation 2006).

To support northern businesses, the GNWT also lowered the Corporate Income Tax rate for large corporations from 14% to 11.5% on July 1, 2006. The GNWT consulted stakeholders on lowering the small business tax as well, from 4% to 2%; however, based on feedback it decided to maintain the taxation rate (GNWT Strategic Planning Branch 2006a).

The GNWT with Indian and Northern Affairs Canada (INAC) manage the Strategic Investment in the Northern Economic Development Program. The program provides money for business development projects such as tourism training, infrastructure enhancement, arts branding, marketing, business training, and business research activities. The fund has \$30 million available for five years (GNWT Strategic Planning Branch 2006a).

Aboriginal businesses have been supplying goods and services since diamond mining began in the NWT. For example, Tlicho Logistics Inc. is 100% owned by the Tłıchǫ and primarily focused on the supply of services to the mining sector, with over 350 employees in 2008 (Werniuk 2008; Tlicho Investment Corporation 2010, internet site). The Det'on Cho Corporation, the economic arm of the Yellowknives Dene First Nation, currently has 20 business subsidiaries that provide goods and services to their local communities and the mining industry (Det'on Cho Corporation 2010, internet site). As a result of the diamond mines, Aboriginal business revenues have gone from \$25 to \$589 million (Figure 12.6-10).

Figure 12.6-10 Aboriginal Business Revenues from Northwest Territories Diamond Mines, Nominal, 1997 to 2007



Source: Impact Economics 2008.

12.6.1.5.2 Effects Analysis

The Project will source goods and supplies from some NWT businesses (Appendix 12.II). In order to prepare businesses, De Beers will offer information sessions on the opportunities for contracting with the Project. De Beers will be providing preference to northern businesses for certain procurement opportunities, such as trucking or camp catering.

12.6.1.5.3 Summary

In the past decade, NWT businesses have established operations that can accommodate new business opportunities. Many NWT businesses do not anticipate having unexpected issues with gaining and retaining employees, beyond their usual challenges. They draw on a different part of the labour force compared to the mining industry and require a different set of skills.

The recent economic downturn provided a break and allowed for consolidation of services in some instances. With the addition of the Project, demand for labour and business will increase but be lower compared to what was experienced prior to the downturn; still, it will be manageable for NWT businesses, many of which experienced labour hiring and retention issues and struggled to meet demand during the economic boom.

12.6.1.6 Government Revenues

This section reviews the potential changes of the Project on government revenues during construction, operations, and closure. Potential changes in economic activity, whether measured through GDP or employment (taxes), will provide new sources of revenue for all levels of government. This subsection of government revenues is broken down into Gross Production, GDP, and taxes.

12.6.1.6.1 Effects Analysis

The economic effects of the Project are driven by expenditures on labour and capital over all phases of the Project. It is from these expenditures that Gross Production is estimated. This in turn provides the information necessary to calculate the value being added in the production process and in the supply of goods and services, which is the Project's contribution to GDP. Estimates of labour income, employment, government revenues, and indirect and induced changes can be derived from the initial Gross Production and GDP results. Inflation is a derivative of increased demand for goods and services without an equal or offsetting increase in supply of the same goods and services. Finally, the quality and quantity of the labour supply influences the number of individuals that are hired in any given area, which has a direct influence on the induced effects of the Project and the consumer price inflation.

Prior to discussing the effects raised in the Terms of Reference, it is essential to summarize the effect from the expenditures related to the Project. The complete discussion of Gross Production and GDP is in Appendix 12.II, Economic Impact Report.

Gross Production

Gross Production (also referred to as gross output) measures the value of all economic activities involved in producing a good or service. The determination of Gross Production⁸ for the Project included the removal of \$90 million of direct imports because they have no effect on the NWT or Canadian economy. The remaining expenditures related to the Project constitute the total expenditures on labour and capital made in Canada. However, additional imports are required in the manufacturing process of some of the Canadian-made equipment that is purchased.

⁸ Gross production measures the value of all economic activities involved in producing a good or service. It counts the cost of production and the value added at each stage of production. Therefore, the gross production value will always exceed that of gross domestic product, since the latter reports only the value-added component of each step in the production process.

Construction Phase

Based on the calculations for Gross Production during the construction phase, the resulting Gross Production for Canada is an increase of \$428.2 million over the two-year construction phase. This spending generates an indirect change to Gross Production equal to \$353 million. The induced change will add a further \$118.3 million.

Direct Gross Production in the NWT will be increase by approximately \$362 million. This equates to the money spent in the territory for the Project construction. The economic "spin-off" from this direct expenditure is expected to provide an additional \$72 million of indirect gross output from suppliers and re-suppliers of goods and services used during construction. Thus, the combined direct and indirect Gross Production in the NWT will equal \$433.9 million over the two-year construction phase (Table 12.6-13).

Table 12.6-13 Effect on Gross Production from the Project during Construction

	NWT	Canada
	(\$, '000s)	
Gross Output	362,200	428,213
Indirect Gross Output	71,652	352,956
Total Direct and Indirect Gross Output	433,852	781,170
Induced Gross Output	13,441	118,269

\$/,'000 = thousands of dollars.

Operations Phase

De Beers intends to spend \$910.9 million on goods and services over the life of the mine (Table 12.6-14). The NWT gross output will increase by \$300.6 million as a result of this initial business demand. The indirect changes from this increase are estimated to equal \$77.1 million. Thus, the direct and indirect gross output will rise by \$377.7 million. Adding the induced changes, gross output will expand by a further \$35.2 million (Table 12.6-14).

On an annual basis, the net potential increase in Gross Production within the NWT alone is estimated at \$37.5 million. The direct portion of this potential value is estimated at \$27.3 million per year, while the indirect portion is estimated at \$7 million per year. The annual value of Gross Production derived from labour expenditures (induced changes) within the NWT is estimated to be \$3.2 million (Table 12.6-14).

Table 12.6-14 Effect on Direct and Indirect Gross Output and Business Demand from the Project during Operations

	Total Increase		Average Annual Increase	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
Gross expenditures on Goods and Services ^(a)	910,854		82,805	
Gross Output from Initial Business Demand	300,608	620,235	27,328	56,385
Indirect Gross Output from Business Demand	77,068	419,420	7,006	38,129
Total Gross Output from Business Demand	377,676	1,039,655	34,334	94,514
Induced Gross Output	35,159	257,455	3,196	23,404

(a) This is the total amount spent on goods and services, including all direct imports and transportation.

NWT = Northwest Territories; \$, '000 = thousands of dollars.

The gross output to be generated in Canada from the \$910.9 million in expenditures on goods and services for the Project is \$1.29 billion, equal to \$117.9 million annually, when considering the direct, indirect, and induced changes. On an annual basis, these changes were estimated to be \$56.4 million in direct gross output, \$38.1 million in indirect gross output, and \$23.4 million in induced gross output (Table 12.6-14).

Gross Domestic Product

Gross domestic product measures the value-added to all goods and services produced in the economy. It can be calculated by summing labour income, mixed income, the cost of depreciation, profits, and indirect taxes less subsidies levied on production. In the NWT, GDP has grown from \$2.2 billion in 1999 to \$3.6 billion in 2008. Even so, economic growth has been virtually flat since 2004, with the exception of 2007 when major capital development took place at all three diamond mines (Section 12.3; Appendix 12.II).

Construction Phase

Project construction increases the NWT GDP by approximately \$112.8 million. Another \$36.6 million rise in the GDP will come from the indirect value added by the suppliers and re-suppliers of goods and services. Combining the direct and indirect changes, the construction of the Project will raise the NWT GDP by \$149.4 million over the two-year period. The induced changes from consumer spending on the part of participating workers will add another \$4.2 million to the overall GDP.

The total increase in national GDP will be approximately \$395.3 million over the same two-year construction period. This includes a direct change equal to \$152.3 million, indirect changes equal to \$170.1 million and induced changes equal to \$72.9 million (Table 12.6-15).

Table 12.6-15 Effect on Gross Domestic Product from the Project during Construction

	Total Increase	
	NWT	Canada
	(\$, '000s)	
Direct GDP	112,810	152,269
Indirect GDP	36,626	170,143
Total Direct and Indirect GDP	149,437	322,412
Induced GDP	4,208	72,905

NWT = Northwest Territories; \$, '000 = thousands of dollars; GDP = gross domestic product.

Operations Phase

Because the Project will be located in the NWT, a major portion of the measured economic value will be recorded in the territory. The estimated annual GDP from the mine production is \$285 million (Table 12.6-16). The value added to the NWT economy by the business activity associated with the supplying of goods and services to the mine's operations is estimated to equal \$16.9 million annually. Combined, the total direct and indirect changes on GDP from the Project are estimated at \$302 million per year on average. The annual induced increase is estimated to be \$3.2 million.

The total GDP that is attributed to the NWT during the 11-year operations phase is estimated at \$3.3 billion, where the majority (\$3.1 billion) is the value added through the production of diamonds. The GDP arising from the business demand will total \$185.7 million. Induced GDP is estimated to equal \$35.2 million (Table 12.6-16).

The estimated annual direct and indirect GDP for Canada is \$326.7 million with a total of \$3.6 billion over the 11 years of the mining operations. Induced impacts were estimated at \$257.5 million for Canada (Table 12.6-16).

Table 12.6-16 Effect on Gross Domestic Product from the Project during Operations

	Total Increase		Average Annual Increase	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
GDP--Mining	3,135,946	3,135,946	285,086	285,086
GDP—Initial Business Demand	147,566	237,238	13,415	21,567
Indirect GDP--Business Demand	38,101	220,734	3,464	20,067
Total GDP--Business Demand	185,667	457,972	16,879	41,634
Total Direct and Indirect GDP	3,321,613	3,593,918	301,965	326,720
Induced GDP	35,159	257,455	3,196	23,404

NWT = Northwest Territories; \$, '000 = thousands of dollars; GDP = gross domestic product.

Taxes

From 2000 to 2009, the GNWT total revenues increased from 74% to \$1.432 billion, which equals an average annual increase of 6.3%, compounded annually. In relative terms, the greatest source of increase has been the GNWT own-source revenues, averaging 9.5% growth. Over that same time period, federal government revenues have grown by 54.9%.

When viewed in real per capita terms (i.e., when taking into account population growth and rising costs), government revenues have expanded from \$21,007 per person in 2000 to \$28,429 per person in 2009. This is equal to a real growth of 35.3% over 10 years or 3.4% annually (Appendix 12.II).

Construction Phase

It is estimated that \$4.4 million in income taxes will be paid by NWT residents working directly or indirectly during the Project construction. The federal government would receive \$3 million while the territorial government would receive \$1.4 million.⁹ Additional revenues will be generated for the federal government's employment insurance program (\$0.5 million), the NWT and Nunavut Workers' Compensation Board (\$0.4 million), and Canada Pension Plan (\$1.2 million) (Table 12.6-17).

The businesses involved directly and indirectly with the Project's construction activities will earn profits and pay corporate taxes. It was estimated that federal corporate taxes would equal \$7.9 million and territorial corporate taxes would equal \$4.8 million over the two-year construction phase. This does not account for claw-back through the Territorial Formula Financing Agreement (Table 12.6-17).

Table 12.6-17 Effect on Direct Tax Revenues in the Northwest Territories during Operations

	Total (\$, '000s)
Income Taxes	4,425
Federal Personal Income Tax	3,020
Territorial Personal Income Tax	1,404
Contribution to Social Insurance Plans	2,166
Employment Insurance	504
Workers' Compensation	445
Canada Pension Plan	1,217
Corporate Tax	12,755
Federal Corporate Tax	7,939
Provincial/Territorial Corporate Tax	4,816
Total	19,346

\$, '000 = thousands of dollars.

⁹ Personal income taxes paid at the provincial level are not calculated because there were no assumptions on the residency of imported labour.

The proposed Project will result in indirect tax revenues on products for the Government of Canada equal to \$2.1 million, \$495,000 of those revenues will be generated in the NWT. Goods and services taxes and gas taxes make up the majority of federal revenues, equaling \$966,000 and \$957,000 respectively, across Canada. In the NWT, the federal government will collect \$76,000 in Goods and Services Tax and \$347,000 in gas taxes.

Provincial and territorial governments across Canada will collect \$3.8 million in indirect tax revenues on products during the construction phase. Provincial sales taxes will account for \$1.9 million and gas taxes \$1.5 million. During construction of the Project, \$604,000 in regional taxes will be collected, of which \$589,000 will be from gas tax.

Indirect taxes on production less any subsidies paid out will total \$5.6 million in Canada over the two-year construction phase. Approximately \$1.2 million of these taxes will be collected from activities occurring in the NWT (Table 12.6-18).

Table 12.6-18 Effect on Indirect Tax Revenues during Construction

	Total Increase	
	NWT^(a)	Canada^(b)
	(\$,'000s)	
Federal Indirect Tax on Products	495	2,112
Provincial/Territorial Indirect Taxes on Products ^(c)	604	3,762
Indirect Tax on Production less Subsidies	1,184	5,604
Total	2,283	11,478

(a) taxes assessed based on activities occurring within the Northwest Territories.

(b) taxes assessed based on activities in all provinces and territories.

(c) the figures do not account for claw back associated with Territorial Formula Financing Agreement.

\$,'000 = thousands of dollars.

Operations Phase

In addition to income earned by businesses and households, all levels of government will benefit from the proposed Project through higher revenues. The largest sources of new government revenues will be direct corporate taxes and royalties paid by De Beers from the Project. Additional revenues will be derived from other business and personal direct taxes, which include income taxes, surcharges, and contributions to the Canada Pension Plan, Employment Insurance, and indirect taxes. Indirect taxes include the Goods and Services Tax, gasoline, liquor, tobacco, other sales taxes and various licenses, fees and permits. Operations phase revenues will total \$896 million for all levels of government.¹⁰

¹⁰ This value does not include direct taxes paid to provincial governments since the residency of imported labour was not calculated.

The effect from increased revenue on the GNWT is complicated by the fact that the GNWT annual federal grant entitlement is affected by incremental revenues. When the GNWT experiences an increase in revenues, there is a reduction in the amount the GNWT receives from the federal government through the Formula Financing Grant (FFG) lagged by two years. It is commonly accepted that a strong economy will enhance the ability of the GNWT to garner more required tax revenues from their own sources and hence, lower the FFG requirement. In essence, the level of the FFG is a good indicator of the level of economic activity in the Territory, as the smaller the grant the stronger the economy.

The direct federal corporate taxes associated with the Project will equal \$310.3 million during operations. Territorial corporate tax collections from the mine operations will equal \$187.8 million. Mining taxes, which are the royalties paid on the resources extracted, will equal \$240.5 million (Table 12.6-18).

Revenues will also come from personal income taxes and social insurance plans. As reported in Table 12.6-19, it is estimated there would be \$36.8 million in income taxes paid by NWT residents working directly or indirectly with the Project operations phase. The federal government would receive \$25.1 million while the territorial government would receive \$11.7 million. Additional revenues will be generated for the federal government's employment insurance program (\$3.7 million), the NWT and Nunavut Workers' Compensation Board (\$4 million), and Canada Pension Plan (\$8.9 million).

Table 12.6-19 Effect on Government Direct Taxes in the Northwest Territories during Operations

	Total (\$, '000s)
Income Taxes	36,796
Federal Personal Income Tax	25,116
Territorial Personal Income Tax	11,680
Contribution to Social Insurance Plans	16,558
Employment Insurance	3,694
Workers' Compensation	3,951
Canada Pension Plan	8,913
Corporate Tax	738,637
Federal Corporate Tax	310,310
Territorial Corporate Tax	187,819
Mining Tax	240,508
Total	791,991

\$. '000 = thousands of dollars.

Project operations will also result in indirect tax revenues on products for the federal government equal to \$51 million; the majority of those revenues, \$49.7 million, will be generated in the NWT (Table 12.6-20).

Provincial and territorial governments across Canada will collect \$40.4 million in indirect tax revenues on products during the operations phase. Provincial sales taxes will account for \$1.2 million of those revenues. The gas tax is by far the largest component of this tax collection, equaling \$36.8 million.

Indirect taxes on production less any subsidies paid out will total \$12.7 million in Canada over the 11-year operations phase, with \$4.8 million of these taxes collected from activities within the NWT (Table 12.6-20).

Table 12.6-20 Effect on Government Indirect Tax Revenues during Operations

	Full Impact (\$,'000s)	
	NWT ^(a)	Canada ^(b)
Federal Indirect Tax on Products	49,693	50,996
Provincial/Territorial Indirect Taxes on Products ^(c)	37,848	40,358
Indirect Tax on Production less Subsidies	4,774	12,751
Total	92,315	104,105

^(a) taxes assessed based on activities occurring within the Northwest Territories.

^(b) taxes assessed based on activities in all provinces and territories.

^(c) the figures do not account for claw back associated with Territorial Formula Financing Agreement.
\$, '000 = thousands of dollars; NWT = Northwest Territories.

Closure Phase

Closure phase revenues to government will be negligible and will result from the \$7.5 million expenditure on labour and goods and service. The largest single expenditure over the eight year period will be wages. However, the workforce will consist of nine individuals, some of whom will receive two to four weeks of employment each year. The personal income tax generated from these wages is too small to calculate accurately.

Summary

The Project has the potential to stimulate considerable economic activity in the NWT. Considering the increases to Gross Production and GDP during the operations phase, NWT businesses will capture \$300 million of the total spending on goods and services, generating another \$77 million of gross output. Total estimated direct and indirect GDP will be \$302 million annually, and the induced increase on GDP will be \$35 million.

Government revenues also come in the form of direct and indirect taxes collected. During the construction phase, taxes paid directly in the NWT will be approximately \$19.3 million or an average of \$9.6 million. Indirect revenues will amount to \$3.4 billion or \$1.7 billion annually.

Revenues during the operations phase are even greater. Over the life of the operating mine an estimated \$792 million or an annual average of \$72 million will

be paid in the NWT. Indirect taxes on production, less any subsidies paid out, will total \$4.8 million collected from activities within the NWT.

12.6.1.7 Mitigation

The mitigation that has been incorporated in the effects analysis for this key line of inquiry is captured in the Environmental Design Features section summarized in Table 12.6-21 (see Section 3 for further details). Other mitigation is proposed in Table 12.6-2, but it involves cooperation and interest of parties other than De Beers. To be conservative (i.e., not underestimate negative impacts or overestimate positive impacts) only the mitigation incorporated in the environmental design features is included in determining the residual (after mitigation) impacts.

Table 12.6-21 Summary of Mitigation for Long-term Social, Cultural, and Economic Effects

Effect	De Beers		Government, Individual, family, community
	Environmental Design Features	Other Mitigation	Other Mitigation
The Project will provide jobs and income for individuals and contractors	<ul style="list-style-type: none"> 690 FTEs during construction Year 1, 372 FTEs during operations, fewer than 100 FTEs during interim closure and reclamation phase, and fewer than 2 FTEs closure identifying opportunities for gathering information and addressing barriers to successful employment offer employment for those with high school graduation or General Equivalency Diploma (De Beers does consider the experiences of individuals not meeting minimum education requirements for entry level positions on a case-by-case basis) procurement needs will be sourced from NWT businesses as much as practical during construction, operations, and closure. 	<ul style="list-style-type: none"> financial or in-kind support for the MTS bring money management course to communities through banking establishment participation in Labour Force Strategy along with the GNWT and other mining operations a position will continue to be staffed with the responsibility to act as a liaison between De Beers, and the GNWT, Aboriginal groups, and NWT businesses working with local employment officers, and advertise in northern newspapers and the company website positions available at the Project. the company already maintains a 1-800 number in the NWT for employment information and job opportunities work with and encourage contractors to participate and support De Beers' commitments related to general hiring commitments as well as promoting the participation of women in the workforce and provide employment incentives to encourage relocation to the NWT 	<ul style="list-style-type: none"> training and education programming enrolling in available training and education informed decision making about wages Labour Force Strategy

Table 12.6-21 Summary of Mitigation for Long-term Social, Cultural, and Economic Effects (continued)

Effect	De Beers		Government, Individual, family, community
	Environmental Design Features	Other Mitigation	Other Mitigation
The Project will provide opportunities for education and skills training and up-grading	<ul style="list-style-type: none"> provide supervisor and mentor training provide apprenticeship positions for NWT Aboriginal residents and other NWT residents who successfully meet trades entrance requirements work with community agencies to ensure that literacy programs will be directly linked to other kinds of upgrading, education, and training programs, so that participants may further improve their qualifications towards employment make best efforts to schedule training so that potential employees who have completed the training will be able to take immediate advantage of employment opportunities with the Project, and encourage contractors to do the same establishing a mine orientation program for all new employees provide money management training provide First Aid/CPR, SHE and WHMIS training use 2:2 rotation to maximize time in the community provide return air transportation to employees travelling from designated pick-up points in NWT communities and the Project 	<ul style="list-style-type: none"> conduct a training needs assessment to identify existing educational and/or skill levels of Aboriginal community members and other NWT residents who apply for positions, so that work can be offered to new recruits and opportunities for advancement can be offered to existing employees collaborate with Aboriginal communities on the development and delivery of training programs based on cultural value systems promote and encourage partnerships with Aurora College and other Canadian post-secondary education institutions to establish work experience and job placement programs setting aside with scholarship programs, scholarships for female NWT students who are attending college and a university offer scholarships and awards for women who are in an apprenticeship program with the Project make female models available for school programs to promote women working at the Project 	<ul style="list-style-type: none"> training and education programming, including partnership with GNWT Education, Culture and Employment to facilitate visits by Student Financial Officers to high schools to help students plan their finances for post-secondary education, and partnerships with the NWT Literacy Council, in the area of family literacy initiatives in the communities.

Table 12.6-21 Summary of Mitigation for Long-term Social, Cultural, and Economic Effects (continued)

Effect	De Beers		Government, Individual, family, community
	Environmental Design Features	Other Mitigation	Other Mitigation
The Project may result in northern and Aboriginal procurement opportunities	<ul style="list-style-type: none"> procurement needs will be sourced from NWT businesses as much as practical during construction, operations, and closure. make best efforts to schedule training so that potential employees who have completed the training will be able to take immediate advantage of employment opportunities with the Project, and encourage contractors to do the same 	<ul style="list-style-type: none"> maintain an NWT business policy sessions will be held in Yellowknife to provide summary information on contracting opportunities identify possible opportunities for joint ventures with Aboriginal businesses develop a flexible contracting approach by size and scope to match the capacity of Aboriginal businesses and NWT businesses where feasible share business-related expertise with industry contacts to support NWT mine-related business initiatives 	
The Project may result in inflation	n/a	n/a	n/a
The Project may result in a modest increase in NWT tax base as a result of the payment of royalties and taxes	<ul style="list-style-type: none"> transfer payments made from federal government to GNWT and communities as result of royalties and taxes 		

FTE = full-time equivalent; GNWT = Government of the Northwest Territories; SHE = Safety, Health, and Environment; WHMIS = Workplace Hazardous Material Information System; n/a = not applicable

12.6.1.8 Residual Effects Summary

The above analysis and results for this key line of inquiry show that the Project offers many direct economic benefits to the NWT. It will also contribute overall to the labour and financial resources of the NWT. Specifically, the Project will increase employment, income, business revenues, and tax revenues to all levels of government with few or no adverse effects on population, inflation, or business capacity (Table 12.6-22).

Table 12.6-22 Summary of Residual Economic Effects from the Project

Valued Components and Measurement Endpoints	Effects Summary
Jobs and Income	<p><u>During construction:</u> Construction phase expenditures are estimated to be \$535 million with a construction workforce of 490 FTEs in Year One and 600 FTEs in Year 2 (545 FTEs annually). A total of \$96.6 million in direct and indirect labour income will be generated in the NWT.</p> <p><u>During operations:</u> Direct employment with the Project will average 365 per annum during operations. Combined with the indirect positions related to NWT business community, the average annual person years of employment is 554. Annual direct NWT jobs (i.e., for NWT residents) are estimated to be 137 and indirect are 71 FTEs, for an annual average total of 208 FTEs of employment for NWT residents. A total of \$438.9 million (\$39.9 million annually) in direct labour income and \$127.4 million (\$11.6 million annually) in indirect labour income will be generated in the NWT.</p> <p><u>During closure:</u> The eight-year lake refilling and monitoring will have nine persons involved for a total of 68 person-weeks, and \$188,000 in annual wages in the NWT.</p>
Labour Supply	<p>The Project comes at a time when the operations of existing mining operations will begin to slow down. For some people, the Project will extend current employment and income opportunities to 2030.</p> <p>The Project should not result in changes to in-migration patterns. Out-migration has been exceeding in-migration for most of the past decade. The Project will likely employ residents who might otherwise migrate outside of the NWT after the other mines close.</p> <p>Historical data shows that population trends within the NWT have not changed. Despite the expansion in economic development, population growth is virtually stagnant.</p> <p>The NWT features a degree of structural unemployment. There are individuals in the NWT who desire employment, but their skills, education, or other circumstances prevent them from meeting the requirements of mine related positions.</p>
Inflation	The Project will have no effect on inflation in the NWT.
Local Business	The effect of the Project on local businesses will be positive. Businesses surveyed expect to meet the demands of the Project.
Government Revenues	<p><u>During construction:</u> GDP in the NWT will increase as much as \$149 million.</p> <p><u>During operations:</u> GDP in the NWT will increase as much as \$3.3 billion.</p> <p><u>During closure:</u> GDP will increase as much as \$7.5 million.</p>

NWT = Northwest Territories; FTE = full-time equivalent; GDP = gross domestic product.

12.6.1.9 Residual Impact Classification and Determination of Significance

12.6.1.9.1 Methods

The Terms of Reference (Gahcho Kué Panel 2007) require that the EIS classify the predicted residual effects (i.e., after mitigation) from the Project using scales of common words and the following criteria:

- direction;
- magnitude;
- geographic extent;
- duration;
- reversibility;
- frequency;
- likelihood; and
- ecological context.

While these criteria work reasonably well for classifying biophysical effects, some criteria are not easily adapted for socio-economic effects. Frequency, reversibility, and ecological context are not suitable to socio-economic impact classification Table 12.6-23.

This table provides the basis for classifying residual impacts and determining significance for this and all subsequent key lines of inquiry in Section 12. Further definitions of the criteria and a discussion of significance are presented in Section 12.5, Assessment Approach and Methods.

Table 12.5-23 Definitions of Terms Used in the Residual Impact Classification

Direction	Magnitude (Negative Impacts)	Magnitude (Positive Impacts)	Geographic Extent	Duration
Negative: A less favourable change relative to baseline values or conditions. Positive: An improvement over baseline values or conditions. Neutral: No change relative to baseline values or conditions.	Low: The change has no impact on the socio-economic environment beyond that of a nuisance (annoyance) value. Moderate: The change to the VC is predicted to impair quality of life or livelihoods. High: The change to the VC is large enough to seriously impair quality of life or livelihoods of individuals and communities.	Low: The change has a slight but discernible positive impact on livelihoods and socio-economic development. Moderate: The change to the VC creates a noticeable increase in opportunities for improving livelihoods, and enhancing socio-economic conditions. High: The change to the VC alters opportunities for livelihoods and socio-economic development to the extent where sustainability of is considerably improved.	Local: The impact will affect one or more of the communities in the local study area. Regional: The impact will affect communities in the local study area and the NWT. National: The impact will affect individuals or communities beyond the NWT.	Short-term: the impact ceases before the end of construction (within 1 to 2 years). Medium-term: the impact ceases before or near the end of operation (within 3 to 11 years following construction). Long-term: The impact will cease after the operational life of the Project. Permanent: The impact on the receiving environment will effectively be irreversible.

VC = valued component

12.6.1.9.2 Results

The Project will result in new expenditures and new employment in the NWT. The primary direct effect will be the extension of industrial activity in the NWT. As the other mines move towards the end of their life within the next ten years, an economic slowdown may result in the NWT. The operation of the Project will not only provide new employment opportunities, but it may allow workers at the other mines to continue with employment in the mining sector (Table 12.6-24).

The Project will create jobs and offer training and education opportunities that could be taken up by NWT residents. It is also likely that people in other parts of Canada will be employed by the Project especially during construction. The Project's contribution to the labour force will last beyond the life of the Project. The Project will contribute to the growth of a skilled local labour force in the NWT (Table 12.6-24).

The Project is not likely to bring about price inflation (Table 12.6-24).

The long-term impact of the Project on local businesses will be positive (Table 12.6-24). Businesses have adjusted business practices and human resource policies to attract and retain staff. The Project will allow businesses to continue their operations.

The GNWT would receive approximately \$9.6 annually during construction and an estimated \$72 million annually during operations in taxes. This annual revenue would be a substantial (i.e., high magnitude) contribution to government revenues (Table 12.6-24).

Table 12.6-24 Classification of Residual Impacts to Jobs and Income

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Production, employment, and income	Positive	Moderate	National	Medium-term	Likely
Labour force	Positive	Moderate	National	Medium-term	Likely
Inflation	Negative	Low	Regional	Medium-term	Not Likely
Local business	Positive	Moderate	Regional	Medium-term	Likely
Government revenues	Positive	High	Regional	Medium-term	Likely

The likely impacts on jobs and income are positive, but not significant with the important exception of the positive impact of the Project on government revenues, which is likely to be significant. The Project is unlikely to affect inflation.

12.6.2 Key Line of Inquiry: Family and Community Cohesion

12.6.2.1 Introduction

12.6.2.1.1 Context

The Key Line of Inquiry: Family and Community Cohesion involves social and cultural issues related to issues identified in other key lines of inquiry and subjects of note. The EIS Sections related to the Key Line of Inquiry: Family and Community Cohesion are the following:

- Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects (Section 12.6.1);
- Key Line of Inquiry: Social Disparity Within and Between Communities (Section 12.6.3);
- Subject of Note: Employment, Training, and Economic Development (Section 12.7.1); and
- Subject of Note: Culture, Heritage and Archaeology (Section 12.7.5).

Issues related to change in diet, changes in local income and disposable income, and the effect on the traditional economy that were identified in the Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects (Table 12.6-1) are addressed as part of family and community cohesion.

12.6.2.1.2 Purpose and Scope

The purpose of the Key Line of Inquiry: Family and Community Cohesion is to meet the Terms of Reference (Gahcho Kué Panel 2007). Specifically, the Terms of Reference require De Beers to address the following:

- rotation;
- influx of outside workers;
- absence from family;
- decreased family cohesion and break-up of family;
- community cohesion;
- absence of leaders and volunteers in the community;
- substance abuse;
- changes in traditional practices;

- loss of cultural connection through lack of access to country foods;
- migration of families to larger centres; and
- money management and lifestyle choices.

In addition, De Beers was to identify if the Project would have an impact on the following:

- population, including in- and out-migration;
- alcohol and drug access and use;
- access to health care;
- housing pressures;
- crime rates;
- access to child care;
- increased social divisions within or between communities;
- public safety;
- educational access and education completion levels;
- the physical, mental, and cultural well-being of northern mine workers and northern mine workers' families;
- existing and required social service networks to support community health and wellness (pressures on social services); and
- the effect of the Project and other past, present, and reasonably foreseeable developments on political and social development, cultural values, traditional practices, and language in potentially affected communities.

Although it also has relevance to social cohesion, the influx of outside workers, or in-migration has already been covered in the Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects. Potential effects of in-migration due to out-sourcing of workers as related to social cohesion are also discussed below in Other Values: The Right Way to Live.

12.6.2.1.3 Content

The issues identified in the Terms of Reference as being related to family and community cohesion have been organized under two broad headings:

- rotation; and
- lifestyle choices.

12.6.2.2 Rotation

Rotational employment at the Project is related to a number of issues of concern identified in the Terms of Reference. Rotation raises concerns related to:

- absence from family and community;
- family cohesion;
- community cohesion;
- absence of leaders and volunteers;
- attachment to cultural practices (e.g., diet, harvesting, time on the land);
- decreased transfer of knowledge between generations; and
- loss of language.

These concerns are discussed below under the headings transition to rotational lifestyle, volunteerism, attachment to cultural practices, and language skills.

12.6.2.2.1 Existing Environment

Transition to Rotational Lifestyle

The majority of existing mine workers are married or in a common law relationship (67%), whether resident in the NWT or not. Not quite half of the mine workers have children at home (47%). Specifically, 54% of residents from the NWT report to be either married or in a common-law situation and 53% had children. Overall, 79% of the residents from the NWT report having dependents (children or other family members) at home (GNWT Bureau of Statistics 2009).

Rotation and absence from family was not specifically identified as a concern among employees from the current diamond communities¹¹. In a 2005 survey of mine employees (GNWT Department of Health and Social Services et al. 2006), only 2% of all employees surveyed reported growing apart from family, 20% reported improved relationships, and 36% reported no change at all. The results were similar among the smaller diamond communities. The results for employees from the small NWT diamond communities reported that 3% grew apart, 12% reported improvements, and 47% reported no change.

In the same survey, families reported remaining supportive of working at the mine and more specifically, children in the small diamond communities reported that the impact was positive (35%), or had no impact (23%). Only 15% reported a negative impact (GNWT Department of Health and Social Services et al. 2006).

¹¹ Behchokò, Gametì, Whatì, Wekweètì, Detah, N'Dilo, Łutselk'e, and Yellowknife.

Discussions and meetings with community members in 2007 and 2008 confirmed that some families have experienced difficulties with transition to a rotational lifestyle. Their statements, however, were qualified by the need to have programming and benefits to help families with the transition, including community support and money management programs. They also stressed the importance of having direct flights to the communities instead of circulating through a larger centre. All existing mines in the NWT operate on a rotation; there are no recently developed “mining towns”.

Volunteerism

Volunteering or the “helping-out culture” is a core part of the northern culture. The rate of volunteering in the NWT is consistent with the national average, but the number of average annual volunteer hours is below the national average. This is a possible explanation for the perception that there are fewer volunteers. Both the rate of volunteering and the number of volunteer hours have decreased between 2004 and 2007. The change is not significantly different. A notable change in volunteering was in the change in the rate of helping others directly (Statistics Canada et al. 2009, internet source) and this may be an important indicator of cultural change.

Whether there are fewer volunteers because individuals are drawn into rotational work has not been established. However, changes in the “helping-out” culture that sustains communities have been linked to participation in the wage economy, as well as to other reasons (Little et al. 2005). The main reasons for not volunteering are the following:

- confusion over whether they should be paid to volunteer;
- not feeling that they had the necessary skills to be a volunteer;
- government programs doing things that used to be done by volunteers;
- feeling a lack of connection to the community; and
- not being asked to volunteer.

Concerns exist about the decline of voluntary efforts within Aboriginal communities, thereby signalling a loss of traditional culture and values. Participants of a 2005 research survey (Little et al. 2005) looking into the Aboriginal voluntary sector concluded some of the following points related to this decline:

- Aboriginal communities are larger and less homogenous than in the past and may not feel as strongly connected or responsible for the well-being of others.

- The wage economy has become more important than traditional land-based economies of the past; therefore, individual well-being has become more important than that of collective or community well-being.
- Aboriginal confusion between paid and non-paid work as the result of the transition from subsistence harvesting to an industrial wage economy.
- Helping out is more structured and organized today, as well as the skills required to do so; many Aboriginal people feel they lack the necessary skills. Government run programs have replaced individual responsibility where community members looked out for each other.

A study of leisure time activities of diamond mine workers find that 26% of the workers volunteer their time through a group or organization (GNWT Bureau of Statistics 2009). Unfortunately, the survey focused on formal opportunities and did not probe whether volunteering also included helping out in the community.

Attachment to Cultural Practices

The Terms of Reference documented the concern that working at the proposed diamond mine will take away from the ability to participate in traditional activities. The research shows that the opposite may actually be true. Lack of income might be contributing to an inability to participate in traditional activities due to the high cost of fuel and equipment needed to pursue these activities (GNWT Department of Health and Social Services et al. 2006b). While the activity itself is “traditional”, hunting is carried out using non-traditional means such as with snow machines and All Terrain Vehicles.

In 2002, the NWT undertook a *Regional Employment and Harvesting Survey* for persons over 15 years of age. In 2009, a harvesting survey for persons over 15 years of age was undertaken as a part of the 2009 *NWT Community Survey* (Table 12.6-25). Both surveys found that 36.7% of the South Slave residents and 39.9% of the Tłıchǫ residents participated in hunting and fishing in 2002 compared to 39.5% of South Slave residents and 40% of Tłıchǫ residents in 2009. While hunting and fishing is either showing a small increase or little change in the study area communities (except for Yellowknife which has dropped about 4%), participation in trapping has been dropping. No reason is provided, but decrease in trapping may be associated with decreasing prices for fur. Information regarding berry picking and plant gathering was taken from the 2002 survey.

Table 12.6-25 Persons 15 Years of Age and Over Involved in Harvesting Activity, by Location, Northwest Territories, 2002 and 2009

Location	Year	Trapped	%	Hunted or Fished	%	Gathered Berries	%	Gathered Plants	%
Northwest Territories	2002	1,514	5.0	12,245	40.2	5,551	18.2	2,060	6.8
	2009	-	6.2	-	39.4	-	-	-	-
South Slave Region (Hay River, Fort Smith, Other Communities)	2002	257	5.0	1,892	36.7	1,271	24.6	434	8.4
	2009	n/a	7.6	n/a	39.5	n/a	-	n/a	-
Tłıchǵo Region (Behchokǵ, Other Communities)	2002	290	14.1	819	39.9	542	26.4	293	14.3
	2009	n/a	13.2	n/a	40.0	n/a	-	n/a	-
Yellowknife	2002	166	1.2	5,301	38.8	1,777	13.0	331	2.4
	2009	n/a	1.2	n/a	34.5	n/a	-	n/a	-

Source: GNWT Bureau of Statistics 2003c; 2010d; 2010e.

n/a = information unavailable; % = percent.

The demographic breakdown of adults pursuing traditional activities based on 2002 data is presented in Table 12.6-26. Most hunters and fishers were 40-59 years of age (46%) and more likely to be Aboriginal males than non-Aboriginal males (58% versus 46%). In the NWT, just over half (51%) of the males participated in hunting and fishing compared to approximately (28%) of females. By contrast, female Aboriginals were the primary plant gatherers (16%) and berry gatherers (31%). More Aboriginal males trapped (15%) compared to non-Aboriginal males (1%), and those 60 years of age and over were most likely to trap (8%). Across all classifications, participation generally increased with age, except for hunting and fishing where it decreased after age 60. Overall, individuals in prime income earning years (i.e., 25-59) were most likely to participate in traditional activities.

Table 12.6-26 Percentage of Persons Involved in Harvesting Activities by Selected Characteristics, Northwest Territories, 2002

	Trapped (%)	Hunted or Fished (%)	Gathered Berries (%)	Gathered Plants (%)
Northwest Territories residents 15 years and over	5.0	40.2	18.2	6.8
Males	7.6	51.4	12.8	5.7
Females	2.2	27.9	24.4	7.9
15 to 24 years	4.0	34.6	12.9	3.9
25 to 39 years	4.7	40.8	16.9	5.2
40 to 59 years	5.1	46.1	22.1	7.3
60 years and over	8.3	31.6	23.8	16.6
Aboriginals	9.9	44.9	23.6	13.0
Males	15.4	58.3	16.6	10.7
Females	4.3	30.7	30.9	15.5
Non-Aboriginals	0.7	36.5	13.2	1.3
Males	1.1	46.2	9.4	1.7
Females	0.3	25.4	17.9	1.0

Source: GNWT Bureau of Statistics 2003c.

% = percent.

Although the above GNWT Statistics data reflect changes across the NWT and are not exclusively specific to diamond communities¹², information collected in Łutselk'e does provide more specific information with regard to harvesting activities and motivations for participation. The *Ni Hat'ni – Watching the Land* (2005) report summarizes the degree to which Łutselk'e residents are involved in traditional activities. The survey found that the majority of adults and youth did not participate in traditional activities (Table 12.6-27). The reasons cited for their lack of participation include the following:

- for the adults:
 - no-one to teach me;
 - no money for gas;
 - no skidoos;
 - no interest on the part of youth; and
 - no money for charter flights for community-sponsored hunts.
- for the youth:
 - adults did not ask them to come along;
 - Elders tend to take only their own family members;
 - no money;
 - no skidoos; and
 - too lazy.

Harvesting participation in the communities considered to be the diamond communities has been tracked by the GNWT since diamond mining began in the NWT. A recent survey (GNWT Bureau of Statistics 2005) found that Aboriginal males involved in diamond mining continued to hunt and fish (Figure 12.6-11) at a marginally higher rate than other employed Aboriginal males.

¹² Behchokò, Gameti, Whatì, Wekweètì, Detah, N'Dilo, Łutselk'e, and Yellowknife.

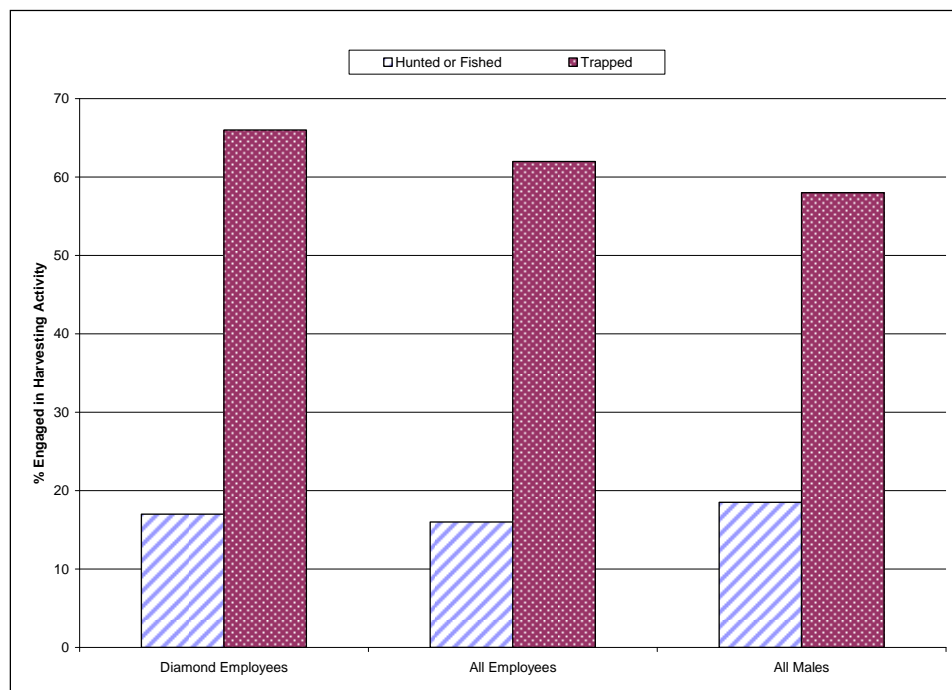
Table 12.6-27 Summary of Participation in Traditional Activities by Łutselk'e Dene (2003 to 2005)

	Adult (2003/2004)	Adult (2004/2005)
Caribou	57% did not harvest caribou	43% did not harvest caribou
Trapping	78% did not set any traps	65% did set between 1 and 20 traps
Goose and duck hunting	64% did not go hunting	26% did not go hunting ^(a)
Make dry fish	67% did not make dry fish	57% did not make dry fish
	Youth (2003/2004)	Youth (2004/2005)
Caribou	52% did not harvest caribou	67% did not harvest caribou
Trapping	78% did not set any traps	70% did not set any traps
Goose and duck hunting	46% did not go hunting	73% did not go hunting
Make dry fish	91% did not make dry fish	73% did not make dry fish

Source: Łutsel K'e Dene Community Members and Krieger 2005.

(a) 44% did not respond to the question.

Figure 12.6-11 Harvesting Activity of Aboriginal Males



Source: Community and Diamonds 2005 reports.

Other reasons for not participating in traditional activities are likely attributable to a decrease in the economic value of the activity. For example, trapping is still an important source of income and allows for a connection with the land. However, the value of fur sales fluctuates and decreased in 2009.

To get a more complete look at what diamond mine employees do with their leisure time, the GNWT undertook a survey of 1,750 miners. Overwhelmingly, the respondents and their families were active in outdoor activities such as hunting or fishing. About 77% of all respondents said that they or their family were involved in outdoor activities. More than half, or 57.4%, hunt or fish in their time off. Overall, 61% of NWT residents surveyed or their families, hunted or fished. By comparison, about 52% of non-NWT residents or their families hunted or fished (GNWT Bureau of Statistics 2009).

Language Skills

Primary Aboriginal language skills have been dropping over the past decade (Table 12.6-28) and are decline even before the first diamond mines starting employing NWT residents (GNWT Education, Culture and Employment 2000 internet source).

Table 12.6-28 Percentage of Aboriginals that Speak an Aboriginal Language, 1989 to 2009

Region	Year		
	1989	1999	2009
NWT	55.6	45.1	38.0
Beaufort-Delta	34.4	27.5	22.1
Dehcho	78.6	64.9	58.2
Sahtu	85.6	64.0	53.3
South Slave	39.5	32.7	25.0
Tlicho	96.1	98.1	90.4
Yellowknife area			
- Detah	94.0	77.4	59.9
- N'Dilo	-	-	46.2
- Yellowknife	36.6	21.9	18.0

Source: GNWT Bureau of Statistics 2009.

The loss of primary language speakers has been identified by the GNWT as a real challenge to creating the right environment for speakers and those wishing to learn to interact. As the numbers decrease, so do the opportunities. Among the responses to questions about how to maintain Aboriginal language skills is language training in schools (Annex K) and communities themselves have taken on the challenge and have been promoting Aboriginal language materials (e.g., Tłıchǫ books such as Yamozha and His Beaver Wife). The GNWT recently released an Aboriginal Languages Plan – A Shared Responsibility (GNWT Education, Culture and Employment 2010, internet source).

There is some indication that while first language speakers are declining in NWT communities, Aboriginal languages as a second language is on the rise. The trend in language loss may be reversing. A comparison of survey results between 2001 and 2006 (Statistics Canada 2008c) shows that use of Tłıchǫ as

the mother tongue¹³ has increased by 10% and knowledge¹⁴ of Tłıchǫ has increased by 17%. The same survey does not explicitly distinguish Chipewyan, but it does identify Dene speakers of which Chipewyan is a sub-set Athapaskan language. There, too, language as a mother tongue has increased by 9% and knowledge of the language by 8%. This period coincides with increasing Aboriginal participation in the diamond-mining workforce, the settlement of land claims, and the addition of Aboriginal languages into the school system.

12.6.2.2.2 Effects Analysis

Rotation will remove individuals from study area communities and other parts of Canada. Rotation has been a part of mining in the NWT for the past decade. The rotation proposed by De Beers (i.e., two-weeks-in and two-weeks-out) is consistent with the other mine operations in the NWT. Some management staff members will be on a four days in and three days out rotation (Table 12.6-29). Yellowknife staff will not be subject to the rotation. Overall, approximately 90% of all employees will be subject to a fly-in and fly-out rotation.

Table 12.6-29 Summary of Employment Cycle

Position	Hours per day	Rotation	Time on rotation
Non-management mine employees	12	Yes	2-weeks in/ 2-weeks out
On-site management	12	Yes	4-days in/ 3-days out
Yellowknife positions	8	No	Not Applicable

De Beers considered rotation alternatives in its Project design. The assessment of alternative rotation schedules revealed that the two-weeks-in and two-weeks-out rotation provided the greatest amount of time at home. The daily option does indicate the possibility of being home every day, but after accounting for travel time, the time at home would have largely been limited to sleep except for days off (Table 12.6-30).

¹³ Mother tongue means the first language learned at home in childhood and still understood.

¹⁴ Knowledge of language refers to its use as a second language.

Table 12.6-30 Alternative Rotation Schedules for the Gahcho Kué Project

Considerations	Assumptions		
	2-weeks on/ 2 weeks off	4 days on/ 3 days off	Daily
Number of flights/month/shift	2	8	60
Average number of days/month	30	30	30
Travel time			
Total travel time to and from airport (hours)	0.50	0.50	0.50
Assembly (meet at airport) and flight time	2	2	2
Total time between plane arrival/departure and start/end of work	1	1	1
Total travel time (per travel day)	3.5	3.5	7 (two way travel)
Hours/shift	12	12	8
Total hours per day on travel days	15.5	15.5	15
Hours/days available in community during time-off	24	24	9 (work days), 24-(days off)
Years of operation	11	11	11
Number of family hours/year ^(a)	2,880 ^(b)	2,304 ^(c)	1,776 ^(d)
Number of family hours over 11 year	31,680	25,344	19,536

^(a) 8 hours for sleeping were removed from the calculation in all cases to focus on quality family time.

^(b) 16 hours per day, 15 days per month, 12 months per year.

^(c) 16 hours per day, 12 days per month (3 days per week for 4 weeks), 12 months per year.

^(d) Days off = 16 hours per day, 2 days per week, 4 weeks per month, 12 months per year; days on = 1 hours per day, 5 days per week, 4 weeks per month, 12 months per year.

While data indicate that, on their time-off, employees continue to participate in traditional activities, change has been occurring related to rotational work. As more and more community members are on rotation, especially young adults, there is the possibility that participation in traditional activities will decline further than it already has in the past two decades. Traditional skills will not be passed on as easily as previously because skilled harvesters may be on a different rotation.

12.6.2.2.3 Summary

Rotation will remove individuals from NWT communities for a two week period, every two weeks. This is the same rotation pattern as has been used by the mines since 1998. Since the establishment of the first diamond mine, studies on the effect of rotation were undertaken by the companies and the GNWT. In all cases, support systems have been put in place to assist employees with the periods of adjustment. Surveys of mine employees in the NWT indicate that they have adjusted to the rotation and that participation in the wage economy has allowed them to pursue activities on the land such as hunting and fishing, which they might not have been able to do without wage employment.

Volunteerism, or helping out has diminished but the NWT is within the national average. As the average volunteer is educated and financially secure and middle age, the decrease of volunteering or helping out, may be a reflection of the young population in the NWT. Mine employees have indicated that they have continued to help out in communities. There is no clear picture other than the reasons in the Little et al. (2005) report as to why loss of volunteers was raised as a concern. The Little et al. (2005) report does provide a hint as to the cause of the concern, as does Parlee and Marlowe (2001); namely, there is an indication that individualism is on the rise in communities. Assisting and sharing in communities may be decreasing and is being replaced by pursuits related to individual well-being. This runs counter to building community strength and survival through helping out.

The Project is set up to maximize time at home with the two week rotation. Employment with the Project also allows for counselling support to assist employees with the adjustment. De Beers does not discourage the use of traditional languages on-site as long as it does not affect health and safety.

12.6.2.3 Lifestyle Choices

Lifestyle choices are mentioned in the Terms of Reference as matters affecting family and community cohesion. Lifestyle choices include drug and alcohol consumption, crime, spousal and sexual assault, and mobility.

12.6.2.3.1 Existing Environment

Drug and Alcohol Consumption

Alcohol consumption is high in the NWT as compared with the rest of Canada. Its consumption in the NWT has been linked to the prevalence of sexually transmitted diseases, crime, and other socially unacceptable behavior (Communities and Diamonds Report 2009). Drugs and alcohol play a large role in most of the NWT's violent crime, and an increase in drug use may also lead to an increase in violent crime rates. Non-Aboriginal, young males were most likely to consume alcohol more than once a week. This statistic applies to the communities, regional centres, and to Yellowknife. In particular, young males without secondary school education and with low incomes were more likely to be involved in an alcohol-related harmful activity (see Annex K).

According to the 2006 NWT Addictions Survey, an estimated 37% of NWT residents 15 years of age or older who were current drinkers engaged in high-risk alcohol use (GNWT Department of Health and Social Services 2006b). The prevalence of hazardous drinking (e.g., inability to remember what happened the night before because of drinking, or injury due to drinking) was about two times

higher in the NWT in 2006 than in other provinces and territories (GNWT Department of Health and Social Services 2006b). Heavy drinking was most common among males and younger residents and among those with lower levels of education and income. There have been reductions in heavy drinking.. From 1996 to 2006 in the NWT, for the Aboriginal population, the proportion of heavy frequent drinkers declined from 17% to 12%, while that of light frequent drinkers increased from 8% to 14%. In contrast, the proportion of heavy frequent drinkers increased from 9% to 13% among the non-Aboriginal population (GNWT Department of Health and Social Services 2006b). Weekly binge drinking declined from 23% to 18% among males and from 27% to 16% among Aboriginals (GNWT Department of Health and Social Services 2006b).

These findings are not inconsistent with other studies that looked at alcohol consumption and employment. Overall, the relationship of alcohol and employment is partially linked, and there is some indication that binge drinking does decrease with employment, whether full or partial (Dooley and Prause, 1997; Lee et al. 1990).

As for drug use, according to the 2004 NWT Addictions Survey, drug and substance abuse at that time was on the rise in the NWT. The 2006 survey (GNWT Bureau of Statistics 2008a) indicated that over half of those surveyed have used cannabis or hash during their lifetime. The 2006 NWT Addictions Survey estimated that 26% of current drug users in the NWT reported at least one incidence of harm or injury from their own drug use, down from 39% in 2004. Harm to home life or marriage (14%) was the most common type of harm reported by users, followed by friendships or social life (12%), physical health (12%), work or study (8%), and learning (7%) (GNWT Department of Health and Social Services 2006b).

Many negative health effects are also linked to drug and alcohol consumption. For example, an estimated 30% of women in the NWT drink while they are pregnant (GNWT Department of Health and Social Services 2006a). Aboriginal communities are affected by Fetal Alcohol Spectrum Disorder (FASD), with the incidence rate in some communities as high as 16%. Nearly 50% of FASD children are placed in the care of child welfare, because families are unable to care for them (National Children's Alliance 2006). Another negative consequence involves drinking and driving. The total number of alcohol-related collisions in the NWT has remained relatively constant since 1998, although the number of injuries has declined over time (GNWT Department of Transportation 2009).

Crime

Crime is directly linked to many social and economic issues and conditions within societies and communities. With a growing labour force during the last decade up to about 2008, an increasing number of transient workers, and larger disposable incomes, the NWT has been facing short- and long-term challenges associated with crime (Criminal Intelligence Service Alberta 2007). The NWT law enforcement is dealing with increased drug and alcohol issues, violence, vandalism, and property crimes.

Increases in overall crime rates, especially violent crime, have been accompanied a period of increasing mineral exploration and deposit appraisal activity. It is unclear if the money that mining has brought to community members has led to an increase in crime. Mining has brought jobs and increased incomes to the community, leading to a greater quality of life for many residents. What has been challenging for some residents is the added financial responsibility that comes with steady, high incomes.

Violent and property crimes in the NWT represented 16% and 15% respectively of all offences committed in the indicated year (Statistics Canada 2008d, internet site). The violent crime rate in the NWT overall has increased by 41% between 1996 and 2008. In Yellowknife, it has fluctuated from year to year but has remained, on average, below 40 per 1000 people. The violent crime rate in some small communities has increased substantially, whereas in others it has declined (GNWT Bureau of Statistics 2009c).

In 2006, a public consultation process about crime and policing was held in several NWT communities (Scott Clark Consulting Inc. 2006a). Community participants frequently expressed the view that alcohol and drug abuse underlie much of the criminal and anti-social behaviour they witness in their communities. In particular, property crime, domestic violence, assault, and creating a disturbance are seen as directly linked to alcohol or drug abuse in almost every case. Police generally agree with the community assessments that substance abuse is strongly linked to property crimes and personal violence (Scott Clark Consulting Inc. 2006a).

Family Violence

Family violence is a significant issue in the NWT, affecting women, men, and children, as well as the health and sustainability of communities. The NWT has seen family violence develop out of such historical traumas as the residential schools, resulting in the breakdown of family, traditional culture, and community life (Status of Women Council of the NWT 2007). Other factors such as poverty and substance abuse also contribute to family violence. Spousal violence and

sexual assault is most often directed at women, and is often more severe than violence against men (Status of Women Council of the NWT 2007). Violence can result in serious physical injury and emotional and mental harm, and may include alcohol and drug abuse, domestic violence, physical and sexual abuse, depression, rage, increased levels of interpersonal violence, and suicide. In 2006, about 12% of adult residents in the NWT experienced some form of spousal violence, as compared to 7% in other jurisdictions (Johnson 2006, internet site). In a recent study, the NWT took the second highest spots for both sexual assault and aggravated assault in 2009 across Canada (Maclean's Magazine 2010).

The NWT faces several challenges in addressing family violence, including the isolation of many of its 34 communities. Some communities do not have social/counselling services, medical services, or shelters available for victims, and often depend on fly-in fly-out services. Many women leave their homes and communities to access shelters or treatment centres elsewhere, thereby facing many additional challenges such as lack of housing, temporary treatment, and lack of community support. Women often end up returning to abusive relationships in their home communities (Status of Women Council of the NWT 2007).

Mobility Choices

The increased education and experience levels associated with the economic development in the NWT over the past decade or so have also increased people's lifestyle choices. People have options, such as taking their newly acquired skills and applying them elsewhere. For example, new or improved skills and additional money mean that people can assess their options and move to other communities either within or outside of the NWT to various points of hire. Education in the NWT continues to be a challenge for some groups, however. Many people in smaller remote communities do not want to move away for work, yet opportunities for long-term, full-time employment remain in the larger regional communities or Yellowknife (GNWT Department of Education, Culture and Employment 2008c).

12.6.2.3.2 Effects Analysis

Lifestyle choices are largely individualistic, although they are influenced by internal and external factors (e.g., income availability, family and community support, the work environment, options for study and training). They also depend to a large extent on historical patterns and culture.

Substance abuse, crime rates, family violence, decisions on where to work and live, and other social behaviors and capacities have been affected by several

factors in the LSA and RSA for many years. The existence of drug and alcohol consumption in the LSA has already been occurring prior to the existence of the diamond mines. This consumption and substance abuse is anticipated to continue with or without the Project, even if program interventions or other restricting factors are implemented. Drug and alcohol problems in the NWT will not disappear without tackling related problems of poverty and homelessness.

Due to its use of a strictly controlled camp environment, rotational work, and limited in-migration, the Project is not anticipated to substantially increase drug or alcohol consumption, and other negative lifestyle choices. Several known mitigation and benefit enhancement strategies will also be implemented to reduce potential negative effects.

12.6.2.3.3 Summary

The above indicates economic development in the NWT has been accompanied by changes to lifestyle choices. These choices have had both positive and negative effects. As one example, alcohol abuse has been in decline especially among Aboriginal males, although recent data is unavailable for drug and alcohol consumption. The Project does not tolerate alcohol or drugs on site and offers counselling services for employees who have difficulties.

12.6.2.4 Other Values: The Right Way to Live

Most Aboriginal communities identify a consistent set of values that relate to maintaining cultural strength. According to Elders (Gibson et al. 2007; Parlee and Marlowe 2001), in order to maintain a strong culture, community members must take part in the following:

- observe rules and laws from tradition;
- learn stories, legends, and history;
- pay respect to lands and animals;
- share with one another;
- provide service to others; and
- speak their language.

In considering the above, it may be that the concerns expressed in the Terms of Reference might actually be related to concerns regarding on-going cultural change and how other cultural values are supplanting traditional ones. This process is called acculturation. The issues expressed in the Terms of Reference can be re-interpreted as reduced access to community culture, exposure to new

ways of thinking, and not practicing the “correct” way to live. If this is the case, concerns related to family and community cohesion are cumulative changes taking place. Changes in culture are consistent with research elsewhere (Davison 2007, Hill et al. 1998), and communities have sought a variety of means by which to maintain their way of life including those similar to practices in the NWT.

The Right Way to Live

The Aboriginal populations in the NWT are enduring communities. That is, they have been the constant presence in the NWT for millennia. In the past 300 years, other populations have come and established a presence, but it is only the Aboriginal populations that are from this environment and have established a culture rooted in this environment (Section 12.7.5). In Aboriginal culture, knowing the “right way to live” facilitates family and community cohesion.

Participation in community activities such as harvesting is a direct connection to Aboriginal culture and is a fundamental basis for social identity, and cultural and spiritual survival (Kruse 1991, Natcher 2009, Nuttall et al. 2005, Condon et al. 1995). As mine workers reported, at least some of the time back home is spent “on-the-land” and that working has actually allowed them to continue harvesting activities (Annex K). Therefore, by all standard measures, family and community cohesion should be improving. According to the available statistics, mine employees from the smaller communities are making good lifestyle choices in order to be successful as mine employees (e.g., moderating their alcohol consumption and participating in traditional activities).

Neither the Terms of Reference on this key line of inquiry nor the community consultation shed much light on the exact nature of the concerns (see social disparity key line of inquiry for related issues). The most explicit comment made during one of the community consultation sessions came from the elders. Several mentioned that it is they who must bear the rise in rent when a mine worker’s income is factored into the net income of the household when the home is rented from GNWT housing. Upon return to the community, the mine employees are not helping with the bills and expenses. Elders asked for assistance in getting the “children” to help cover expenses. This unwillingness by some mine employees to recognize their responsibilities to the household was a source of stress for these elders and may be expressed as having lost the “right way to live”.

There is also some indication that reciprocity within the community is narrowing. Aboriginal culture generally dictates a broad sharing of goods in order to ensure survival of the community (Kruse 1991, Natcher 2009, Nuttall et al. 2005). Indications are that mine employees may financially support immediate family

members with their time on the land activities or other interests, but not necessarily beyond the family unit (Parlee and Marlowe. 2001). This assistance is not being extended beyond the immediate family. Interest has shifted to taking care of your own family, but not extending that care to the broader community (Parlee and Marlowe 2001). Regardless, some mine employees do share the largess of the hunt especially with elders. Therefore, mine employees may be choosing to contribute to the community culturally, rather than financially, through the provision of country food, and/or having others accompany them when they are out hunting and fishing.

Finally, while the mine employee surveys suggest stability or improvements in family and community relations, that may not be the entire story. Other research suggests that the members left behind may have a different perception of the same events. The mine employees time-off may not actually be spent in the community and there is a perception of transience and therefore, inconsistent parenting. The following quotes are taken from Davison (2007) from her work in Behchokò:

"[There is a] more transient population now, working at the mine, having more money to travel. People moving around even in small remote communities" (Administrator, interview, primary source).

"...they are away from the homes for two weeks yeah, but now days it is consuming eh? It's Walmart, its Extra Foods, it's Edmonton. They go to Edmonton, they just pick up and go to Edmonton...every weekend" (Elder, interview, primary source).

"...the kids really run the show. I think that there is more money in town, because of the mine but now parents are hardly ever at home... They have replaced parenting and guidance and caring with money (Elder, interview, primary source).

It may be that the grandparents or other family members are not coping as well as the surveys of miners and their families may suggest.

Influence of Mine Life on the Right Way to Live

Choices made by mine employees when back in the community are not the responsibility of De Beers. However, De Beers does try to ensure that cultural differences are not discouraged, and that Aboriginal cultural practices can continue at the mine site (e.g., quiet room for cultural activities). De Beers does require that all its employees take cultural awareness and cross-cultural training (Section 3). Permanent employees will have their own rooms when on-site. However, there are few options to keep people from acquiring other view points

and bringing those back to the home communities. De Beers, through its employee benefits package, does offer counselling and mentoring to employees who pursue it. De Beers will also continue to support communities with their cultural programming.

The Project site will also allow its employees to continue speaking their traditional language as long as it does not pose a health and safety issue. In addition, De Beers does support communities with their cultural programming (e.g., assistance with Aboriginal on-the-land programs and other key cultural activities). Further, De Beers will, where operationally feasible, avoid flights through Yellowknife so as to minimize time away from family and communities. De Beers also provides incentives to its employees to volunteer in communities.

In-migration is another issue related to loss of culture. The anticipated influx of workers into the NWT has not occurred. Therefore, the concern for in-migration may be linked to the interaction of NWT residents with non-residents at the mine site. This interaction may introduce alternative worldviews and values. This interaction may have the same effect as an influx of new workers into communities, as it introduces all mine employees to different worldviews and ways of living. This interaction at the Project site may be a source of concern for some; however, it also has the potential for benefits (e.g., non-residents may introduce new ways to protect the environment).

While at the mine site, workers from the LSA are exposed to other ideas and influences and new friendships are cultivated. These influences may mean that social networks become changed and the community member behaves differently when back home. The challenge to this Project evaluation is that there is no factual evidence on the extent or direction of these influences, which may be neutral, positive, negative or a combination of directions. Community members involved in mining are not choosing to leave the NWT or their home communities. Rather, proximity to family has been expressed as a reason to stay in communities (GNWT 2009).

12.6.2.5 Mitigation

All mitigation measures for Family and Community Cohesion proposed by De Beers are summarized in Table 12.6-31 and are already part of the Project Description (Section 3). In addition to Environmental Design Features which will help mitigate the concerns addressed above, De Beers will continue to support cultural events in communities, as well as literacy programming. Both of these measures relate to making good lifestyle choices. Some of the main mitigation measures for Family and Community Cohesion are provided here.

De Beers offers a comprehensive benefits plan to all its employees, as well as mandatory new employee training, which covers among other things, money

management. These supports are aimed at assisting employees in making good lifestyle choices and remaining effective employees. De Beers offers an extensive benefits plan that covers services to assist with family issues, work performance, career development, and general health and wellness. It also arranges for family counselling services for mine employees and their families. Such services might include family and relationship counselling, stress management, anger management, support services for women and single mothers, child-care services, and parenting training.

The employment of NWT residents at the Project will remove some individuals from communities who may have been active in volunteering or helping out in the community. To encourage employees to continue with formal volunteering, or to get new employee volunteers into communities, De Beers includes among its benefits a volunteer incentive. Given that the typical community volunteer is older, educated, and has an income, De Beers expects that these individuals will continue volunteering even in their time off. With sufficient notice and flexibility in their rotation schedule, De Beers also provides opportunities for employees who wish to be engaged in traditional activities.

De Beers will be operating an alcohol-free and drug-free work place, and has a behaviour code of conduct for employees travelling to and from the Project work site. Employees are required to remain alcohol-free and drug-free while at the work site and when in-transit. These have been requirements since the first diamond mine was established in the NWT. De Beers does not discourage the use of Aboriginal languages at the mine site. The language of work will be English, but in circumstances where health and safety are not a concern, Aboriginal languages may be spoken.

Table 12.6-31 Mitigation of Family and Community Cohesion Effects

Effect Category	Effect	De Beers		Government, Individual, Family, Community
		Environmental Design Feature	Other Mitigation	Other Mitigation
Work Rotation	<ul style="list-style-type: none"> • Separation from family / community • Maintain language and cultural skills 	<ul style="list-style-type: none"> • encourage the practice of Aboriginal languages at the worksite when it does not compromise health and safety • traditional pursuits of Aboriginal employees accommodated within work schedules where practicable and with appropriate notice, in balance with operational needs of the Projects • provide and maintain space at the mine site for spiritual and cultural pursuits • provide core policies in Chipewyan and Tłıchô, as well as English and French • use 2:2 rotation to maximize time in the community • provide return air transportation to employees travelling from designated pick-up points in NWT communities and the Project provide incentives to those employees interested in volunteering their time for social or cultural programs or activities in their home communities 	<ul style="list-style-type: none"> • language program support assistance in communities • financial or in-kind support for local cultural programming • financial or in-kind support for language support programs in communities • financial or in-kind support for on-the-land programming • coordinate and welcome special site visits with Aboriginal leaders 	<ul style="list-style-type: none"> • on-the-land training and education programming in schools
Lifestyle	<ul style="list-style-type: none"> • Loss of leaders and volunteers within communities • Drug and alcohol abuse 	<ul style="list-style-type: none"> • provide volunteer incentives to those employees interested in volunteering their time for social or cultural programs or activities in their home communities • offer drug and alcohol programming • employees and immediate family members may access counselling services through the company health care plan 		
In-migration	<ul style="list-style-type: none"> • In-migration of workers 	<ul style="list-style-type: none"> • provide return air transportation to employees travelling from designated pick-up points in NWT communities and the Project encourage the practice of Aboriginal languages at the worksite when it does not compromise health and safety • cultural awareness and cross-cultural training for northern Aboriginal and non-Aboriginal workers • offer northern relocation benefit 		

12.6.2.6 Residual Effects Summary

Cohesion is the act of working together, sharing values and challenges, and developing a mutual sense of trust and reciprocity among community members. The outcome is a society that looks after its members and has minimal disparity and schisms in the group (Foote 2008; Helliwell and Wang 2010; Woolcock 2000).

Characteristics of a socially cohesive society (Gibson et al. 2007; Parlee and Marlowe 2001) include the following:

- trust in people and institutions;
- respect for diversity and differences;
- reciprocity and a sense of belonging;
- strong social networks;
- philanthropy and volunteerism; and
- participation in the community.

As previously summarized (Section 12.3, Appendix 12.II, and Annex K), the potentially affected communities are improving on many indicators that have been used to measure cohesion. Income is increasing; economic security is improving, divorce is unchanged or declining, participation in traditional harvests by mine employees is possibly greater than by those not employed by the mines; and airport and road improvements have been undertaken. Finally, the natural environment¹⁵ is generally secure and healthy (Annex K).

The communities most linked with diamond mining are also transforming. The middle class is increasing, as more household incomes annually exceed \$30,000 and a growing number of household incomes surpass \$75,000 annually.

The analysis also shows that rotation is not creating problems on families and communities as perceived. Overall, the experience has been a positive one for most families. Alcohol consumption has remained moderate with Aboriginal people consuming less than non-Aboriginal people. In addition, participation in harvesting activities seems to be most prevalent among people in their prime incoming-earning years; employment, including employment at the diamond mines, has facilitated participation rather than hindered it. Finally, there has not

¹⁵ The exception may be the Bathurst caribou herd.

been an influx of people into the NWT, but rather, there has actually been an exodus of people from the NWT in the past five years.

By all conventional indicators, family and community cohesion is improving. Therefore, the question becomes: Why have issues related to cohesion arisen, and is there a connection between these issues and the diamond mines? The next discussion tries to shed some light on the issue, and provide another interpretation. It examines if individual choices made by employees when they are home may be the real cause of the concerns.

12.6.2.7 Residual Impact Classification and Determination of Significance

The proposed rotation maximizes time at home even though it requires being away from the family and community for up to two weeks at a time. In addition, De Beers offers its employees counselling and mentoring to assist with the adjustment both for employees and their families. De Beers also offers incentives to encourage employees to “keep helping out” in the communities.

De Beers also recognizes that some members of the population are not as able to participate in rotation-based work. As such, De Beers will provide opportunities to those who are not directly employed by the mine through contracts and purchasing. It will also continue to support community based skill development programs.

De Beers recognizes that not every individual is suited to the mining lifestyle. For those who choose to take part in employment with the Project, De Beers offers a variety of benefits to help these employees and their families adjust to the rotational nature of the lifestyle. De Beers will also continue to support community cultural activities, literacy programs, and other activities that have the effect of promoting community cohesiveness. The effects of the Project on lifestyle choices are summarized in Table 12.6-32.

The residual (i.e., after mitigation) impacts of the Project on family and community cohesion are described in Table 12.6-32 using the criteria identified in the Terms of Reference.

Table 12.6-32 Classification of Residual Impacts to Family and Community Cohesion

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Rotation	Negative to neutral after a period of adjustment	Low	Local	Medium-term	Likely
Lifestyle choices	Positive	Moderate	Local	Medium-term	Likely
In-migration	Negative to neutral	Low	Local	Medium-term	Not Likely

The residual impact of the Project on family and community cohesion is predicted to be not significant.

12.6.3 Key Line of Inquiry: Social Disparity within and between Communities

12.6.3.1 Introduction

12.6.3.1.1 Context

This section addresses the Key Line of Inquiry: Social Disparity within and between Communities. The issues raised in this key line of inquiry are closely linked to other key lines of inquiry and subjects of note within the SEIA component of this EIS. This section also captures the effect of the wage economy from the Key Line of Inquiry: Long-term Social, Cultural and Economic Effects.

The issues discussed in this section are also related to:

- Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects (Section 12.6.1);
- Key Line of Inquiry: Family and Community Cohesion (Section 12.6.2);
- Subject of Note: Employment, Training, and Economic Development (Section 12.7.1); and
- Subject of Note: Demands on Infrastructure (Section 12.7.2).

12.6.3.1.2 Purpose and Scope

The purpose of the Key Line of Inquiry: Social Disparity within and between Communities is to meet the Terms of Reference issued by the Gahcho Kué Panel (2007). Fundamentally, De Beers has been asked to evaluate the effect of economic development on those individuals who have not, for a variety of

reasons (e.g., by choice, education, health, age, family circumstance, skills set) been able to participate in the primary mine-related benefit, namely, employment. The Terms of Reference indicate that members of the communities feel that the benefits and costs of development in the NWT are not evenly shared between and within communities.

The Terms of Reference stated that social disparity is linked to those who have benefited from development and those who have not. In particular,

... Elders, traditional land users, women, and others who are less likely to participate in mining related activities are not only left behind but have to contend with increased costs of living, causing an effective decrease in standard of living and associated social problems. During the environmental assessment Aboriginal communities expressed concerns that they may not benefit from this development. This concern was based on their experience with previous mines and on the already existing skilled labour shortage in the NWT (p. 32).

The Terms of Reference require a separate analysis for each potentially affected community and an indication of how community input was used.

Many factors can influence the dispersion of benefits from mining activities within a community and, more important, these factors differ by community. Not all community residents can or wish to participate in employment opportunities resulting from further development of the mining industry. For those who do participate, not everyone benefits equally. Key barriers to full participation are discussed later in this section, and some actions that might be considered are presented as a means to enhance participation and reduce social disparity.

The issue of social disparity is not unique to the NWT, nor is it only associated with economic growth. All communities throughout Canada experience social disparity, changing standards of living for those who are not employed, and persistent social problems. There is no cure or panacea solution that will “fix” social disparity.

12.6.3.1.3 Content

This key line of inquiry is organized into two parts:

- impact of the Project on social disparity **between** communities; and
- impact of the Project on social disparity **within** communities.

Measuring social disparity is complex. It relies on proxy indicators and measures that point to changes between and within communities that are deemed to reflect changing social conditions. In this case, the following measurement endpoints of social change and disparity between communities will be used to assess the impact of the Project:

- change in family income support recipients by community;
- change in average annual employment income levels;
- change in employment/unemployment status in communities; and
- change in average annual inflation rates.

12.6.3.2 Social Disparity between Communities

12.6.3.2.1 Existing Environment

Income Support and Income Levels

Income derived from diamond mining has had an influence on the income support programs and income levels. The percentage of the population within the NWT as a whole receiving income support has fallen, and within the communities involved in diamond mining, it has declined to varying degrees (Table 12.6-33). Additionally, income per capita across the territory has grown by an estimated annual increase of 8.6% since 2000 (Appendix 12.II). Associated with this, family incomes have risen dramatically over the past decade as represented by the number of tax filers who report family income greater than \$60,000 per year; while the number of families reporting annual income below \$25,000 has declined. The exception is Łutselk'e, in which the percentage of families with income less than \$25,000 started to rise after 2003 (Table 12.6-34).

Unemployment

Over the past decade, the economy in the NWT has grown by approximately 90%, as measured by real GDP (Figure 12.6-12) and the unemployment rate went from over 14% to below 6% for three consecutive years (Figure 12.6-13)¹⁶. Starting in 2008, the rate of unemployment has crept up to average 6.3% in

¹⁶ For years 1997 and 1998, the unemployment rate was interpolated using Statistics Canada's 1996 Census and NWT Bureau of Statistics labour force data.

2009. This is still below the national average for that year which was 8.3%¹⁷ (Appendix 12.II).

Collectively, all the communities involved in diamond mining,¹⁸ with the exception of Behchokò and Łutselk'e, show a continual decrease in unemployment between 1994 and 2009. Several showed an increase in unemployment by 2009 (Table 12.6-35). The situation in Łutselk'e and Behchokò is not easily explained. Behchokò's unemployment rate in 2009 was actually higher than the 1994 rate, but lower by half from 1999 when diamond mining was starting. This may be a reflection of a young population or members from other Tłıchq communities moving to Behchokò. Overall, mining has benefitted the communities, if not to a consistent and sustainable rate. The community that showed the greatest drop in unemployment is Whatì going from 50% unemployment to 27% in 2009. Pick-up of employees in this remote community has been beneficial.

Table 12.6-33 Income Support Beneficiaries, Monthly Average, Northwest Territories and Diamond Communities, 2004 to 2009

Community	2004	2005	2006	2007	2008	2009
Northwest Territories	2,073	1,924	1,925	2,024	2,067	2,402
Behchokò	270	222	210	220	190	240
Detah	-	-	-	-	-	-
Gamètì	33	24	23	10	6	12
Fort Resolution	62	51	52	82	62	61
Łutselk'e	29	40	42	-	-	-
N'Dilo	-	-	-	-	-	-
Whatì	62	60	56	48	62	53
Wekweèti	17	18	18	6	6	4
Yellowknife	497	460	417	385	368	440

Source: GNWT Bureau of Statistics 2010b.

Note: "-" indicates data not available or not applicable.

Table 12.6-34 Percentage of Families with Income less than \$25,000 or over \$60,000, Northwest Territories and Diamond Communities, 1996 to 2006

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
% Filers Reporting Less than \$25,000											
Northwest Territories	24.5	24.0	22.9	21.9	21.7	16.9	15.3	16.5	16.2	15.1	14.3
Behchokò	42.5	42.5	40.5	34.9	32.6	26.7	23.9	19.1	25.0	21.3	24.5
Detah	-	-	-	-	-	-	-	-	-	-	-

¹⁷ Statistics Canada, Labour Force Characteristics. Available at http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.pgm?Lang=E&SP_Action=Result&SP_ID=1803&SP_TYP=50&SP_Sort=-0&SP_Mode=2 accessed April 15, 2009.

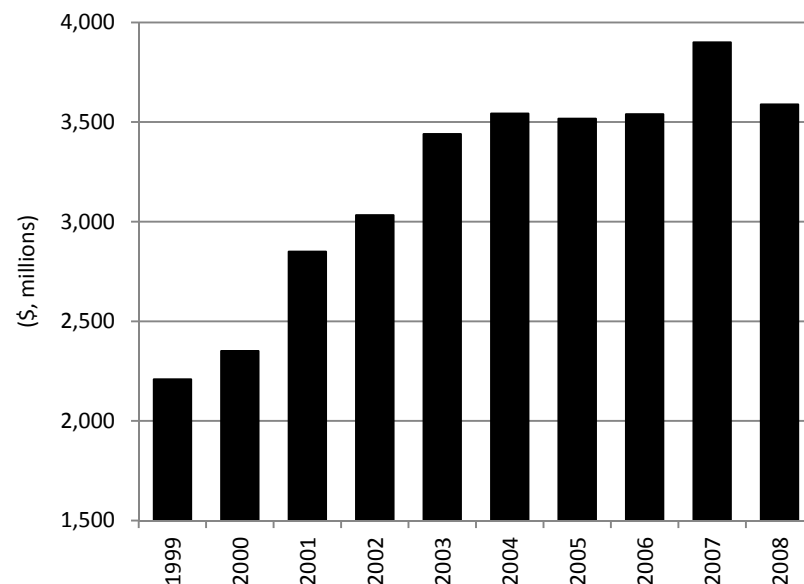
¹⁸ Behchokò, Gamètì, Whatì, Wekweèti, Detah, N'Dilo, Łutselk'e, and Yellowknife

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Fort Resolution	57.1	53.3	30.8	42.9	46.2	35.7	28.6	23.1	30.8	23.1	35.7
Gamèti	50.0	20.0	50.0	28.6	28.6	42.9	28.6	42.9	-	42.9	28.6
Lutselk'e	42.9	62.5	66.7	44.4	25.0	30.0	30.0	22.2	33.3	44.4	44.4
Wekweètì	-	-	-	-	-	-	-	-	-	-	-
Whatì	44.4	55.6	50.0	30.0	36.4	36.4	27.3	9.1	30.8	9.1	16.7
Yellowknife	15.0	13.9	13.2	14.6	14.0	10.3	9.0	10.3	9.5	9.5	8.6
% Filers Reporting over \$60,000											
Northwest Territories	48.6	48.9	49.0	50.4	50.7	56.9	59.9	59.7	61.1	63.2	64.6
Behchokò	17.5	17.5	19.0	20.9	20.9	37.8	41.3	38.3	45.8	48.9	46.9
Detah	-	-	-	-	-	-	-	-	-	-	-
Fort Resolution	14.3	13.3	15.4	14.3	15.4	21.4	28.6	23.1	23.1	23.1	28.6
Gamèti	-	-	-	28.6	28.6	28.6	28.6	28.6	60.0	28.6	42.9
Lutselk'e	-	-	-	22.2	25.0	20.0	30.0	22.2	22.2	-	22.2
Wekweètì	-	-	-	-	-	-	-	-	-	-	-
Whatì	22.2	22.2	20.0	20.0	27.3	27.3	27.3	36.4	30.8	36.4	33.3
Yellowknife	64.3	65.0	64.3	65.0	65.3	70.7	73.9	73.5	74.0	75.7	77.8

Source: GNWT Bureau of Statistics 2008b.

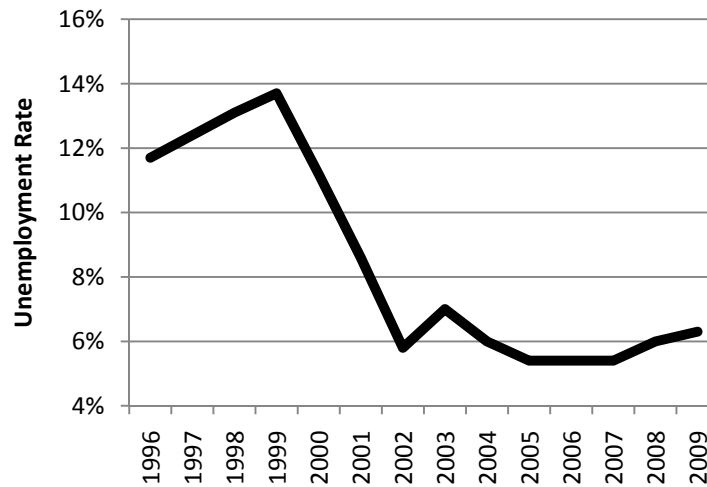
"-" indicates information unavailable. N'Dilo is considered part of Yellowknife.

Figure 12.6-12 Gross Domestic Product at Market Prices, Chained (2002) Prices, 1999 to 2008



Source: Statistics Canada National Economic Accounts, CANSIM Table 384-0002.

Figure 12.6-13 Unemployment Rate in the Northwest Territories, 2000 to 2009



Source: Statistics Canada Monthly Labour Force Survey, NWT Bureau of Statistics Labour Force Survey

Table 12.6-35 Unemployment Rate (%), Northwest Territories and Diamond Communities, 1994 to 2009

	1994 (%)	1999 (%)	2004 (%)	2006 (%)	2009 (%)
Northwest Territories					
Unemployment Rate	14.8	13.7	10.4	10.4	10.3
Lutselk'e					
Unemployment Rate	31.7	28.4	14.6	30.0	27.8
Gamèti					
Unemployment Rate	41.7	42.7	38.9	29.2	24.1
Whati					
Unemployment Rate	50.0	32.9	30.7	23.7	27.1
Wekweètì					
Unemployment Rate	17.2	35.6	27.0	25.0	14.5
Behchokò					
Unemployment Rate	10.8	46.5	30.1	26.3	22.7
Detah					
Unemployment Rate	29.6	24.7	33.7	16.7	28.2
Yellowknife/N'Dilo					
Unemployment Rate	6.8	7.9	5.0	5.7	5.6

Source: GNWT Bureau of Statistics 2010b, internet site.

"-" indicates information unavailable; % = percent.

Education and Employment

While it is possible to be employed at the existing mines with less than a Grade 12 education (Table 12.6-36), overall long-term employment success with the

mines is linked to educational achievement (Statistics Canada 2010, internet source; Gingras 2002, internet source).

Table 12.6-36 Employment Rates based on High School Completion, 2009

Community	Employment Rates (2009)	
	Less than High School Diploma (%)	High School Diploma or Greater (%)
NWT	35.4	81.2
Behchokò	23.2	64.6
Detah	37.1	72.9
Fort Resolution	17.4	59.5
Gamètì	33.6	80.0
Łutselk'e	37.5	61.9
N'Dilo	-	-
Wekweètì	53.2	64.7
Whatì	34.1	58.7
Yellowknife	48.1	85.7

Source: GNWT Community Profiles 2009; Internet site

Note: 2009 Employment Rates: NWT Bureau of Statistics, GNWT. Refers to the employment rate for two groups of people: those who do not have a high school certificate, and those with at least a high school certificate. Employment rate refers to the percentage of persons 15 years of age and over who are working at a job.

"-" indicates information unavailable; % = percent.

The education system in communities changed in the past decade. The GNWT has been working towards providing full secondary school programs in the communities and, in most cases, access to these resources has improved. Grade 12¹⁹ is now offered in nearly all communities and/or regional centres. The impact of this investment in educational infrastructure has resulted in greater enrolment (Table 12.6-37) and generally higher Grade 12 graduation rates (Table 12.6-38).

Table 12.6-37 Number of Students Enrolled and Graduated in Small Communities, 2002 to 2008

Grade	Number of Students Enrolled			
	2002 to 2003	2004 to 2005	2006 to 2007	2007 to 2008
Grade 10	1,096	1,214	1,158	1,020
Grade 11	648	633	742	808
Grade 12	487	470	634	689.5
Total Graduates	283	343	370	n/a

Source: GNWT Department of Education, Culture and Employment 2005a and 2007e.

"n/a" indicates information unavailable.

¹⁹ Not including Gamètì, Łutselk'e and Wekweètì.

Table 12.6-38 Percentage of Individuals with a High School Diploma Northwest Territories and Diamond Communities, 1991 to 2006

Community	1991	1994	1996	1999	2001	2004	2006
Northwest Territories	59.9	63.2	63.5	66.1	64.8	67.5	67.0
Behchokò	23.1	40.7	29.8	32.1	29.9	38.1	37.2
Detah	35.0	31.1	24.0	32.9	29.2	35.3	37.5
Gamètì	40.6	31.0	21.2	19.0	28.6	24.9	32.4
Fort Resolution	33.8	34.4	45.9	39.3	44.6	46.3	45.8
Łutselk'e	37.8	32.7	28.6	45.9	40.0	38.3	45.7
N'Dilo	26.9	-	28.6	-	43.8	28.4	-
Whatì	32.6	23.8	35.7	29.7	36.2	32.8	38.5
Wekweètì	13.3	13.0	29.4	40.5	21.1	29.4	47.4
Yellowknife	73.9	79.0	75.3	80.6	77.7	82.1	80.9

Source: GNWT Bureau of Statistics 2010b.

"-" indicates information unavailable.

Not all communities have experienced the same level of educational achievement. While reasons for this remain unclear, two possible reasons include the need to complete secondary education away from home and the community age structure. Neither of these explanations is completely satisfactory. Gamètì and Wekweètì require students to complete secondary school away from home. N'Dilo, however, has direct access to two secondary schools; and yet, all three have similar rates of graduation. Students from Łutselk'e must also complete school away from home and its percentage of graduates is similar to Behchokò, Detah, and Whatì; all of which have direct access to secondary schools. Likewise, age distribution may explain the difference in Wekweètì as there are a greater number of middle-aged and seniors in the community, but it does not explain the situation in Gamètì and Łutselk'e. Other explanations may be the enticement of mine income and the lack of community role models (Davison 2007). Completion of school is linked to role models for the students. There is no NWT-related information on whether students leave school for work.

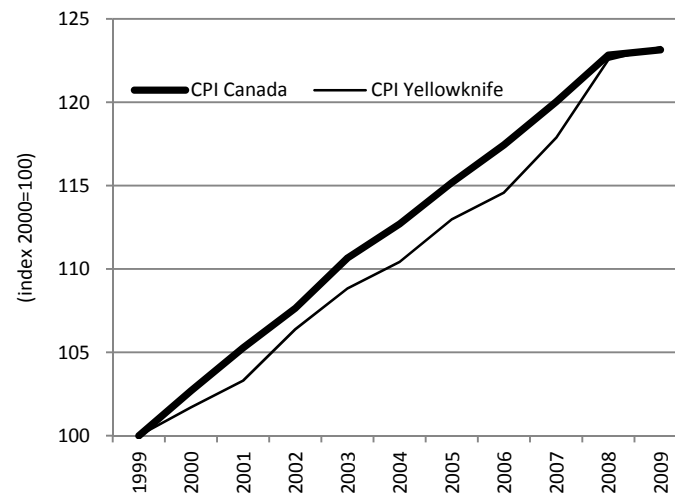
Inflation and Cost of Living

The inflation rate within the NWT has remained lower than the rest of Canada until 2008 (Figure 12.6-14) despite the mining activity in the NWT. The CPI represents the changing prices of a basket of goods and services. In the NWT, CPI is calculated for Yellowknife only. Therefore, price changes that occur elsewhere in the NWT will not be captured. It is nevertheless a good proxy for consumer price movements throughout the NWT.

A larger concern in the NWT is likely cost of living. There are marked differences in the cost of living between communities. For example, the cost of living (which

is based on the cost of purchasing the same basket of consumer goods in each community) in Yellowknife was 17.5% greater than Edmonton in 2005, while the cost of living in Łutselk'e was 52.5% greater than Edmonton (Table 12.6-39).

Figure 12.6-14 Consumer Price Index: 1999 to 2009



Source: Statistics Canada 2008.

Table 12.6-39 Living Cost Differentials in the Study Area Communities and Northwest Territories, 2005 (Price Index Ranges: Edmonton=100)

Community	Index
Behchokò	122.5
Detah	-
Gamètì	147.5
Enterprise	-
Fort Providence	132.5
Fort Resolution	137.5
Fort Smith	127.5
Hay River	127.5
Hay River Reserve	-
Łutselk'e	152.5
N'Dilo	-
Whatì	147.5
Wekweètì	-
Yellowknife	117.5

Source: GNWT Bureau of Statistics 2007b.

"-" indicates information unavailable.

The disparity in the cost of the basket of consumer goods alone between Yellowknife and other NWT communities is shown in Table 12.6-40. The cost of the basket of consumer goods for those communities that do not have year-round road access, including Gamètì, Łutselk'e, Whatì, and Wekweètì was higher than anywhere else. The remaining price differences when compared to Yellowknife were driven largely by market size. Thus, disparity between communities in relation to cost of living does exist, but it is largely logistics and market size that dictate the disparity rather than economic development.

Table 12.6-40 Food Price Indexes in the Study Area Communities from 1987 to 2004 (Yellowknife=100)

Community	1987	1991	1997	2000	2001	2004
Behchokò	103	107	119	131	127	137
Detah	-	-	-	-	-	-
Gamètì	164	136	139	136	124	153
Enterprise	-	-	-	-	-	109
Fort Providence	97	105	106	119	113	126
Fort Resolution	103	111	127	138	128	131
Fort Smith	90	97	108	114	108	113
Hay River	89	98	108	118	110	113
Hay River Reserve	-	-	-	-	-	107
Łutselk'e	165	156	169	175	163	175
N'Dilo	-	-	-	-	-	-
Whatì	-	154	168	156	141	153
Wekweètì	-	169	159	166	141	170

Source: GNWT Bureau of Statistics 2007b.

"-" indicates information unavailable.

12.6.3.2.2 Effects Analysis

As mentioned above, the issue of social disparity is not unique to the NWT, nor is it only associated with economic growth. Social disparities between communities were occurring before the existence of the diamond mine projects. Certain communities have been able to benefit more than others due to diverse factors such as willingness and capacity to do rotational mine work, proximity to points of employment and training, supportive community business institutions, and existing levels of skills and education. Some positive trends, however, are anticipated to continue as a result of the Project, which will serve to counter many social disparities. These positive effects, however, will vary across communities due to some of the aforementioned factors such as experience with mining and the availability of labour and businesses.

For example, the Project is expected to have a positive, moderate influence on employment and income. This will also reduce the rate of unemployment and

need for social assistance. Additional jobs created as a result of the Project will largely depend on community and individual capacity. For instance, not all communities have the same level of educational achievement, and in some cases, the completion of Grade 12 has been challenging due to the need to send students to other communities within the LSA to finish their high school. The same is true of training; the communities within the LSA have different levels of access to skills and education needed to work in mining. This situation is expected to improve, however, as the GNWT continues to expand and intensify its educational services and programs offered.

It is likely that the addition of the Project will have no consequence on the rate of inflation or the cost of living. There is no apparent relationship with previous mine development and costs in the NWT. The cost of living rate is increasing, but this is unrelated to the Project. Cost of living rises have been likely due to the following:

- rising fuel prices making transportation of goods and services more costly – this is more acute in communities with only seasonal road access;
- loss of eligibility for subsidized housing when one or more family members enters the wage economy; and
- change in consumption pattern over time.

These costs of living and inflation trends are expected to continue, with or without the Project.

12.6.3.3 Social Disparity within Communities

The Terms of Reference identified social disparity as an issue. This topic has already been touched upon in the previous key line of inquiry. This key line of inquiry is linked to those not participating in employment opportunities. There is a segment of the population that feels left behind, and that family and community support mechanisms have been declining. Other factors affecting social disparity include social inclusion and perceptions of fairness.

12.6.3.3.1 Existing Environment

Employment Rate

Education and unemployment rates are closely linked in the NWT and elsewhere. Over the past decade those without high school education were most likely to be unemployed with unemployment rates ranging from a high of 20%, dropping to 13% during the peak of the mining operations mid-decade and

climbing to 16% in 2009. Individuals with some high school completion, some post-secondary and university fared best during the past decade with the unemployment rate ranging from 0% to 9%. The unemployment rate for those with a certificate or a diploma ranged from 2% to 6%.

As already presented, the rate of not completing secondary school is still high. Individuals without secondary school graduation are likely to be Aboriginal males. Their ability to secure work is dependent on the availability of unskilled labour positions. With respect to mining positions, unskilled labour positions are most likely found with contractors and linked to positions of camp support. Mines, themselves, have only a small number of these positions.

Women and Employment

The ability for women to participate in the economy has frequently been raised as a contributing factor in social disparity. Among the reasons limiting employment access are the following:

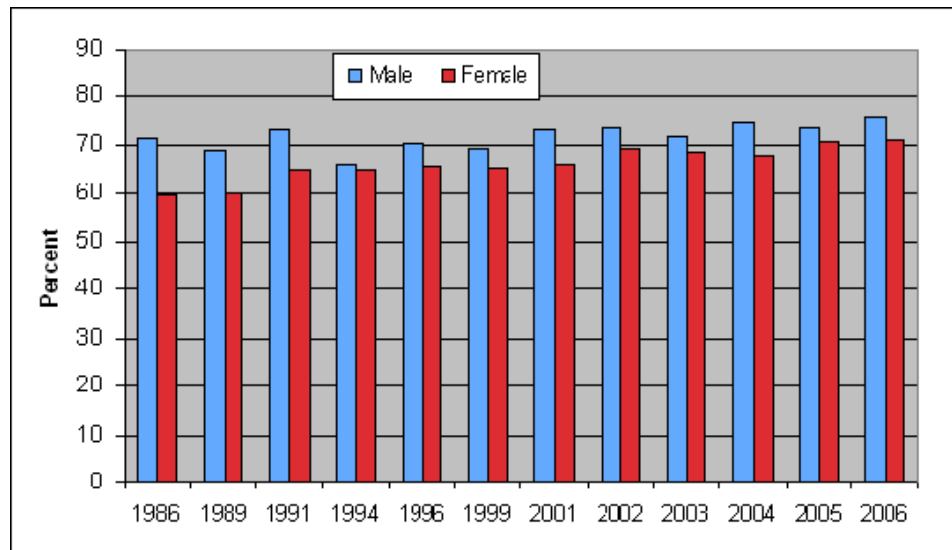
- lack of child care support;
- lack of necessary training or skills;
- lack of mobility to and from work; and/or
- conflict with other community obligations (GNWT Bureau of Statistics 2006h).

While women continue to lag behind their male counterparts with respect to employment, the NWT has seen a steady rise in the employment rate for women in the past ten years (Figure 12.6-15). Unlike men, their employment has not been at mines, but in community government, social services, health services, and educational organizations because they have tended to achieve higher education levels (GNWT Department of Education, Culture and Employment 2002). Women are also more likely to finish secondary school and seek higher education.

Recognizing that women have not been active in mining-related employment, the Status of Women Council of the NWT, working in partnership with industry, educational institutions and services, governments, labour and community groups, established the Women in Mining, Oil and Gas Project in October 2004 and the Northern Women in Mining and Oil and Gas Project (NWMOG) in March 2007. The project anticipates that 104 women will directly benefit by taking trades and industrial-based training courses as a result of the NWMOG. As well, hundreds of other women will be better informed and may become interested in

the possibilities of trades and industrial-based occupations in the mining, oil, and gas industries (Status of Women Council of the NWT 2008).

Figure 12.6-15 Employment Rate by Gender in the Northwest Territories from 1986 to 2006



Source: GNWT Bureau of Statistics 2007f.

Family and Community Support

Disparity within communities is also linked to the perceived loss of family and community support, and the loss of volunteers. The feeling is that people left behind are worse off.

Although much available information on family and community support systems is dated, anecdotal evidence from baseline study interviews indicate that some of these issues remain relevant today. While community members may feel that they have lost family and community support, the 2000-2001 Canadian Community Health Survey showed that NWT communities were still strongly satisfied with their social support networks. Respondents from smaller communities rated the support at 79% and those from Yellowknife rated their support at 86% (GNWT Department of Health and Social Services 2005a). Unfortunately, when the survey was repeated in 2003, the North was not included; therefore, it is unknown if there was a change in perception about community support. Regardless, these results at a time when the diamond mines were actively growing, while at the same time other mines were closing, suggests that economic activity has had limited influence on these social networks.

Family and community support is also an issue of security. Stress factors such as unemployment and low financial status may contribute to family violence. A rapid change in financial status can also mean changes in crime rates, which lessen community security. In the NWT, during the period 1999 to 2004, there was virtually no change in family violence rates. Likewise, crime rates in smaller communities have largely unchanged, although as noted above there are some differences among communities, such as concerning violent crime. One change in the type of crime that has been committed is that property crime has become the most common (GNWT Department of Health and Social Services 2005a). Reasons are unclear, but this could be related to substance abuse and accessibility of material goods.

Homelessness is also tied to family and community support, and is an issue of growing concern (GNWT Department of Health and Social Services 2005b). The 2007 report *YWCA Being Homeless is Getting to be Normal* identified the following characteristics as contributing to homelessness in the NWT: the remote geography; cost of living; limited employment opportunities; inadequate access to appropriate social services; domestic violence and intergenerational dependency on income supports; underdeveloped infrastructure; the lack of accessible and affordable transportation systems; and the high cost of labour and materials needed to increase available housing. Recent data suggest that homelessness continues to be a growing problem in Yellowknife. In 2008, 936 individuals stayed in a city shelter at least one night; of these, 49% were single men and the remainder were single women, youth (25 and under), and families; about three-quarters (67%) stayed from one to 30 days; 26 individuals or families are on a supportive living waitlist (Yellowknife Homelessness Coalition 2009).

Some of the context behind what is driving or affecting social inclusion is discussed next.

Creating Social Inclusion

Social inclusion can be difficult to define; however, the following explanation from a report to the Department of Heritage (Impact Economics 2007) provides a good context of social inclusion for this report.

Social inclusion is a somewhat confusing term since it implies a purely social definition when in fact it is largely an economic concern. It is from economic growth that society gains the freedom to choose its social, environmental and even political path. Without the proceeds from economic growth these freedoms disappear.

Social inclusion can be thought of as a subcomponent of society's ultimate goal of a high and sustainable quality of life. Included in its

definition are such things as access to employment, opportunities for economic prosperity and improved socio-economic standing, greater equality and tolerance of beliefs and values, and greater social justice.

Thus, to understand the issues affecting social inclusion, it is important to know something about the state of the economy, its ability to create new jobs, perceptions of its fairness in the distribution of benefits and its long-term stability, and its contribution to individual and state wealth.

Distribution of Benefits

Economics is the study of how society distributes limited resources (e.g., money, food, metals, etc.) across unlimited demand; it is the study of society's choices, why certain choices are made, and how those choices affect people (Friedman et al. 2005). Economic growth is necessary because it provides society with choices regarding the means to improve human development. Human development is a term that encapsulates all those things that people require for a high and sustainable quality of life. It includes standard of living and other economic and political freedoms, but also includes social and environmental elements such as issues of health and education, security, cultural identity, social inclusion, civic engagement, and environmental management and protection (Sheram and Soubbotini 2000).

Economic growth is not the end, but rather, a means to an end. In and of itself economic growth does not directly result in an improved quality of life for society because it is measured by an increase in value-added production, not by its effect on people. There are actual examples where "economic growth was achieved at the cost of greater inequality, higher unemployment, weakened democracy, loss of cultural identity, and/or over consumption of resources needed by future generations" (Soubbotini 2004). Thus the characteristics of a particular economy are important, as are the choices society (or the NWT communities in this instance) makes in directing the proceeds from that growth.

The economic expansion flowing from the growth of the diamond industry in the NWT is unique. It has changed human, social and cultural; and financial capitals within the NWT economy, enhancing the need for an educated, mobile labour force, and improved infrastructure such as roads, social services and a more diversified education system. This has altered the status quo within the NWT labour market, creating an initial period where some inequalities have developed. That is, there has been the expansion of a middle-class and more and more individuals reporting incomes of greater than \$75,000 where not so long ago many in the same communities would have reported incomes of less than

\$30,000 or be on social assistance. It is natural that some individuals, families, and communities would be in a better position to take advantage of the opportunities than others. However, people without the necessary qualifications, abilities, or interest in working at a mine site are less likely to benefit directly.

When an economy is undergoing profound change, whether through industrial development or rapid modernization, or both as is the case in the NWT, a common result is to see some skills lose their value in the marketplace, while the need for other skills disappears altogether. These results can lead to other forms of disparity that typically strike the same group of people. History has shown this period of inequality that appears during periods of economic transition is unavoidable (Impact Economics 2007). However, history also shows that access to the wage economy has resulted in a revival of traditional skills (Hill et al. 1998).

Economic growth can also reduce social disparity and improve social inclusion. Experience elsewhere indicates that those who benefit from the economic growth gain a vested interest in seeing it continue. The preservation of their new and higher standard of living becomes tied to that of the economy. This is especially true for new entrants into the economy because their relative position in society will have improved the most; in times of great economic expansion, the number of new entrants can be significant.

These “champions” of the new economy will make choices and promote policies that ensure the preservation of their new wealth and that of the economy. Their generosity and interest in achieving social or environmental objectives is a function of their own personal welfare. This has important implications for reducing racial and gender barriers and other attitudes of intolerance, and can result in significant political and social progress. In the NWT, this progress can include the preservation of indigenous culture, support for traditional or non-wage activities, and additional time and money for community volunteering.

12.6.3.3.2 Effects Analysis

Similar to the previous section on social disparity between communities, social disparity within communities has been occurring before the existence of the diamond mine projects. Certain individuals have been able to benefit more than others due to diverse factors such as willingness and capacity to do rotational mine work, proximity to points of employment and training, supportive community business institutions, supportive family and community networks, and existing levels of skills and education.

Within the LSA, key differences also exist for family and community supportive networks, patterns of employment such as female participation in the labour

force, and the available or preferred types of positions, and security issues such as crime and housing. Given its relatively short timeframe, it is anticipated that the Project is not likely to substantially change the existing environment of social disparity within communities. By implementing the proposed mitigation and benefit enhancement measures, however, De Beers has an opportunity to contribute in a positive manner to individual and community wellbeing, thus helping to reduce social disparity to some extent.

The response of those who lose out in the period of transition is equally important for social progress to occur. An initial period of increasing inequality will be tolerated if this group believes the new economic prosperity will last long enough so that eventually everyone will benefit; if not personally, then at least for their children. This group can then see that they, too, can benefit if they can acquire the right skills. This has important consequences for the Project because of the following:

- It verifies the important role this Project has for increasing confidence in the long-term growth of the NWT economy.
- It validates the Project's design concerning human resources and business practices that will ensure NWT labour and businesses have a fair and reasonable chance of benefiting from the Project.
- It provides evidence on how and where disparities are occurring and lends suggestions as to how they might be addressed.

De Beers recognizes that social problems between and within communities are rooted, in part, in the disparity of participation in the wage economy. These social problems are linked to "social inclusion" regardless of whether mining activity exists or not. De Beers does not control how communities respond to the opportunities of economic growth and how they choose to share inside a community, but it does recognize that it can influence greater social inclusion (and hence less social disparity) through its role in the communities and with the GNWT and federal government as a promoter of education and training and other community activities that support traditional values.

12.6.3.4 Mitigation

Some of the issues raised by Elders and others regarding social disparity are captured in the Environmental Design Features (Table 12.6-21). De Beers recognizes that limitations to social inclusion remain despite its planned Environmental Design Features. De Beers addresses many disparity-related issues in its Project design, but it is primarily targeted to its employees and their families. Although De Beers has little control over the dispersion of employment

income paid to employees, or royalties paid to government, it does recognize that it can influence future social inclusion between and within communities through a combination of the following:

- hiring practices that encourage participation from study area communities;
- requiring completion of Grade 10 (or General Equivalency Diploma). De Beers does consider the experiences of individuals not meeting minimum education requirements for entry level positions on a case-by-case basis;
- offering education and training programs to qualified staff as a means to enhance skills;
- supporting financial management practices through workshops and mentoring; and
- scheduling of work rotations to encourage and facilitate community volunteerism.

The Project, as already discussed, will employ as many as possible qualified NWT residents. With employment comes a comprehensive benefits package that includes:

- counselling and family support;
- money management;
- medical and dental benefits; and
- drug and alcohol counselling.

De Beers also offers other support in the communities related to:

- education;
- cultural programming; and
- job fairs.

De Beers will also provide information sessions for local business on procurement opportunities.

Table 12.6-41 summarizes the mitigation of effects causing social disparity within and between communities.

Table 12.6-41 Summary of Mitigation for Disparity within and between Communities

Effect	De Beers		Government, Individual, Family, Community
	Environmental Design	Other Mitigation	Other Mitigation
Jobs and income for individuals and contractors	<ul style="list-style-type: none"> 690 FTEs during construction Year 1, 372 FTEs during operations, fewer than 100 FTEs during interim closure, and fewer than 2 FTEs during closure Identifying opportunities for gathering gather information and addressing barriers to successful employment offer employment for those with high school graduation or General Equivalency Diploma (De Beers does consider the experiences of individuals not meeting minimum education requirements for entry level positions on a case-by-case basis) 	<ul style="list-style-type: none"> establish a recruitment and training strategy for school students that encourages and promotes the completion secondary school identify possible opportunities for joint ventures develop a flexible contracting approach by size and scope to match the capacity of Aboriginal businesses and NWT businesses where feasible offer scholarships to female NWT students who are attending college and university programs offer scholarships and awards for women who are in an apprenticeship program with the project 	<ul style="list-style-type: none"> participation in Labour Force Strategy along with the GNWT and other mining operations
Loss of skilled labour in the communities Loss of volunteers	<ul style="list-style-type: none"> use 2:2 rotation to maximize time in the community provide return air transportation to employees travelling from designated pick-up points in NWT communities and the Project provide incentives to those employees interested in volunteering their time for social or cultural programs or activities in their home communities provide apprenticeship positions for NWT Aboriginal residents and other NWT residents who successfully meet trades entrance requirements work with community agencies to ensure that literacy programs will be directly linked to other kinds of upgrading, education, and training programs, so that participants may further improve their qualifications towards employment provide First Aid/CPR, SHE and WHMIS training 	<ul style="list-style-type: none"> traditional pursuits of Aboriginal employees accommodated within work schedules in balance with the operational requirements of the Project, where practicable and with appropriate notice financial or in-kind support for local cultural programming financial or in-kind support for language support programs in communities financial or in-kind support for on-the-land programming 	
Inflation; cost of living	<ul style="list-style-type: none"> provide money management training for employees 	<ul style="list-style-type: none"> bring money management course to communities through banking establishment 	

FTE = full-time equivalent; GNWT = Government of the Northwest Territories; NWT = Northwest Territories; SHE = Safety, Health and Environment; WHMIS = Workplace Hazardous Materials Information System;

12.6.3.5 Residual Effects Summary

The evidence suggests that there is some degree of social disparity within and between the communities in the study area. In the potentially affected communities, the following observations have been made:

- unemployment is down, meaning fewer people are on social assistance;
- income levels have gone up overall;
- education levels are improving, although not all communities have experienced the same level of educational achievement;
- previous mining activities have had no impact on inflation, although some differences exist in the cost of living between communities; and
- social support networks in communities still exist.

The information presented above indicates that benefits have been dispersed across communities, albeit not equally. De Beers recognizes that, although some inequality between communities may persist, the real challenge is to identify the specific issues and barriers that prevent some communities from participating fully in the emerging economy, including increased employment opportunities. Those that have benefited the least are those with less than high school completion.

Mining projects may have reduced community disparity through the employment of people who previously might have been considered unemployable by many accepted standards in southern Canada. Among the notable barriers to employment for many individuals is the requirement to having achieved an academic level of Grade 12. The current NWT economy has created a productive role for people with limited formal skills and/or education. It has also brought employment to people living in small and isolated communities without any active market in which they might generate economic activity on their own.

In general, the issues raised and captured in the Terms of Reference suggest that a segment of the population is concerned about the lack of social inclusion, or the ability to benefit from the employment opportunities offered by economic development and the Project. The issue is not with economic growth or the Project itself, but rather how others can directly benefit from this activity when they are not directly or indirectly employed by it. The clearest example of this came during De Beers' engagement activities with communities. Elders expressed concern at the lack of support from family members who were employed at the mines (e.g., assistance with rent).

The Project will not have a negative impact on social disparity, cost of living, and social problems. In fact, as previously indicated in this key line of inquiry, social disparity between communities has been greatly reduced over the past decade and the overall standard of living has greatly improved as a consequence of economic growth.

The issues and concerns raised by elders in this key line of inquiry more likely have resulted from the lack of social inclusion. Specifically, some communities and community residents have not been able to participate in the wage economy for a variety of reasons. The social problems that persist despite the economic benefits of diamond mining are of concern to De Beers. Although not directly linked to the Project, De Beers is committed to addressing some of the root causes of social disparity through human resources programs and policies.

12.6.3.6 Residual Impact Classification and Determination of Significance

12.6.3.6.1 Impact on Social Disparity between Communities

Based on experience with earlier mines, the impact of the Project will be positive and of moderate magnitude, and will not result in a significant social disparity between communities (Table 12.6-42).

Table 12.6-42 Classification of Residual Impacts to Social Disparity between Communities

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Education and Skills Up-grading	Positive	Moderate	Local	Medium-term	Likely
Social assistance	Positive. Reduced social assistance	Moderate	Local	Medium-term	Likely
Unemployment	Positive. Reduced unemployment	Moderate	Local	Medium-term	Likely
Inflation	Neutral	Low	Regional	Long-term	Likely

12.6.3.6.2 Impact on Social Disparity within Communities

The Project is expected to have a positive impact of moderate magnitude on education and skills upgrading and a positive impact on employment opportunities for women (Table 12.6-43).

Table 12.6-43 Classification of Residual Impacts to Social Disparity within Communities

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Education and Skills Up-grading	Positive	Moderate	Local	Medium-term	Likely
Loss of skilled labour/volunteers	Neutral	Low	Local	Medium-term	Likely
Employment access for women	Positive. Reduced unemployment	Low	Local	Medium-term	Likely
Inflation	Neutral	Low	Regional	Long-term	Likely

Based on experience with earlier mines, the Project will not result in significant social disparity within communities.

12.7 SUBJECTS OF NOTE

This section of the Environmental Impact Statement (EIS) for the Gahcho Kué Project (Project) provides information on potential effects related to the social, cultural, and economic environment. The Gahcho Kué Panel (2007) included six subjects of note related to socio-economic impacts in the *Terms of Reference for the Gahcho Kué Environmental Impact Statement* (Terms of Reference). These subjects of note are as follows:

- Employment, Training, and Economic Development (Section 12.7.1);
- Demands on Infrastructure (Section 12.7.2);
- Tourism Potential and Wilderness Character (Section 12.7.3);
- Proposed National Park (Section 12.7.4);
- Culture, Heritage, and Archaeology (Section 12.7.5); and
- Aboriginal Rights and Community Engagement (Section 12.7.6).

The subjects of note have been answered in the order they appear above.

The description of each subject of note provided by the Gahcho Kué Panel (2007) in the Terms of Reference is based on the results of the scoping sessions

held by the Mackenzie Valley Environmental Impact Review Board (MVEIRB). Although the subjects of note do not have the same priority as the key lines of inquiry, they also require serious consideration and substantive analysis. The Terms of Reference also require a cumulative effects assessment for each subject of note; this requirement is addressed in Section 12.8.

The Subject of Note: Aboriginal Rights and Community Engagement, is briefly described but not analyzed in this section because consultation on Aboriginal rights is not the responsibility of the developer. Community engagement is, however, an integral component to the Project and this EIS, and can be found in Section 4, Community, Regulatory, and Public Engagement.

12.7.1 Subject of Note: Employment, Training, and Economic Development

12.7.1.1 Introduction

12.7.1.1.1 Context

The Subject of Note: Employment, Training, and Economic Development is a broad issue that overlaps other sections of the EIS. In particular, it is closely related to the following two key lines of inquiry:

- Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects (Section 12.6.1); and
- Key Line of Inquiry: Social Disparity Within and Between Communities (Section 12.6.3).

12.7.1.1.2 Purpose and Scope

Training and education are important considerations with respect to economic growth. For those employed, jobs provide income that, when spent, benefit the broader economy. An increased number and variety of jobs also provide opportunities to maintain and improve skills and aptitudes, which are important aspects that enhance community sustainability. Employment and income are also strongly correlated to improved socio-economic status, including health and well-being.

The purpose of the Subject of Note: Employment, Training, and Economic Development, is to meet the Terms of Reference (Gahcho Kué Panel 2007). The Terms of Reference describe the requirements of this subject of note as follows:

“The EIS must provide an analysis of training and education needs for mine employment and mine worker advancement. In addition the EIS must provide an analysis of how the proposed development might affect training and education in the potentially affected communities in general. For example, increased training and education programs for mine employees but not for others, might increase the social disparity issues discussed in Section 4.1.6 [in the Terms of Reference]. Moreover, training and education can contribute to providing opportunities unrelated to the proposed development that may address some of the lost opportunities issues defined in Section 4.1.7.

The EIS must assess the current capacity of training programs and of Aboriginal and northern people to engage in these training programs. The developer is encouraged to present its views on how the development can address the issue in conjunction with existing or possible future government programs. (p42-43)

The scope is provided by the Terms of Reference, which specifically direct De Beers to provide the following:

- all employment requirements by skills category over the life of the project;
- which employees will be direct versus contractor employees, and describe whether and how the developer will require its contractors to have similar commitments to maximizing regional and Aboriginal employment;
- where the likely labour pool “draw” is going to be from for this development. This must include an assessment of the available labour pool, at varying geographic scales, to meet the direct mine labour requirements, including: individual communities and the Akaitcho and Tłıchǫ regions as a whole, territorial, and beyond the NWT;
- any identified barriers to employment, advancement and retention for Northern workers (with particular emphasis on residents of smaller potentially affected communities and Aboriginal people), including minimum skill requirements, hiring policies related to criminal records or substance addictions, availability of willing employees, and lack of training opportunities for community members;
- the requirements for any training, education, and other improvements necessary to maximize employment of residents of potentially affected communities in the workforce of the mine, and compare these requirements to existing training initiatives available in the NWT;

- requirements for any training, education or other improvements necessary to maximize engagement of businesses of each potentially-affected community in the economic benefits accruable from the development; and
- the developer's strategies, plans or commitments with respect to maximizing the proportion of direct mine employees that are NWT residents, Aboriginal persons, and residents of potentially affected communities (e.g., through hiring policies, training initiatives).

12.7.1.1.3 Project Features that Reduce Effects

To address the issues that are embodied in the Terms of Reference, De Beers has incorporated environmental design features and mitigation into the Project to remove or reduce the negative effects, or enhance the positive effects of the Project. De Beers offers a variety of training and education opportunities to its employees, and supports similar programs for contractor employees (Table 12.7-1). These opportunities are intended to prepare individuals for employment and allow interested employees to up-grade their skills through participation in apprenticeship programs.

Table 12.7-1 Environmental Design Features that Enhance Positive Effects related to Employment, Training and Economic Development

Project Component	Potential Effect	Environmental Design Feature
Employment	the Project will encourage opportunities for education and training on Project-related trades and careers	<ul style="list-style-type: none"> • provide supervisor and mentor training • provide apprentice and trade positions • offer literacy programs for employees who do not meet the minimum requirement to allow for up-grading and possible advancement • make best efforts to schedule training so that potential employees who have completed the training will be able to take immediate advantage of employment opportunities with the Project, and encourage contractors to do the same
	the Project will provide training / skills up-grading to employees	<ul style="list-style-type: none"> • provide apprentice and trade positions, including necessary training hours for workers to achieve their trade's certificates on-site (heavy equipment operator, electrician, and mechanic and mill operators) • provide training for new employees • provide money management training • provide on-site literacy programs • provide SHE and WHMIS training
Procurement	the Project may result in northern and Aboriginal procurement	<ul style="list-style-type: none"> • verify that hiring and training commitments from contractors are met • make best efforts to schedule training so that potential employees who have completed the training will be able to take immediate advantage of employment opportunities with contractors

SHE = Safety, Health and Environment; WHMIS = Workplace Hazardous Materials Information System

12.7.1.1.4 Content

The Terms of Reference requirements for Employment, Training, and Economic Development can be summarized into two key impact considerations:

- what needs to be done to maximize direct employment of residents and economic development in the Northwest Territories (NWT); and
- what can be done to maximize skills development in employees.

Particular emphasis for this subject of note will be given to residents of smaller communities and Aboriginal people.

12.7.1.2 Maximizing Northwest Territories Employment and Procurement

The following discussion begins with a review of current labour market conditions in the NWT and how this has evolved over the past decade, with reference made to past and present economic development and Aboriginal businesses. This is followed by an analysis of projected labour supply and labour market conditions, demand, and the implications with the Project, followed by a discussion of what needs to be done to maximize direct employment and procurement in the NWT.

12.7.1.2.1 Existing Environment

The Terms of Reference recognize that future industrial development issues relate mainly to the cumulative socio-economic changes that have taken place over the past decade. The NWT has been able to demonstrate that it is possible to have economic development, while maintaining traditional community values and lifestyles. Evidence from the baseline study indicates that the majority of socio-economic changes have been positive, although not in all cases. For example, crime, homelessness, and other features of social disparity have been experienced unevenly in the Local Study Area (LSA) communities. Still, the success of the NWT has been largely attached to its impressive economic development trajectory since the end of the 1990s.

The NWT has undergone a major transformation since the construction of the Ekati Diamond Mine began and the beginning of diamond production in 1998, affecting all aspects of economic life in the territory. While the impetus for these changes has been largely driven by resource development, the creation of Nunavut in 1999 has been a contributing factor. It was the discovery of diamonds in the North Slave Region of the NWT followed shortly thereafter by construction of BHP Billiton's Ekati Diamond Mine that set the NWT on a new path. In 2003, the opening of Rio Tinto's Diavik Diamond Mine overshadowed

the negative effects of the division of the NWT and Nunavut and the closures of Giant and Con Mines.

Some highlights of the past 12 years of diamond mining development when compared to socio-economic conditions pre-1998 are as follows.

- The wealth generated by the diamond industry has changed the NWT. Governments have benefited further as a result of increased revenues generated at the corporate and personal taxation levels, through resource royalties, and through indirect taxes on products. Through all this, inflation has also remained below the Canadian average.
- Participation in the workforce has grown considerably and has attracted new labour into the marketplace. Existing businesses have expanded, new ones have been created, and viable Aboriginal development corporations have emerged (discussed below), furthering the size and extent of economic benefits flowing from the diamond industry. Unemployment is no longer the dominant issue preventing NWT society from reaching its socio-economic potential. Unemployment has dropped in most communities, rising only slightly with the recent economic downturn. The NWT unemployment rate achieved a low of 5 percent (%) from 2005 to 2007. The larger workforce has also resulted in fewer people drawing on social assistance.
- Education and skill levels of NWT residents have undergone a substantial improvement. This is likely the result of the combined efforts of community leaders, the diamond mining community, and government programming (e.g., secondary schools are now in nearly all the communities).

The NWT has not undergone a dramatic population change as had been predicted during the environmental assessments for Ekati Diamond Mine and Diavik Diamond Mine (in-migration of job seekers). Throughout much of the first decade of 2000, there has been a net out-migration of skilled labour. Instead, the number of NWT residents has changed little over the past decade, growing at a rate well below the national average, and leaving the growth in demand for public services and infrastructure, as it relates to population growth, as it was prior to this latest development phase. While many of these factors have been largely positive, economic growth in the NWT has slowed since 2004. Major capital developments during the mid 2000s, the Ekati, Diavik and Snap Lake mines, have had a positive effect on economic growth rates. The period between 2003 and 2007 represented a period of increasing mineral exploration and deposit appraisal activity. This began with \$53.6 million in spending in 2003 and peaked in 2007 with \$193 million in spending (NWT Bureau of Statistics 2010a).

The economic downturn in 2009 has since led to a decline in mineral exploration activity to \$29.5 million in 2009. In 2009, mining and oil and gas represented one-third (32%) of the total GDP, a 15% decline from 2008 (NWT Bureau of Statistics 2010b). Overall, GDP in the NWT declined by 5.9% in 2009, the fourth largest decline among all provinces and territories (NWT Bureau of Statistics 2010b).

Mining and oil and gas in the NWT have resulted in spin-off activities in other sectors such as construction, commercial services, transportation, and storage. Indirectly, this has led to growth in the number of registered corporations, including housing sector investments, hotel accommodation, and full-service restaurants.

The Conference Board of Canada (2010) predicts that a rebound in mineral exploration will propel total GDP forward by 4.8% in 2010 and 9.3% in 2011 (but still below the 2007 increase). Employment growth is expected to lag behind the recovery and the employment rate is projected to average 7% over the next three years, a substantially higher rate than before the recession. Spending in the construction sector is also expected to decline by 30% in 2010. One reason for the large decline is the completion of the \$565 million Diavik underground expansion (Conference Board of Canada 2010).

Aboriginal Businesses

Many northern businesses serve the mining industry and are interested in Project-related business opportunities. Several of these businesses are Aboriginal-owned and located in the LSA. Unlike many other commercial enterprises, Aboriginal business must also fulfill a social mandate; this includes providing training, development, and marketable skills that will have value in the future, even if the mining industry shifts focus to another part of the world. The Northern Aboriginal Business Association is seeing more companies exploring employment and procurement options across Canada and in other countries (MTS 2009). Aboriginal leaders have increasingly separated their business interests from their political interests, which, according to the Northern Aboriginal Business Association, allow them to pursue opportunities outside their home communities in addition to local opportunities (MTS 2009).

Several Aboriginal-owned registered businesses are located in or near Yellowknife. Tlicho Logistics Inc. is 100% owned by the Tłı̨chǫ and primarily focused on the supply of services to the mining sector, with over 350 employees in 2008 (Werniuk 2008; Tlicho Investment Corporation 2010, internet site). Det'on Cho Corporation, the economic arm of the Yellowknives Dene First Nation, currently has 20 business subsidiaries that provide goods and services to their local communities and the mining industry (Det'on Cho Corporation 2010,

internet site). In 2010, for example, there were 17 registered Inuit businesses (Pan Arctic Inuit Logistics Corporation 2010, internet site).

Several business funding and service programs have also been developed for Aboriginal people. Indian and Northern Affairs Canada (INAC) is a provider of the Aboriginal Business Canada program, with an office in Yellowknife. Aboriginal entrepreneurs of Métis, Dene, and Inuit heritage are eligible for financial assistance, business information and resource materials, and referrals to other possible sources of financing or business support. The program supports business in a variety of areas that include manufacturing, tourism, innovation, and youth entrepreneurship (Indian and Northern Affairs Canada 2009).

Aboriginal businesses in the NWT have been affected by the economic downturn in 2008 and 2009. The marketplace has become more competitive and Aboriginal companies have adapted to these pressures. Anticipated private sector investment and business activity in some parts of the LSA, such as the South Slave Region, are not as well developed compared to other regions of the NWT. Socio-economic factors affecting the level of private sector investment, business activity, and employment in the South Slave Region include political uncertainty, business climate, job and training availability, educational levels attained, and the level of government financial support. Indirect benefits of private-sector investments include businesses that provide goods and services such as housing, retail, and professional services.

Through its Snap Lake Mine, De Beers encourages northern and Aboriginal involvement in several ways, such as through its NWT Business Registry. Businesses can submit their profiles and access information about goods and services required at the Snap Lake Mine. In 2009, nine NWT businesses either entered or modified their profiles in the NWT Business Registry; by the end of the year, 163 Businesses were registered. De Beers also publishes an annual Northern Business Opportunities Profile, which outlines their Northern Business Agreements and Commitments, lists items to be purchased for the following year's winter road supply and provides contacts, among other information (Snap Lake Mine Report 2009).

12.7.1.2.2 Effects Analysis

De Beers will annually employ 372 people (typical year)²⁰ over the course of its 11 years of operations for the Project, with only half this number being on-site at any given time due to the rotational schedule. Table 12.7-2 indicates the approximate distribution of skilled, semi-skilled, unskilled, professional and managerial staff. Most positions are semi-skilled and require high school completion. Any positions above semi-skilled require the completion of a trades program or university. Only unskilled positions do not require the completion of secondary school.

In addition to the direct employment benefit, the Project will extend the economic cycle of the NWT (Figure 12.7-1) and procurement opportunities with the business community. This may not happen initially as the current labour force is limited due to structural²¹ and frictional²² unemployment (Appendix 12.II). As the South Slave Region of the LSA develops economically, the diversity of available goods and services should increase. Łutsek'e should also benefit economically with the establishment of the East Arm National Park and its associated tourism and recreation opportunities.

Table 12.7-2 Number of Projected Skilled, Semi-Skilled, Unskilled, Professional and Managerial Staff during the Operations Phase of the Project

Type of Operation	Management	Professional	Skilled	Semi-Skilled	Unskilled	Total
Mining	4	14	43	96	6	163
Process Plant	1	9	20	32	7	69
Surface Operations	0	0	4	22	4	30
Administration: On Site	12	9	27	0	50	98
Administration: Yellowknife	3	0	6	3	0	12
Administration: Outside NWT	0	0	0	0	0	0
Total Number	20	32	100	153	67	372
Percentage	5%	9%	29%	41%	18%	

Note: The above employment distribution estimate is an approximation for the operations period based on typical annual employment of 372 people (average is 365 people). It is important to note that in any one year, the total and mix of employees may differ from this estimation.

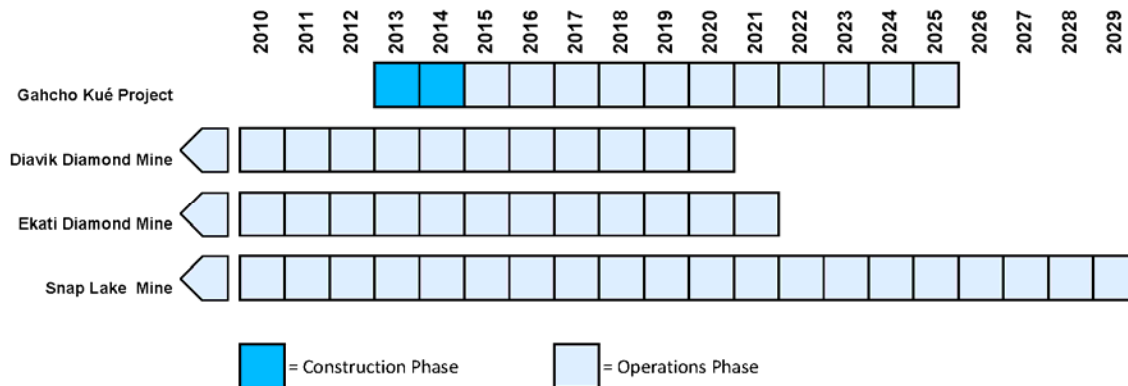
% = percent

²⁰ A "typical" year is based on 7 out of the 11 years of operations. During the first few years, the Project is ramping up to full capacity whereas in the final few years it is gearing down towards closure.

²¹ Structural unemployment refers to situations where the pool of prospective employee is unable to participate in the economy because of issues of mobility, education, mismatching skills, cultural issues and a lack of interest in the wage economy.

²² Frictional unemployment refers to individuals that are between jobs or are new to the workforce.

Figure 12.7-1 Projected Operating Life of Existing and Proposed Diamond Mines in the Northwest Territories



Note: Estimated construction start date dependent on all permits and approvals, and is subject to change.

Early on, De Beers anticipates that a majority of its construction work force will reside outside of the NWT, and for the first few years of operations, the number of available, qualified, and interested labourers from the NWT will be limited. However, once the slowdown at the other mines is underway, the availability of labour for the Project should increase. The characteristics of the future local labour force include:

- a strong skill set focused on mining activities;
- many years of experience in a variety of capacities within mining and mine services;
- being accustomed to the rotational work schedule; and
- an eagerness to find new employment in order to maintain their standard of living.

To maximize NWT employment and procurement, De Beers' approach includes the following:

- targeted recruitment across the NWT;
- co-operation and partnership in training programs;
- promotion of employment opportunities in the mining industry;
- employing best efforts to hire contractors according to the preference and order indicated in the Project Description (e.g., first preference to northern contractors);

- identifying which Project components should be targets for a northern business development strategy (i.e., can be directed at northern contractors); and
- establishing pick-up points in NWT communities close to the Project for the transportation of employees in and out of site.

Overall, the Project will likely have a positive influence on the labour force and unemployment rates through 2025 (Year 11, end of operations). By 2030 (Year 16) when the Project is winding down, unemployment rates will creep upwards to rates nearly double from present day (Table 12.7-3). The employment from the Project offsets the expected job losses at Ekati and Diavik, especially in the latter years of the current decade. This demographic scenario in Table 12.7-3 assumes that any changes in the current major economic projects are allowed to influence the population and labour force of the NWT, no other major projects are introduced, and the underlying economy moves forward at a pace that matches the existing economic state. This scenario also assumes that there is no influence from economic developments in Nunavut. By 2025 (Year 11), with the Project, total employment in the NWT will equal 22,415 and the unemployment rate will equal 10.6%. In 2030 (Year 16), with the closure of the mines, however, employment drops to 21,096 and unemployment rate increases to 13.6%.

Table 12.7-3 Current Labour Force Projections in the Northwest Territories, 2010 to 2030

Year	Projected Net Population	Population 15 years of age and older	Labour Force	Employment	Unemployment Rate (%)
2010	43,759	34,228	22,878	21,200	7.3
2015	44,644	34,710	24,222	22,370	7.6
2020	45,060	35,098	24,677	22,627	8.3
2025	44,941	35,385	25,059	22,415	10.6
2030	42,827	34,324	24,406	21,095	13.6

Source: Appendix 12.II

% = percent

12.7.1.3 Maximizing Skills Development for Employees

12.7.1.3.1 Existing Environment

Rising demand for labour in the NWT has led to increasing participation and employment rates in the LSA. However, these rates are lower in smaller communities when compared to Yellowknife. Smaller communities have fewer and more limited job and career opportunities compared to larger centres, and lower educational attainment rates are likely having an effect on the size of the labour pool. Some of those who are unemployed or not participating in the

labour force face barriers to employment including literacy, adequate training and education opportunities and substance abuse issues (NAHO 2008).

The government, schools, and industry are seeking to address these challenges in an effort to increase the labour force and create more economic and employment opportunities for Northern residents. There is growing demand for skilled labour, especially in mining, and it has become more and more challenging to meet these needs in the North. Key informants suggest that those who are employable are employed, and that as a result companies are hiring outside the NWT to fill skilled and professional level positions in their workforce.

The NWT offers full secondary school programming in all the LSA communities except for Łutselk'e, Gamètì, and Wekweètì. In these communities, after Grade 9, the students must travel to other communities to finish their education. These students are billeted with families, as needed.

In addition to offering training, institutions such as the MTS also track job opportunities at the different mines in the NWT, not only the diamond mines. Careers in mining are growing in demand. British Columbia, Nunavut, and Ontario are also pushing for more trained miners and are competing for the same labour pool being tapped by the NWT.

The NWT also has a well-established system to support individuals who may have an interest in mining-related careers, with a variety of programs that support literacy, and gaining experience related to the mining industry (e.g., the recent Northern Women in Mining, Oil and Gas Program, and the variety of programs delivered through the MTS). Over the past decade, mine-related skills and trades programming has expanded and matured. Northwest Territories residents can access the following:

- the Job Futures Program;
- the MTS, Aurora College, and industry partners;
- industry-driven training positions (e.g., underground mining, large equipment mechanic, mineral processing);
- Aurora College programs for certificate, diploma, and trades and technology skills development; and
- scholarships and financial aid.

Programming or finances are available to individuals who have an interest. All the mines offer scholarships or other supports to eligible students. In addition,

students can enroll in university programs outside the NWT that relate to needed mine-related skills (e.g., engineering). If they return to the NWT after school completion, some or all of their Government of the Northwest Territories (GNWT) loan repayments will be waived depending on the circumstances. Some institutions such as the Northern Alberta Institute of Technology (NAIT) and the Southern Alberta Institute of Technology (SAIT) provide additional support to assist northern students with the transition.

Not all of these education and training initiatives have been successful. For example, the limited success of the Northern Women in Mining, Oil and Gas Project (2007 to 2010) indicate that barriers still exist for women in the NWT to become employed or retain their positions in the trades. Women especially face many employment barriers in the mining, and oil and gas sectors, including being the primary, and possibly the only, caregiver in the family. They may also lack support from partners and family in pursuing rigorous training; they are often unable to work either full time or outside the community. Other barriers are based on limited education levels and opportunities, limited financial resources, and the perception that trades and industrial occupations are best suited to men. More concerted efforts are required to overcome these barriers.

12.7.1.3.2 Effects Analysis

As the baseline study indicated, availability of skilled labour in the NWT is increasing but is still low by Canadian standards. Most communities in the LSA have secondary schools, mining and trades training have increased enrolments, and the number of scholarships has increased over the past several years. Still, engagement held with potentially affected communities in the LSA indicate that more support is needed for literacy and education to develop capacity for an educated workforce as people are struggling with accessing training programs.

The Project requires a training program to address the shortage of trades people in the NWT. Maximizing skills development for employees required for the Project cannot be predicted with high certainty. How many people will need to be trained or how effective the training will be is unknown. Programs need to address barriers to hiring and retention, such as training programs for LSA community residents and initiatives to support employment of women.

The Project will provide employment opportunities for NWT residents throughout construction, operations, and closure, as well as after the expected decline of the existing mining operations. Maximizing the employment of NWT residents and maximizing skills development are an integral part of the Project Design. The Project will require 372 employees during operations. Most of these positions are semi-skilled and skilled. A semi-skilled person has secondary school or

equivalent and three years of work experience, such as equipment operator or apprentice. Skilled employees are generally individuals that have finished their trades training and are certified.

The aim is to fill as many of the skilled positions and as many of the semi-skilled positions as possible with northern Aboriginal workers over the life of the Project. Unskilled workers will receive on-the-job training. As vacancies in skilled and semi-skilled positions occur, concerted efforts will be made to fill these positions with northern Aboriginal workers. While high school graduation or General Equivalency Diploma are the minimum qualifications for entry level (unskilled jobs) for construction and operations, De Beers will consider the experiences of individuals not meeting minimum education requirements for entry level positions on a case-by-case basis. De Beers' hiring objectives also include considering hiring from points in the NWT other than the traditional diamond communities²³.

De Beers has developed a specific training approach and relationships for its northern operations (Section 12.4 Project Description). Individuals employed with the Project will be able to continue their skills development, inside and outside of classrooms. The skills development program offered at the Project includes the key aspects required for a successful skills development program. In addition, skill development in employees requires the following:

- knowing the skills needs;
- identifying the training and learning opportunities;
- providing coaching and mentoring opportunities; and
- ensuring access (Alberta Human Resources and Employment 2005).

Other considerations to maximize skills development in the NWT include employment and training of potential employees, worker advancement, and identifying supports that will encourage the participation of women in training and employment opportunities. De Beers will continue to support programming in training and education in general.

De Beers is already involved with the following initiatives related to the employment and training of potential employees:

- offering a mine orientation program for all new employees;

²³ Behchokò, Gameti, Whatì, Wekweètì, Detah, N'Dilo, Łutselk'e, and Yellowknife.

- making best efforts to schedule training so that potential employees and encouraging contractors to support placement of trainees and apprentices;
- conducting training needs assessment to identify existing educational and/or skill levels of Aboriginal community members and other NWT residents who apply for positions and using the results so that work can be offered to new recruits and opportunities for training and advancement can be offered to existing employees; and
- training and offering advancement opportunities to existing employees in accordance with the hiring priorities; subject to each employee's performance, training, skills, interest, and career plan.

Advancement of Workers

To provide opportunities for career advancement, De Beers is already involved with the following initiatives related to worker advancement:

- promoting from within and facilitate advancement of entry-level Aboriginal workers;
- locating a learning centre on-site with equipment and resources, which will include computers and a learning centre resource library. On-site literacy programs are linked to recruitment and employment strategies to permit employees to take advantage of career advancement opportunities;
- offering apprenticeship positions in accordance with the requirements of the Northwest Territories *Apprenticeship, Trade and Occupations Certification Act*. Opportunities are provided for workers to obtain the necessary training hours to achieve their trades certificates on-site, including heavy equipment operator, electrician, and mechanic and mill operators;
- linking new Aboriginal employees with mentors that focus on encouraging career development and advancement; and
- implementing a mandatory Supervisory Training Program for supervisory and management staff. The program establishes the roles and responsibilities of foremen and supervisors, including coaching and supporting the training and development of their employees.

Women

Among others, De Beers is involved with the following initiatives related to the employment and training of women:

- working through Skills Canada, the Native Women's Association of the NWT, the Status of Women Council of the NWT, Aurora College,

Aboriginal communities, and the GNWT to promote women in trades and mining occupations;

- setting aside within scholarship programs, scholarships for female NWT students who are attending college and university;
- promoting and supporting activities in the NWT that target young women for jobs at the Project;
- making female role models available for school and community partner programs to promote women working at the Project;
- supporting “women in trades” programs in partnership with educational institutions and women’s groups in selected communities;
- offering scholarships and awards for women who are in an apprenticeship program with the Project; and
- encouraging contractors to participate and support De Beers’ commitments related to promoting the participation of women in the workforce.

Continued employment for people already in the workforce and new employment opportunities for those not in the workforce will also lead to increased skills and experience. By increasing the capacity of northern and Aboriginal employees and contractors through continued and new work opportunities, combined with the skills and training to be obtained for those involved in working for the Project, additional spin-off effects will be generated that could carry over to other types of work (e.g., oil and gas sector, construction, maintenance).

12.7.1.4 Residual Effects Summary

With the experience De Beers has already gained with its northern operations, the effects of training on the LSA communities during the lifespan of the Project are anticipated to be positive. De Beers has also established relationships with the LSA communities. Because the LSA overlaps with the existing Snap Lake Mine, De Beers will be able to adapt ongoing training initiatives throughout the LSA communities for this Project. The LSA communities will also be encouraged to help more applicants pursue existing training programs, or new ones when they are made available.

With these and related efforts, more people in the LSA are expected to benefit from training and employment opportunities provided by the Project. These benefits are expected to extend after mine closure. The magnitude of effects of maximizing skills development for employees is expected to be moderate.

One factor that may limit success includes the availability of the existing labour force, with trained mine workers from local communities already largely employed in the sector, and the need to bring in skilled workers from beyond the RSA (NWT). Another potential barrier is availability and support for training initiatives in the LSA communities. Targeted training programs will be required, not only by De Beers, but also as developed and implemented by the GNWT and others. Continued participation with the GNWT in developing its Labour Force Strategy will also be required to ensure strategies for those from LSA communities are supported with training initiatives that increase their chances of employment in the NWT.

12.7.1.5 Mitigation

Mitigation related to maximizing employment, skills, and procurement are captured as environmental design features or additional programming offered by De Beers (Table 12.7-4). De Beers will also continue its support of initiatives offered by other parties (see also Section 3). As with any training program, the success of these programs will be dependent on the participation and interest of NWT residents.

Table 12.7-4 Mitigation for Employment, Training and Economic Development

Effect	De Beers		Complementary Actions by Government, the individual, family or community	Cumulative Effect (yes, no)
	Environmental Design Feature	Other Mitigation	Other Mitigation	
The Project will provide jobs and income for individuals and contractors	<ul style="list-style-type: none">372 unskilled, semi-skilled, skilled, professional and management positions during operationsidentify opportunities to gather information and address barriers to successful employmentoffer employment for those with high school graduation or General Equivalency Diploma (De Beers does consider the experiences of individuals not meeting minimum education requirements for entry level positions on a case-by-case basismaintain two Community Liaison Coordinator positions to work with communities throughout life of the Project.	<ul style="list-style-type: none">contract positions related to procurement opportunitiespromoting and encouraging partnerships with NWT schools that enable students to understand career opportunities available as well as training and education required to pursue these opportunities encourage partnerships with Aurora College and other Canadian post-secondary education institutions to establish work experience and job placement programswork with local employment officers, and advertise positions available in northern newspapers and the company websitework through Skills Canada, the Native Women's Association of the Northwest Territories, the Northwest Territories Status of Women Council, Aurora College, Aboriginal communities, and the Government of the Northwest Territories to promote women in trades and mining occupationsverify that hiring commitments from contractors are metprovide employment incentives (e.g., performance)offer scholarships to female NWT students who are attending college and university programsconduct a training needs assessment to identify existing educational and/or skill levels of Aboriginal community members and other NWT residents who apply for positions, so that work can be offered to new recruits and opportunities for advancement can be offered to existing employeesfinancial or in-kind support "women in trades" programs in partnership with educational institutions and women's groups in selected communitiesestablish a recruitment and training strategy for school students that encourages and promotes the completion of secondary school and awards for women who are in an apprenticeship program with the Projectencourage career development and advancement for young Aboriginal employees through mentoring program	<ul style="list-style-type: none">training and education programmingLabour Force Strategy developmentenrolling in available training and education	Yes. Continued employment for people already in the workforce and new employment opportunities for those not in the workforce
The Project will encourage opportunities for education and training on Project-related trades and careers	<ul style="list-style-type: none">provide apprenticeship positions for NWT Aboriginal residents and other NWT residents who successfully meet trades entrance requirementsestablish a mine orientation program for all new employeesprovide money management trainingwork with community agencies to ensure that literacy programs will be directly linked to other kinds of upgrading, education, and training programs, so that participants may further improve their qualifications towards employmentprovide First Aid/CPR, SHE and WHMIS trainingprovide supervisor and mentor trainingprovide apprentice and trade positionsmake best efforts to schedule training so that potential employees who have completed the training will be able to take immediate advantage of employment opportunities with the Project, and encourage contractors to do the same	<ul style="list-style-type: none">encourage partnerships with NWT schools regarding work experience and job placement programsencourage partnerships with Aurora College and other Canadian post-secondary education institutions to establish work experience and job placement programsoffer scholarships to female NWT students who are attending college and university programsconduct a training needs assessment to identify existing educational and/or skill levels of Aboriginal community members and other NWT residents who apply for positions, so that work can be offered to new recruits and opportunities for advancement can be offered to existing employeesoffer scholarships and awards for women who are in an apprenticeship program with the Projectencourage career development and advancement for young Aboriginal employees through mentoring programwork with and encourage contractors to participate and support De Beers' commitments related to general hiring commitments as well as promoting the participation of women in the workforce and provide employment incentives to encourage relocation to the NWT	<ul style="list-style-type: none">training and education programmingenrolling in available training and educationwork through Skills Canada, the Native Women's Association of the NWT, the Status of Women Council of the NWT, Aurora College, Aboriginal communities, and the GNWT to promote women in trades and mining occupationsfinancial or in-kind support "women in trades" programs in partnership with educational institutions and women's groups in selected communitiestraining and education programming, including partnership with GNWT Education, Culture and Employment to facilitate visits by Student Financial Officers to high schools to help students plan their finances for post-secondary education, and partnerships with the NWT Literacy Council, in the area of family literacy initiatives in the communitiesenrolling in available training and education	Yes. A more skilled and educated work force.

SHE = Safety, Health, and Environment; WHMIS = Workplace Hazardous Materials Information System; NWT = Northwest Territories; GNWT = Government of the Northwest Territories.

12.7.1.6 Residual Impact Classification and Determination of Significance

12.7.1.6.1 Methods

The criteria for the describing residual effects are provided in Table 12.7-5. Details on the assessment approach and method are provided in Section 12.5. Significance determination for adverse effects will be based on these impact criteria.

Table 12.7-5 Definitions of Criteria Used in the Residual Impact Classification

Direction	Magnitude (Negative Impacts)	Magnitude (Positive Impacts)	Geographic Extent	Duration
Negative: A less favourable change relative to baseline values or conditions. Positive: An improvement over baseline values or conditions. Neutral: No change relative to baseline values or conditions.	Low: The change has no impact on the socio-economic environment beyond that of a nuisance (annoyance) value. Moderate: The change to the VC is predicted to impair quality of life or livelihoods. High: The change to the VC is large enough to seriously impair quality of life or livelihoods of potentially-affected individuals and communities.	Low: The change has a slight but discernible positive impact on livelihoods and socio-economic development. Moderate: The change to the VC creates a noticeable increase in opportunities for improving livelihoods, and enhancing socio-economic conditions. High: The change to the VC alters opportunities for livelihoods and socio-economic development to the extent where sustainability of is considerably improved.	Local: The impact will affect one or more of the communities in the local study area. Regional: The impact will affect communities in the local study area and the NWT. National: The impact will affect individuals or communities beyond the NWT.	Short-term: the impact ceases before the end of construction (within 1 to 2 years). Medium-term: the impact ceases before or near the end of operation (within 3 to 11 years following construction). Long-term: The impact will cease after the operational life of the Project. Permanent: The impact on the receiving environment will effectively be irreversible.

VC = valued component; NWT = Northwest Territories.

Frequency and reversibility were not considered. For socio-economic conditions the effects are generally continuous; therefore the criterion for frequency is typically not used (Section 12.5). Reversibility is generally not desirable even if it were possible. Socio-economic effects associated with a project are typically part of an ongoing process of interdependent economic and social change extending into the future, which generally cannot be reversed to return to pre-project development conditions. In fact, it is usually not desirable because to do so implies job losses and other negative socio-economic effects. Consequently, the socio-economic manageability of potential effects is often considered rather than their reversibility, as few means exist to reverse social change that occurs as a result of a project (Section 12.5).

The following definitions were used to determine the significance of the impacts from the Project on the subjects of note:

- **Not significant** - The impact is measurable at the individual, family, or community level, and strong enough to be detectable at the population level, but is not likely to result in substantial changes in the well-being of populations and communities.
- **Significant** - The impact is clearly distinguishable from baseline conditions and results in strong interest or concern, and/or results in substantial changes in the well-being of populations and communities.

12.7.1.6.2 Results

The residual impacts of maximized direct employment and procurement of NWT residents are predicted to be positive, but will vary over the life of the mine. Once the Project concludes, these jobs and contracts will disappear. Still, the impact of direct employment will be long-term as it extends beyond mine closure (Table 12.7-6).

Table 12.7-6 Classification of Residual Impacts to Employment, Training, and Economic Development

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Maximized Direct Employment	positive	moderate	local	long-term	highly likely
Skills Development	positive	moderate	local	permanent	highly likely

% = percent

The residual impacts of maximized skills development are predicted to be positive, but will vary with the interest of the employees. Once the Project is concluded, the impact will continue for those employees who have chosen to develop their skills. The impact is permanent as the work experience and skills gained will be transferable to other projects and even other sectors (Table 12.7-6).

The Project is predicted to have a positive impact of moderate magnitude on employment, training, and economic development of people and the LSA communities. This benefit is not considered to be significant due to the relatively few additional employed workers and contractors, and limited number of trained employees, from the LSA, particularly the smaller communities

12.7.2 Subject of Note: Demands on Infrastructure

12.7.2.1 Introduction

12.7.2.1.1 Context

In this subject of note, discussions on the labour shortage, and human and economic resources are closely related to other discussions in Section 12. The related subsections of Section 12 are as follows:

- Key Line of Inquiry: Long-term Social, Cultural, and Economic Effects for the labour shortage discussion (Section 12.6.1)
- Subject of Note: Employment, Training, and Economic Development for the human and economic resources discussion (Section 12.7.1)

12.7.2.1.2 Purpose and Scope

The purpose of the Subject of Note: Demands on Infrastructure is to meet the Terms of Reference (Gahcho Kué Panel 2007). In light of the multiple infrastructure demands, the following specific issues identified in the scoping sessions must be addressed:

- infrastructure pressures on regional centres from in-migration;
- shortage of locally available labour for community services;
- costs for government to provide services increases and maintain adequate physical infrastructure;
- monitoring and regulatory capacity over-extension of human and economic resources by local communities through Project and its review process; and
- rotational schedule resulting in the absence of critical volunteers (e.g., volunteer fire fighters).

Infrastructure consists of the physical resources and social services used by people and communities. These include roads, water and wastewater facilities, schools, recreation facilities, and health care facilities. Infrastructure may also include social services such as counselling services, addiction services, and homeless shelters. Changes in access to these physical and social resources can affect the health and quality of life of residents. This section assesses the potential effect of the proposed Project on the demand for physical infrastructure and social services.

12.7.2.1.3 Project Features that Reduce Effects

To address the issues identified in the scoping sessions, De Beers has incorporated environmental design features into all phases of the Project. Environmental design features include management policies and procedures, social programs, environmental best practices, and engineering design elements. The environmental design features that reduce the demands on infrastructure are summarized in Table 12.7-7.

Table 12.7-7 Environmental Design Features that Reduce Effects on Infrastructure

Project Component	Potential Effect	Environmental Design Feature and Mitigation
Infrastructure use	the Project may increase demand for existing infrastructure from the transport of material and people to the Project site	direct flights reducing demand on NWT's largest airport construction, operations, and closure accommodations will include the necessary facilities to sustain the workforce at the site, including medical personnel accessible 24/7, reducing demand on transport of people
	cost to government to provide and maintain services and physical infrastructure	private medical services recycling provide counselling offer programs for drug and alcohol abuse and addiction

NWT = Northwest Territories; 24/7 = 24 hours a day, 7 days a week.

12.7.2.1.4 Content

This section on demands on infrastructure addresses the issues identified by the Gahcho Kué Panel under the following headings:

- in-migration;
- government provision of social services and physical infrastructure;
- government monitoring and regulatory capacity; and
- obtaining and retaining critical volunteers.

12.7.2.2 In-migration

12.7.2.2.1 Existing Environment

In-migration has not been associated with mineral exploration and mining activity over the past decade. Except from 2002 to 2003, the NWT has experienced net out-migration of people since 1997 (Section 12.3). The communities most closely associated with diamond mining have seen a slight increase in population, largely due to in-migration (generally speaking, friends and family), since birth rates have been declining. This trend is expected to continue. Projections of population changes during the life of the Project are as follows:

- natural increase will remain a net contributor to the NWT's population however, the increase will be at a decreasing rate given a declining birth rate and a rising death rate from an ageing population;
- net migration into the NWT will, on average, remain negative throughout the forecast period; and
- modest net out-migration of 250 to 350 people annually. The NWT population is predicted to increase to 44,676 around the year 2025, assuming that any changes in the current major economic projects are allowed to influence the population and labour force of the NWT. With the Project, the NWT population in 2025 would be 44,941 or 265 higher than the current scenario populations.

12.7.2.2.2 Effects Analysis

Based on information in the existing environment, it is anticipated that population growth will slow during the life of the Project. Consequently, the introduction of the Project is not expected to have a substantial or lasting effect on population growth in the NWT. This means that the overall demand for infrastructure and services will not come from migrants to the NWT. Additionally, any external or temporary labour brought in by the Project will not likely remain in the NWT. Transportation of these and other staff to and from the Project will be the responsibility of De Beers.

However, with or without the Project, the population dynamic is changing with time. The pregnancy rate is slowly declining, resulting in fewer births, while the death rate is climbing because of the ageing local population. This situation will increase demand for infrastructure and services that address the needs of the elderly, such as health care and mobility transit.

De Beers will not add pressures to the existing medical services. De Beers will use private services for the initial medical check of all new employees and will contract with emergency services to deal with on-site injuries.

12.7.2.3 Government Provision of Social Services and Physical Infrastructure

12.7.2.3.1 Existing Environment

Infrastructure Renewal

All existing infrastructure such as roads, hospitals, and water and wastewater services must be maintained and eventually replaced. It is commonplace throughout most municipalities in Canada to see on-going maintenance and replacement of all forms of existing infrastructure. To facilitate this process in the

NWT, in recent years the GNWT and the Government of Canada have signed agreements for infrastructure renewal to respond to declining infrastructure and growing needs. It is understood that the GNWT, the City of Yellowknife, and other branches of government within the NWT are financially constrained in dealing with infrastructure maintenance and renewal.

Highway Infrastructure and Truck Traffic

Six all-weather highways serve the LSA communities (Table 12.7-8). Highway 1, the Mackenzie Highway, is the NWT's longest highway and the main route from southern Canada. It joins Highway 2 at Enterprise and Highway 3 south of Fort Providence. Highway 2 links Enterprise with Hay River and Highway 3 links Fort Providence with Behchokò and Yellowknife. Highway 4, known primarily as the Ingraham Trail, extends 70 km east from Yellowknife and winds through parks, day use areas, and "cabin country".

Table 12.7-8 Transportation Infrastructure in the Local Study Area Communities, 2004

Location	Highway Access	Rail Access	Marine Re-supply Facility	Airport or Airstrip	Air Terminal Building
Behchokò	All-Weather Access Road Yellowknife Highway 3	no	no	yes	yes
Detah	All-Weather Access Road Yellowknife Highway 3	no	no	no	no
Enterprise	All-Weather Access Road Mackenzie Highway 1	freight only	no	no	no
Fort Providence	All-Weather Access Road Yellowknife Highway 3	no	no	yes	no
Fort Resolution	All-Weather Access Road Fort Resolution Highway 6	no	yes	yes	yes
Fort Smith	All-Weather Access Road Fort Smith Highway 5	no	no	yes	yes
Gamètì	Winter Access Road	no	no	yes	yes
Hay River	All-Weather Access Road Hay River Highway 2	freight only	yes	yes	yes
Hay River Reserve	All-Weather Access Road Hay River Highway 2	no	no	no	no
Łutselk'e	No	no	yes	yes	yes
Wekweètì ^(a)	Winter Access Road	no	no	yes	yes
Whatì	Winter Access Road	no	no	yes	yes
Yellowknife	All-Weather Access Road Yellowknife Highway 3	no	yes	yes	yes

Source: Adapted from GNWT Bureau of Statistics 2006.

Notes: ^(a) This winter road is operated by Indian and Northern Affairs Canada for conducting reclamation work at the former Colomac Mine.

The community of Detah is accessed from Highway 4. Highway 4 also consists of the first section of the Tibbitt-to-Contwoyto Winter Road, which is described later in this section. Highway 5 links Hay River to Fort Smith and Highway 6 is a 60 km route off Highway 5 to Fort Resolution on the southeast shore of Great Slave Lake.

The trucking industry in the NWT is large and continuing to expand. A survey estimated that 1,659 heavy-duty trucks were registered in the NWT in 2002 and 366,000 tonnes of freight were moved by truck in that year (PROLOG Canada Inc. 2006; Menzies 2005). The GNWT Department of Transportation (DOT) reported that the number of heavy trucks steadily increased during the past decade. Department officials identify truck traffic as a significant source of wear on the roads leading to frequent and costly maintenance (GNWT Department of Transportation 2005). Under the Canada Strategic Infrastructure Fund, the NWT has received \$130 M for road improvements in 2003 to 2004 and in 2008 to 2009 (GNWT Department of Transportation 2005). Some of those funds are being used to upgrade the section of Highway 3 between Behchokǫ and Yellowknife. In 2003, this section of road had the highest traffic volumes within the NWT (PROLOG Canada Inc. 2006).

Tibbitt-to-Contwoyto Winter Road

Winter roads are built over frozen lakes and tundra and are only open in winter, usually from approximately January to March/April. Winter roads are also built annually into remote exploration and mine sites. Industry depends heavily on the Tibbitt-to-Contwoyto Winter Road for transporting construction equipment, building materials, equipment parts, power generators, fuel, and food to the existing diamond mines, including the Snap Lake Mine. The Tibbitt-to-Contwoyto Winter Road is managed by the Tibbitt-to-Contwoyto Winter Road Joint Venture (Joint Venture 2010). Current members of the Joint Venture are De Beers Canada Inc., BHP Billiton Diamonds Inc., and Diavik Diamond Mines Inc. The road is constructed by Nuna Logistics. Engineering and security services are provided by EBA Engineering Consultants Limited (EBA) and SecureCheck, respectively. The Joint Venture is responsible for the annual construction, maintenance, dispatching, and camp catering for the 586 km winter road.

The number of trucks on the winter road peaked in 2007, with 10,922 northbound and 818 southbound loaded trucks (Table 12.7-9). In 2006, which was one of the warmest winters on record, the winter road season was approximately 50 days, and did not reach its full load-bearing capacity. The increased truck volume for 2007 included equipment and materials that were not transported in 2006 due to early closure (GNWT 2007).

Table 12.7-9 Number of North and Southbound Truck Loads on the Tibbitt-to-Contwoyto Winter Road, 2000 to 2010

Year	Operating Period	Number of Northbound Trucks	Number of Southbound backhauls
2010	Feb. 4 to Mar. 24	3,506	424
2009	Feb. 1 to Mar. 22	4,847	530
2008	Jan. 29 to Mar. 31	7,484	890
2007	Jan. 27 to Apr. 9	10,922	818

Table 12.7-9 Number of North and Southbound Truck Loads on the Tibbitt-to-Contwoyto Winter Road, 2000 to 2010 (continued)

Year	Operating Period	Number of Northbound Trucks	Number of Southbound backhauls
2006	Feb. 5 to Mar. 26 ^(a)	6,841	469
2005	Jan. 26 to Apr. 5	7,607	243
2004	Jan. 28 to Mar. 31	5,091	165
2003	Feb. 1 to Apr. 2	5,243	883
2002	Jan. 26 to Apr. 16	7,735	433
2001	Feb. 1 to Apr. 13	7,981	201
2000	Jan. 29 to Apr. 3	3,703	135

Source: Joint Venture (2010, internet site).

(a) Road shut down early due to thin ice conditions.

Jan. = January; Feb. = February; Mar. = March; Apr. = April

Table 12.7-10 summarizes commercial truck volume and tonnage on the Tibbitt-to-Contwoyto Winter Road by various mining companies from 1998 to 2009 (GNWT 2007, 2009). In 2010, a total of 3,506 trucks were dispatched north, carrying approximately 120,100 tonnes (Joint Venture 2010). From 2007 to 2009, the Diavik Diamond Mine was the largest single user of the Tibbitt-to-Contwoyto Winter Road. In addition to supplies to support day-to-day mining operations from open pits, the Diavik Diamond Mine trucked additional loads of fuel, cement, explosives, materials, and equipment to support construction for underground mining (Diavik 2008). With the closure of the Jericho Diamond Mine owned by Tahera, the Tibbitt-to-Contwoyto Winter Road was not built to that mine in 2009 or 2010 (Joint Venture 2010).

Table 12.7-10 Traffic Volume on the Tibbitt-to-Contwoyto Winter Road, 1998 to 2009

Year	Load ^(a)	Lupin Mine	Ekati Diamond Mine	Diavik Diamond Mine	Snap Lake Mine	Jericho Diamond Mine	Mineral Exploration Traffic	Total
1998	tonnage	4,220	73,712	0	0	0	4,056	81,988
	# trucks	112	2,431					2,543
1999	tonnage	3,356	41,453	0	n/a	0	12,399	57,208
	# trucks	85	1,759					1,844
2000	tonnage	21,672	66,609	25,068	0	0	12,031	125,380
	# trucks	557	3,402					3,959
2001	tonnage	26,239	99,297	111,506	0	0	8,545	245,587
	# trucks	688	2,912	4,127	0	0	363	8,090
2003	tonnage	27,832	101,990	67,394	0	0	1,602	198,818
	# trucks	702	3,003	2,202	0	0	87	5,994
2004	tonnage	11,097	105,127	53,960	6,852	0	2,108	179,144
	# trucks	288	2,984	1,572	295	0	117	5,256
2005	tonnage	7,709	117,661	94,303	18,089	0	14,771	252,533
	# trucks	251	3,434	2,848	703	0	614	7,850
2006	tonnage	1,071	82,447	55,750	34,852	7,821	2,435	184,376

**Table 12.7-10 Traffic Volume on the Tibbitt-to-Contwoyto Winter Road, 1998 to 2009
(continued)**

Year	Load ^(a)	Lupin Mine	Ekati Diamond Mine	Diavik Diamond Mine	Snap Lake Mine	Jericho Diamond Mine	Mineral Exploration Traffic	Total
2007	# trucks	35	3,152	2,094	1,623	258	148	7,310
	tonnage	2,059	121,716	133,267	64,505	17,566	4,172	343,285
	# trucks	55	3,937	4,573	2,355	500	236	11,656
2008	tonnage	0	72,233	138,051	43,244	2,300	2,513	258,341
	# trucks	0	1,840	4,239	1,250	49	77	7,455
2009	tonnage	0	58,544	91,362	22,884	0	405	173,195
	# trucks	0	1,663	2,779	904	0	31	5,377

Source: GNWT (2009) and GNWT (2007b). # = number

^(a) For each year, the number of trucks indicated are loaded truckloads, and represents one-way traffic. To determine the total truck traffic, these numbers should be multiplied by 2.

The carrying capacity of the Tibbitt-to-Contwoyto Winter Road is largely a function of the weather. Colder and longer winters not only extend the operating season, but also result in thicker, safer ice that allows trucks to carry full loads. In addition to climate, the Tibbitt-to-Contwoyto Winter Road Joint Venture is now taking a progressive approach to its winter road construction that is resulting in a road with greater carrying capacity and durability (Tibbitt-to-Contwoyto Winter Road Joint Venture 2010, internet site). Since the 2006 trucking season, road builders have done the following (Madsen 2007a, pers. comm.):

- begun road construction activities much earlier than previously;
- purchased specialized equipment and added more employees to flood the road;
- built several roads across lakes particularly susceptible to early deterioration and have reduced truck traffic on lakes to 10 km/hour;
- built a secondary route that bypasses some of the trouble spots on the southern-most portion of the winter road. This route is used primarily for backhauling, which has improved road efficiencies, but its most important contribution is to decrease the risk against another year of unusually warm winter weather; and
- upgraded the more troublesome portages.

Even though these activities have improved the road's durability, 343,000 tonnes of northbound traffic likely represents the roads carrying capacity from safety and logistical perspectives. A greater tonnage could not be achieved, though if climatic conditions were ideal, the winter road season in 2008 could have remained operational for up to three additional weeks had it been necessary (Madsen 2007b).

12.7.2.3.2 Effects Analysis

De Beers estimates that over the two-year construction period for the Project, an average of 1,500 truck loads will travel the Tibbitt-to-Contwoyto Winter Road. This will represent approximately 20% of the overall loads along the winter road. During the operations and interim closure phases of the Project, it is estimated that truck volumes will be much lower. The peak usage of the winter road is measured at approximately 8,300 loads year. Table 12.7-11 shows the road volumes forecasted for the Project.

The concern for the Project's effect on the winter road is related to its timing. If its construction period occurs at a time when other operators using the road require fewer tonnes of freight, then the effect of truck traffic bound for the Project will be negligible. This is likely to be the case. The Diavik Diamond Mine will be finished its underground mine construction in 2012 before the Project construction phase. The Ekati Diamond Mine has no major construction plans over the next five-year period, and the Snap Lake Mine began production in 2008. The estimated loads during life of mine are well within the known capacity of the road.

Table 12.7-11 Forecasted Road Traffic Volumes for the Project

Project Phase	Number of Years	Project Loads per Year		Total Winter Road Loads	Percentage Change (%)
		Average	Maximum		
Construction	2	1,500	2,000	8,600-9,100	17-22
Operations	11	1,000	1,200	8,100-8,300	12-14
Closure ^(a)	2	110	200	7,210	2

^(a) Closure refers to time required to remove site infrastructure, also referred to as "interim closure". Only infrastructure required for lake refilling will remain at the Project site beyond two years. Final site demobilization will occur via a winter ice strip once Kennady Lake has been refilled.

% = percent

In forecasting winter road usage, it is necessary to look at other potential developments along the route including the following:

- Jericho Diamond Mine has ceased operations;
- Peregrine Diamonds has scaled back exploration activities; and
- BHP Billiton Inc. has re-evaluated its use of the winter road and as a result has reduced the tonnage of freight hauls by truck to site.

Therefore, peak truck traffic during the construction and operation phase of the Project can be accommodated without jeopardizing the viability of the other users and their operations. The addition of the Project will add to this overall truck traffic for at least the first five years. After that, it is expected that the Ekati and

Diavik diamond mines will start to wind down operations, reducing the volume of truck traffic.

12.7.2.4 Government Monitoring and Regulatory Capacity

12.7.2.4.1 Existing Environment

Project monitoring and reporting is undertaken by the companies with active mine sites. Since the first diamond mine was established, monitoring agencies or boards have been created to track commitments and effectiveness of mitigation. Each of the existing mines has an independent monitoring agency or board (e.g., Independent Environmental Monitoring Agency for the Ekati Mine, Environmental Monitoring Advisory Board for the Diavik Diamond Mine, and the Snap Lake Environmental Monitoring Agency for the Snap Lake Mine). The composition of each varies slightly, but may include one or all of the following:

- Aboriginal members;
- government members; and
- others, such as scientific experts.

These boards receive funding from the relevant project. Government staff participate in inspections and licensing processes.

12.7.2.4.2 Effects Analysis

De Beers operates within the consortium for the maintenance of the Tibbitt-to-Contwoyto Winter Road. Industrial users of the road network pay taxes to support maintenance on the Tibbitt-to-Contwoyto Winter Road. It is expected that additional government monitoring of increased traffic volumes from the Project will be limited.

De Beers will also be completing its own Project monitoring and reporting as mandated by the regulatory processes. De Beers will be providing revenues and taxes that can be directed to the budget of departments and agencies.

12.7.2.5 Obtaining and Retaining Critical Volunteers

12.7.2.5.1 Existing Environment

The absence of “critical volunteers” was identified as a crucial part of the social service infrastructure. Loss of volunteers has already been covered in Section 12.6.2.4. This section will focus on the loss of volunteer fire-fighters.

In 2008, 132 adults were volunteer fire-fighters (Table 12.7-12), spread across 13 fire stations in the LSA. Yellowknife is the only municipality with dedicated career fire-fighters. The number of volunteer fire-fighters has declined somewhat in recent years in at least three communities: Łutselk'e, Wekweèti, and Whati. The reason for this decline is unclear. However, the decline started in 2007 after the three diamond mines were either already producing or near completion of construction as in the case of the Snap Lake Mine. Only Łutselk'e has seen a dramatic change in the number of volunteer fire-fighters.

Table 12.7-12 Fire Protection Services and Fire-fighters from 2004 to 2008

Community	Fire halls (As of 2008)	2004	2005-2006	2007	2008	
		Volunteer fire-fighters	Volunteer fire-fighters	Volunteer fire- fighters	Volunteer fire- fighters	Career fire- fighters
Behchokò	2	4	4	6 to 8	15 paid-on-calls	0
Detah	1	12	12	1 fire chief; n/a	1 fire chief; n/a	0
Fort Resolution	1	5 to 8	6	8	8	0
Gamèti	1	9	9	8	8	0
Łutselk'e	1	8	8	1	1	0
N'Dilo	0	0	0	Responded to by Yellowknife 0	Responded to by Yellowknife 0	0
Wekweèti	1	6	6	2	2	0
Whati	1	14	14	8	8	0
Yellowknife	1	20	20	4 chief officers; 15 paid-on-calls	4 chief officers; 15 paid-on-calls	20
Total	9	152^(a)	154	118^(a)	132	20

Source: GNWT Department of Municipal and Community Affairs 2004b; GNWT Department of Municipal and Community Affairs 2008.

Note: Career fire-fighters are located only in Yellowknife, NWT; N'Dilo is considered to be part of Yellowknife, and there is a service agreement under which Yellowknife provides services to N'Dilo.

^(a) approximate values.

n/a = additional data not available.

12.7.2.5.2 Effects Analysis

The Project will be a fly-in/fly-out operation with a self-contained camp with its own facilities and airport. When combined with its relatively remote location and ground access by winter road only, it is not likely to directly affect physical infrastructure or the provision of critical services in local communities. Some of the current volunteer fire-fighters might be drawn to mining or mining support company jobs that will affect their ability to volunteer for this and other community services when they are on shift. Fire-fighting capacity also appears to be stretched in some communities such as Łutselk'e, Wekweèti, and Whati.

12.7.2.6 Residual Effects Summary

There is little evidence that the Project will affect the physical infrastructure or the provision of critical services in the LSA communities. The use and management of the Tibbitt-to-Contwoyto Winter Road is governed by a consortium. The anticipated loads from the Project are below the peaks already recorded. To reach the Tibbitt-to-Contwoyto Winter Road, loaded trucks will be using NWT highways. An increase in heavy traffic on the highways is expected to result in the need for sooner upgrades. To offset costs and limited ability to raise revenues, GNWT arrangements are in place with the Government of Canada to replace community infrastructure or upgrade roads. This will have to be done whether or not the Project goes ahead, but additional use may affect timing.

The Project is also expected to have a negligible effect on social services or volunteers and, in particular, fire-fighters. Fire-fighter numbers have already adjusted or are unchanged due to the other developments in the LSA. Communities demonstrating issues with retaining fire-fighters include Łutselk'e, Wekweètì, and Whatì.

12.7.2.7 Mitigation

De Beers has proposed environmental design features that relate to demands on infrastructure, including any effect on social services from in-migration and on volunteerism (Table 12.7-13). De Beers will offer pick-up points throughout the LSA communities. The mine camp will include the necessary facilities to sustain the workforce at the site, including medical personnel accessible 24/7, reducing demand on transport of material and people. With respect to any effect on road infrastructure, De Beers will be paying royalties and taxes to all levels of government that will be allocated as appropriate. De Beers also offers a volunteer incentive, which employees can apply for, and volunteer incentives will be provided to those employees interested in volunteering their time for social or cultural programs or activities in their home communities.

Table 12.7-13 Summary of Mitigation for Infrastructure

Effect	De Beers		Government, Individual, Family, Community
	Environmental Design Feature	Other Mitigation	Other Mitigation
The Project may result in out-migration and / or in-migration	<ul style="list-style-type: none"> offer pick-up points throughout the LSA communities offer northern relocation benefit 	N/A	N/A
The Project may increase demand for existing infrastructure and services from the transport of material and people to the Project site	<ul style="list-style-type: none"> direct flights reducing demand on NWT's largest airport construction, operations and closure camp will include the necessary facilities to sustain the workforce at the site, including medical personnel accessible 24/7, reducing demand on transport of material and people 	<ul style="list-style-type: none"> industry covers cost of upgrades and maintenance of the winter road. 	<ul style="list-style-type: none"> revenue allocation
The Project may result in pressure on government services	<ul style="list-style-type: none"> private medical services on-site recycling provide counselling services for employees offer programs for drug and alcohol abuse and addition 	<ul style="list-style-type: none"> royalties and taxes monitoring and reporting (consultation, annual report) 	<ul style="list-style-type: none"> revenue allocation
The Project may result in time away from the family / community	<ul style="list-style-type: none"> provide incentives to encourage volunteerism 	N/A	<ul style="list-style-type: none"> continue to offer training in fire fighting through MACA other community members consider taking up volunteer positions training of Emergency Medical Responders adds value in that those volunteering have additional skills developed

NWT = Northwest Territories; LSA = Local Study Area; MACA = Municipal and Community Affairs; N/A = not applicable

12.7.2.8 Residual Impact Classification and Determination of Significance

12.7.2.8.1 Methods

The methods used to assess socio-economic impacts are described in Section 12.7.1.6.1.

12.7.2.8.2 Results

The Project will have a small measurable residual impact on in-migration, and costs to the government to upgrade infrastructure and to monitor and regulate the Project. Any external or temporary labour brought in by the Project will not likely remain in the NWT, and transportation of these and other staff between the mine site and LSA communities will be the responsibility of De Beers. Therefore, the magnitude of this impact is considered low (Table 12.7-14). Associated benefits such as increased government revenues would likely offset some of the costs associated with provision of infrastructure and services for in-migration. De Beers recognizes that economic development may have a demand on transportation infrastructure and services, although this demand will diminish during the operations phase. The Project could possibly have a low impact on the availability of volunteers for the communities of Łutselk'e, Wekweètì, and Whatì.

The residual impacts from the Project on the demands on infrastructure are not expected to be significant.

Table 12.7-14 Classification of Residual Impacts on Infrastructure

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
In-migration	negative	low	regional	medium-term	likely
Costs for Infrastructure and Services	negative	low	regional	medium-term	likely
Costs to Monitor and Regulate	negative	low	regional	medium-term	likely
Volunteerism	negative	low	local	short-term	possible

12.7.3 Subject of Note: Tourism Potential and Wilderness Character

12.7.3.1 Introduction

The vast areas of wilderness of the NWT are an important feature for many residents, and the aesthetic qualities of this wilderness have an inherent value. Further, tourism in the NWT depends heavily on the wilderness character of the land. The purpose of this Subject of Note: Effects to Tourism Potential and Wilderness Character is to assess the potential effects of the Project on tourism and wilderness.

12.7.3.1.1 Context

The Subject of Note: Tourism Potential and Wilderness Character also relates to the following sections in the EIS:

- Noise Assessment (Appendix 7.II);
- Key Line of Inquiry: Water Quality and Fish in Kennedy Lake (Section 8);
- Key Line of Inquiry: Caribou (Section 7);
- Subject of Note: Other Ungulates (Section 11.11)
- Subject of Note: Carnivore Mortality (Section 11.10)
- Subject of Note: Species at Risk and Birds (Section 11.12)

12.7.3.1.2 Purpose and Scope

The purpose of this subject of note is to meet the Terms of Reference (Gahcho Kué Panel 2007). The Terms of Reference specifically require a discussion of the following:

- impacts from air traffic;
- loss of wilderness character; and
- decreased hunting success and/or wildlife sightings thereby reducing the attractiveness of tourist-based activities in the vicinity of the Project.

12.7.3.1.3 Project Features that Reduce Effects

During the development of the Project, many features were incorporated into the design to reduce or eliminate potential effects. The possible Project-related effects to tourism potential and wilderness character, and the environmental design features identified to reduce these effects are listed in Table 12.7-15.

Table 12.7-15 Environmental Design Features that Reduce Effects on Tourism Potential and Wilderness Character

Project Component	Potential Effect	Environmental Design Features
Project Footprint (e.g., pits, Fine PKC Facility, Coarse PK Pile, mine rock piles, Winter Access Road)	<ul style="list-style-type: none"> The Project may affect the availability of wildlife for viewing and harvesting The Project may affect the availability of fish for sport fishing The Project may result in a loss of wilderness character 	<ul style="list-style-type: none"> compact layout of the surface facilities will limit the area disturbed at construction and increase site operations efficiency a minimum flying altitude of 300 m above ground level (except during takeoff, landing, and field work) will be maintained for cargo, passenger aircraft, and helicopter outside of the Project site equipment noise sources will be limited by locating them inside buildings, to the extent possible limit use of airstrip to mine and exploration activities watering of roads, airstrip, and laydown areas will facilitate dust suppression speed limits will be established and enforced the Project will have a comprehensive water management system, designed to reduce downstream effects all buildings will be removed at closure at closure, transportation corridors and the airstrip will be scarified and loosened to encourage natural revegetation, and re-contoured where possible Kennady Lake will be refilled after operations at closure, the entire site will be stabilized and contoured to blend with the surrounding landscape where possible
Construction and Operations		
Closure and Reclamation		

12.7.3.2 Existing Environment

Tourists come to the NWT for the wilderness experience. While the main tourism season runs from May 15 to September 15 (GNWT Department of Industry, Tourism and Investment 2007), the GNWT promotes a variety of activities throughout the year, such as hiking, fishing, boating, camping and wildlife viewing in the summer months, and snowmobiling, snowshoeing, and aurora borealis (northern lights) viewing in the winter months.

Sport hunting in the NWT is conducted by both residents and non-residents of the NWT. Non-residents of the NWT require the services of an outfitter and usually use hunt from the various remotely located hunting lodges in the NWT.

Within the vicinity of the Project, the sport hunting industry concentrates around the barren-ground caribou, but wolverine and wolf are also available.

Figure 12.7-2 shows the location of the hunting and fishing lodges that attract tourists. It is anticipated that some tourists identify industrial activities as incompatible with the wilderness experience. Industrial activities have the potential to change the visual aesthetics of a region, and introduce noise disturbances. Industrial activities may also interfere with the interaction between tourists and wildlife.

Ecotourism is one of the main attractions for visitors to the NWT, and for residents who wish to explore Canada's north. They are attracted by the unique and pristine flora, fauna, and cultural heritage that the NWT has to offer. Residents of the NWT have taken advantage of this market by offering guided tours and northern activities to tourists that are also considered eco-friendly, such as dog mushing, snowshoeing, kayaking, canoeing, skiing, hiking, camping, wilderness viewing, aurora borealis viewing, cultural heritage camps, and sustainable fishing and hunting.

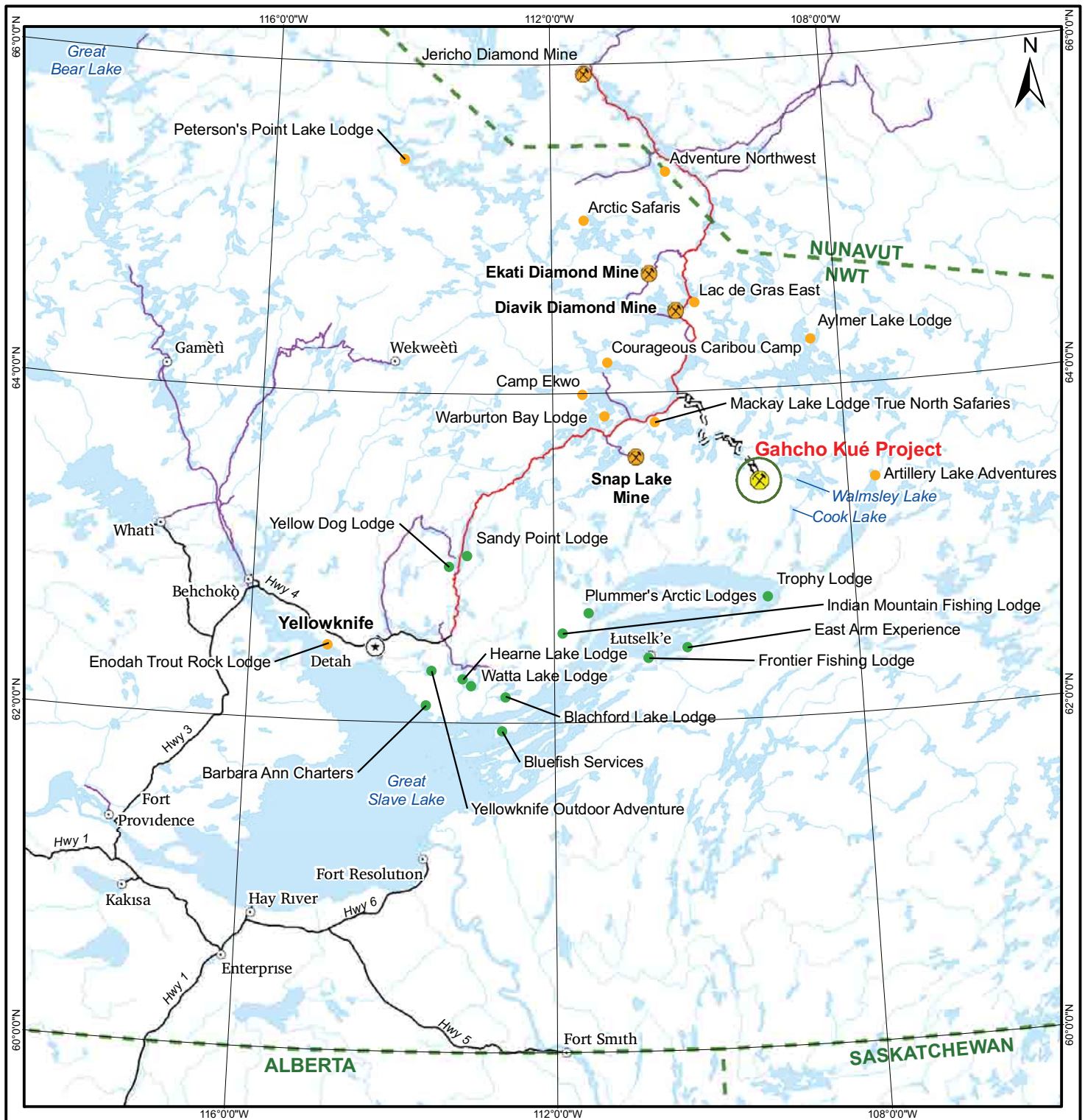
The guided canoe trip industry depends upon both the qualities of the river and the wilderness through which the river travels. The closest major river to the Project is the Lockhart River, but it is not used as a regular destination for canoe outfitters (Blackfeather 2008; Wanapitei 2008), and it is not on the list of top 12 rivers recommended by the NWT tourism website (GNWT Department of Industry, Tourism and Investment 2008).

The nearest tourist establishment is a day fishing camp at Cook Lake, located about 25 km from the Project and operated by Aylmer Lake Lodge. Aylmer Lake Lodge operates its facilities from the beginning of July to the beginning of September.

12.7.3.3 Effects Analysis

12.7.3.3.1 Visual Aesthetics

In a remote location, an industrial development such as the Project and its associated activities are distinctly different than the surrounding natural environment. The Project will have a negative effect on the wilderness experience a tourist would be anticipating. Therefore, the effects analysis considered the spatial extent of the effect.



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Proposed Winter Access Road
- Watercourse
- Waterbody
- Fishing Lodge
- Fishing and Hunting Lodge
- Hunting Lodge
- Territorial / Provincial Boundary
- 15 km Radius

NOTES

Base data source: The Atlas of Canada
Hunting and Fishing Lodge locations provided by Northwest Territories Tourism

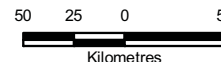
GAHCHO KUÉ PROJECT

Hunting and Fishing Lodges in the Socio-economic Local Study Area

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:3,750,000



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Figure 12.7-2

Permanent changes to the landscape after closure will consist of mine rock piles on the shores of Kennady Lake, within line of sight in up to 30 km from the Project in some directions. This effect might influence users of Walmsley and Fletcher Lakes, which are approximately 30 km away from the Project and within the proposed East Arm National Park boundary. This assumes that the observer is able to distinguish mine features from this distance with the naked eye.

The closest wilderness canoeing lake or river identified by NWT Tourism is the Lockhart River/Artillery Lake system, approximately 70 km from the Project. At this distance, Project-related facilities will not be visible to canoeists. Great Slave Lake, other wilderness canoe routes, and major destinations for scenic overflights are also all well beyond the Project viewshed.

The Project is situated approximately 120 km from the Tibbitt-to-Contwoyto Winter Road and approximately 390 km by road from the end of the Ingraham Trail, the furthest point of permanent road from Yellowknife. Therefore, the Project will not be visible to any tourist activities on or near these roads. Considering the distance to the Project, it is unlikely that tourists would travel this far along the Tibbitt-to-Contwoyto Winter Road.

12.7.3.3.2 Noise

Noise will be generated from mobile and stationary mining equipment, blasting, and aircraft at the Project. The distance for noise attenuation to reach background levels for mining operations (including blasting) is predicted to be 3.5 km (Appendix 7.II). Aircraft noise will be limited to a few minutes during takeoff and landings and a maximum of two round-trip flights per day are expected during Project construction and operations. The distance for noise attenuation to reach background levels from the airstrip is 5.5 km (Appendix 7.II). However, disturbance from large aircraft is expected to be infrequent and short-term (less than five minutes in duration). The analysis of blasting activity indicated that the maximum distances at which the criteria for peak ground (12.5 millimetres per second [mm/s]) and airborne vibration levels (120 linear decibels [dBL]) would be met are 596 and 730 m, respectively (Appendix 7.II). The effects from noise and other sensory disturbances on the movement and behaviour of wildlife are anticipated to stop after closure of the Project (i.e., the effect will likely last a few years after closure) (Sections 7, 11.10, 11.11, and 11.12).

12.7.3.3.3 Availability of Fish for Sport Fishing

The Key Line of Inquiry: Water Quality and Fish in Kennady Lake (Section 8) assessed the potential effects of the Project on fish within Kennady Lake and the

Kennady Lake watershed. The Key Line of Inquiry: Downstream Water Effects (Section 9) assessed the potential effects of the Project on fish in the streams and lakes downstream of Kennady Lake. The assessment determined that predicted changes to flows and lake levels and water quality during all phases of the Project would be negligible at Kirk Lake and points downstream.

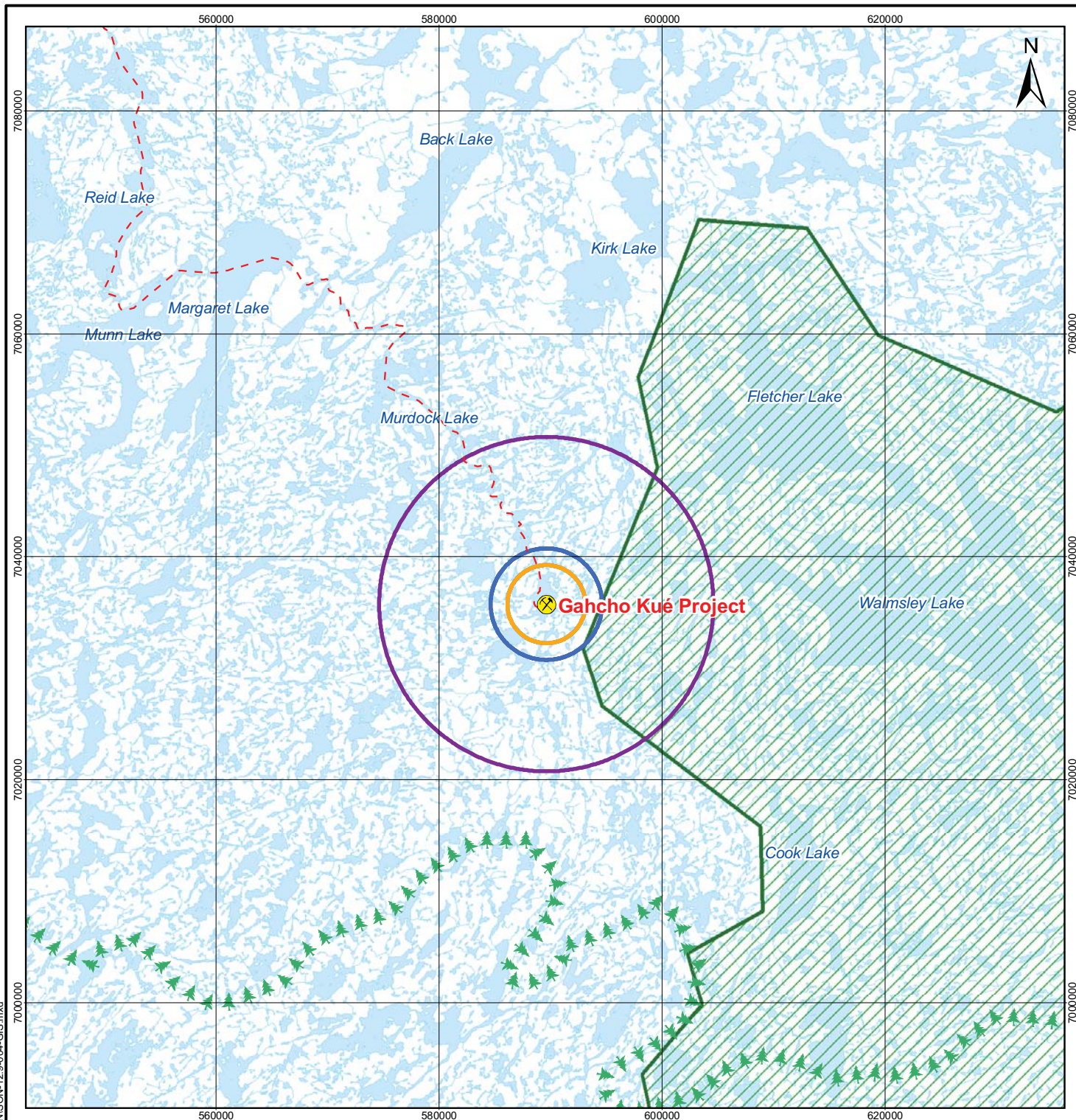
Aylmer Lake, the closest sport fishing lake, is situated downstream from Kirk Lake, and approximately 100 km downstream of the Project. As a result, the Project will not have any effect on fish available for sport fishing.

12.7.3.3.4 Availability of Wildlife for Viewing and Hunting










The Key Line of Inquiry: Caribou (Section 7) assessed the potential effects of the Project on the populations and distributions of caribou. Literature review and data analysis predicted that the Project may influence the distribution of animals within a 15 km radius of the footprint (the zone of influence, or ZOI). This ZOI does not overlap with any existing caribou hunting camps (see Figure 12.7-2 and 12.7-3)

The Subject of Note: Other Ungulates (Section 11.11) assessed the potential effects of the Project on other ungulates including moose and muskoxen. For muskox and moose, the Project ZOI is predicted to be 5 km and 3.5 km respectively. The Subject of Note: Species at Risk and Birds (Section 11.12) determined that most effects from the Project on birds would be local and within 1 km of the Project footprint. In the Subject of Note: Carnivore Mortality (Section 11.10), it was predicted that the geographic extent of combined effects of noise, dust deposition, and sensory disturbance on habitat quality for wolf, wolverine, and grizzly bear is 15 km from the Project footprint.

Although the ZOI from the Project is predicted to alter the movement, behaviour, and distribution of wildlife, animals are expected to use habitats adjacent to the Project. In addition, there are no tourist establishments within the maximum predicted zone of influence around the Project (i.e., 15 km). Therefore, the magnitude of the effect from the Project on the availability of caribou, other ungulates, birds, and carnivores on tourism potential and wilderness character is predicted to be low. There are examples of successful hunting lodges within or near the ZOI of existing diamond mines in the NWT, such as the Lac de Gras hunting camp (located within 9 km of the Misery Pit of the Ekati Diamond Mine) and the MacKay Lake Lodge (approximately 30 km from the Snap Lake Mine).



LEGEND

-  Gahcho Kué Project
-  Winter Access Road
-  Watercourse
-  Waterbody
-  Treeline
-  Proposed East Arm National Park
-  15 km Zone of Influence (Caribou, Grizzly Bear, Wolverine, and Wolf)
-  5 km Zone of Influence (Muskoxen)
-  3.5 km Zone of Influence (Moose)

NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000
Proposed East Arm National Park provided by Parks Canada.

GAHCHO KUÉ PROJECT

Predicted Zones of Influence for Wildlife That Overlap the Proposed East Arm National Park

PROJECTION:

UTM Zone 12

DATUM:

NAD83

Scale: 1:500,000



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Figure 12.7-3

12.7.3.4 Residual Effects Summary

The nearest tourism facility to the Project is an outpost camp located at Cook Lake, which is a seasonal day-use camp. The camp is 25 km from the Project and outside the maximum predicted spatial extent (15 km) of Project-related effects on wildlife. The closest wilderness canoeing lake or river identified by NWT Tourism is the Lockhart River/Artillery Lake system, approximately 70 km from the Project. At this distance, Project-related facilities will not be visible to canoeists.

The Project is expected to have a negative effect on the wilderness experience for any tourist within clear sight and audible range (3.5 to 5.5 km). Permanent changes to the landscape after closure will consist of mine rock piles on the shores of Kennady Lake, within a line of sight of up to 30 km from the Project in some directions (assuming that they are visible with the naked eye at that distance). Thus, the number of tourists and hunters that may be affected by the Project, and the overall effect of the Project on tourism potential and wilderness character is predicted to be low.

12.7.3.5 Mitigation

Environmental design features to limit Project effects are provided Table 12.7-15 (Section 12.7.3.1.3). No other mitigation is proposed.

12.7.3.6 Residual Impact Classification and Determination of Significance

12.7.3.6.1 Methods

The methods used to assess socio-economic impacts are described in detail in Section 12.7.1.6.1.

12.7.3.6.2 Results

The Project is predicted to alter the distribution of caribou, grizzly bears, wolverines, and wolves within 15 km. The geographic extent of residual impacts from the Project on muskoxen, moose, and birds is expected to be within 1 to 5 km. These impacts are local as they should not be felt by tourists and hunters in the NWT (regional scale) (Table 12.7-16). The magnitude of the impacts from the Project on the availability of wildlife for tourism potential and wilderness character are anticipated to be low (i.e., the impact is not beyond that of nuisance (annoyance) value). The only camp near the Project is not frequently used, and is not a hunting camp. Further, there are examples of hunting camps in the Northwest Territories that have operated successfully within the vicinity of a

mine. The duration of the residual impacts are expected to last through the construction and operation of the Project (Table 12.7-16).

The wilderness character of the area around the Project may be affected by the Project's visual aesthetics (in particular mine rock piles and aircraft overflights). Again, the primary receptor is a day camp for fishing at Cook Lake operated by Aylmer Lake Lodge. Tourists may notice the mine rock piles when they are fully developed near closure of the Project. This impact is confined to the line of sight of the Project and is expected to have little visibility to the unaided eye. As a result, the impact is considered to be of low magnitude and local geographic extent. However, as the mine rock piles will be a permanent feature of the landscape following closure, the duration of the impact to wilderness character is permanent (Table 12.7-16).

Table 12.7-16 Classification of Residual Impacts on Tourism Potential and Wilderness Character

Pathway	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Wildlife Availability	Negative	Low	Local	Long-term	Likely
Wilderness Character	Negative	Low	Local	Irreversible	Likely

The impacts from the Project on the abundance and distribution of wildlife were determined to not be significant (Sections 7, 11.10, 11.11, and 11.12). The Project is also not predicted to have a significant impact on fish downstream of Kirk Lake (Section 8). Some changes to wildlife movement and behaviour are expected to occur within 15 km of the Project, but the magnitude of the impacts on the availability of wildlife for tourism potential and wilderness character are anticipated to be low. There will be local impacts of low magnitude to wilderness character for tourists that can see and hear the Project. Overall, the Project is not predicted to significantly impact tourism potential and wilderness character.

12.7.4 Subject of Note: Proposed National Park

12.7.4.1 Introduction

12.7.4.1.1 Context

The Project is near the area of interest for the proposed East Arm National Park, and the direct effects of the Project may affect the Park. Therefore, the related EIS sections include the following sections, which describe Project effects that may be relevant to the Park:

- Key Line of Inquiry: Caribou (Section 7);
- Key Line of Inquiry: Water Quality and Fish in Kennady Lake (Section 8);
- Subject of Note: Vegetation (Section 11.7).
- Subject of Note: Carnivore Mortality (Section 11.10);
- Subject of Note: Other Ungulates (Section 11.11);
- Subject of Note: Species at Risk and Birds (Section 11.12).

12.7.4.1.2 Purpose and Scope

In October 2006, a Memorandum of Understanding (MOU) was signed between the Łutselk'e Dene First Nation (LKDFN) and the Canada Parks Agency that formally launched a feasibility study for a proposed National Park at the East Arm of Great Slave Lake (CBI 2006, internet site; Parks Canada 2009a, internet site). The MOU "establishes a collaborative approach to assessing the proposed National Park as part of a broader protection initiative for the Dene's traditional territory." (Parks Canada 2009b, internet site). In addition to the existing permanent withdrawal from 1970, a second, larger land withdrawal order was approved for a study area for a National Park on the East Arm of Great Slave Lake in 2007 (Cumming 2007, pers. comm.).

The Project will be near the proposed National Park. As a result, the Terms of Reference require that De Beers provide:

- maps showing the exact location of the proposed development in relation to the National Park preliminary area of interest; and
- an evaluation of potential impacts from the Project, including activities indirectly caused by the proposed development, such as increased access.

The final boundary of the proposed National Park has yet to be established. There is currently a permanent land withdrawal from 1970, and a larger 12-year land withdrawal made in 2007 (also known as the National Park Study Area, Figure 12.7.4). The final Park boundary will likely be different from both of these. To be conservative (i.e., to not underestimate the effects), this assessment assumes that the Park will be established during the operational lifetime of the Project, and that the larger 2007 boundary will be used (Figure 12.7-4).

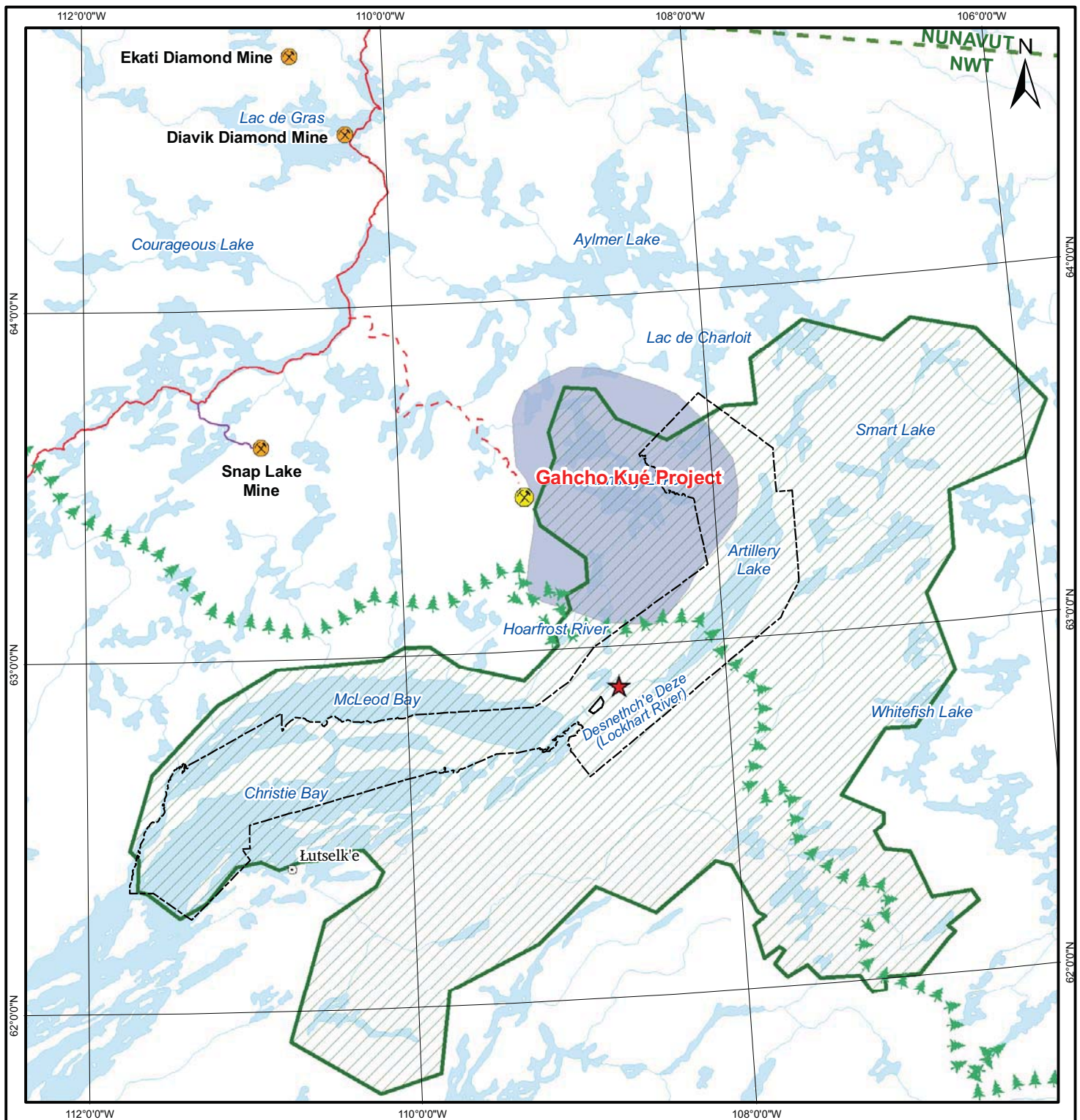
Due to the length of time that is expected to develop the proposed National Park and the timing for the Project, the Park will likely be established during the operational phase of the Project.

12.7.4.1.3 Project Features that Reduce Effects

The Project will be located near the boundary of the National Park preliminary area of interest identified in 2007; however, environmental design features incorporated in the Project will reduce any effects to the Park. The possible Project effects the proposed National Park, and the environmental design features to reduce these effects, are presented in Table 12.7-17

Table 12.7-17 Environmental Design Features that Reduce Effects on the Proposed National Park

Project Component	Potential Effect	Environmental Design Features
Project Footprint (e.g., pits, Fine PKC Facility, Coarse PK Pile, mine rock piles, Winter Access Road)	<ul style="list-style-type: none"> The Project may affect the availability of wildlife for viewing The Project may affect vegetation within the Park the Project may change visual aesthetics within the Park 	<ul style="list-style-type: none"> compact layout of the surface facilities will limit the area disturbed at construction and increase site operations efficiency a minimum flying altitude of 300 m above ground level (except during takeoff, landing, and field work) will be maintained for cargo, passenger aircraft, and helicopter outside of the Project site
Construction and Operations	<ul style="list-style-type: none"> the Project may lead to anthropogenic noise in the Park 	<ul style="list-style-type: none"> equipment noise sources will be limited by locating them inside buildings, to the extent possible
Closure and Reclamation	<ul style="list-style-type: none"> the Project may change access to the Park the Project may change the cultural landscape of the Park 	<ul style="list-style-type: none"> limit use of airstrip to mine and exploration activities watering of roads, airstrip, and laydown areas will facilitate dust suppression speed limits will be established and enforced the Project will have a comprehensive water management system, designed to reduce downstream effects at closure, transportation corridors and the airstrip will be scarified and loosened to encourage natural revegetation, and re-contoured where possible Kennady Lake will be refilled after operations at closure, the entire site will be stabilized and contoured to blend with the surrounding landscape distinguishable from the landscape where possible



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Tsank'ui Theda (Parry Falls [Our Lady of the Falls])
- Treeline
- Bedaghé Tué
- 1970/1997 Land Withdrawal for the Proposed East Arm National Park
- 2007 Study Area for the Proposed East Arm National Park

NOTES

Base data source: The Atlas of Canada. Study Area for a National Park on the East Arm of Great Slave Lake provided by Parks Canada. Source: NWT Protected Areas Strategy, GNWT, Parks Canada, DIAND <http://nwtcrs.rwed-hq.gov.nt.ca/pub/PA/files.htm>

GAHCHO KUÉ PROJECT

Proposed East Arm National Park

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:1,750,000
25 12.5 0 25
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Figure 12.7-4

12.7.4.1.4 Content

This subject of note provides background information on the process and potential environmental effects of the Project on the wildlife and vegetation in the Park and other factors that would affect users of the Park.

The subject of note does not include the aquatic environment because no effects to water quality or aquatic health from the Project are predicted for water within the land withdrawal for the National Park, which includes the Lockhart River, the Hoarfrost River watershed, and the East Arm of Great Slave Lake (Section 11.2). The Project is located in the head waters of the Lockhart River watershed, but potential impacts are restricted to waters upstream of Aylmer Lake, which is outside the National Park Study Area (Figure 12.7-4).

12.7.4.2 Existing Environment

12.7.4.2.1 Park Setting

The proposed National Park is located in a wilderness area with Łutselk'e being the only nearby community. The Park is located in an area of transition between boreal and tundra conditions (Figure 12.7-4). The topography is variable with level to gently rolling terrain, except for the East Arm of Great Slave Lake, which has large hills and many cliffs. Lakes are common in the lowlands, while rock outcrops are common in the uplands. Permafrost, continuous and discontinuous, is common.

Features of the Park include several large peninsulas extending into Great Slave Lake, the Lockhart River canyons and falls, and Christie Bay, the deepest water in North America. Artillery Lake shows an abrupt transition from a boreal forest to tundra. The Park also has a rich cultural landscape. This includes the traditional hunting and fishing areas of the LKDFN, the historic Fort Reliance, Dene communities, and Pike's Portage linking Great Slave and Artillery Lake. There are many archaeological sites left by explorers, fur traders and trappers. Most importantly, the Park contains sacred areas to the Dene, such as the Parry Falls (the Old Lady of the Falls).

Barren-ground caribou herds with ranges that potentially overlap with the National Park are the Bathurst, Ahiak, and Beverly herds. Caribou are most likely to be present between fall and early spring; however, the number of caribou during any given year or season will vary.

Unlike caribou, muskoxen do not undertake long migrations. They live together in small herds, and are distributed across the circumpolar Arctic, with the very

northern and coastal parts of their range supporting the highest density. Muskoxen are not common as far south as the proposed National Park, although they appear to be expanding into the boreal regions in and south of the proposed National Park. Muskoxen have been reported within the Regional Study Area (RSA) for the wildlife baseline, which overlaps the Park. Traditional knowledge indicates that muskoxen are using the RSA more frequently than in the past.

Moose range encompasses suitable habitat south of the tree line throughout the NWT, although densities are relatively low. Traditional knowledge suggests that moose are not common in the barren lands and are more often harvested in forested areas such as the East Arm of Great Slave Lake. Moose are not common in the RSA but have occasionally been observed during the spring to autumn seasons.

Carnivores present in the proposed East Arm National Park (proposed National Park) will include barren-ground grizzly bear, black bear, wolverine, wolf, Arctic fox, red fox, marten, ermine, river otter, and lynx. Of these, the Arctic fox is most important to the proposed National Park's history. The proposed National Park is within the range of the red fox and at the southern extent of the Arctic fox range. Until the advent of fur farming, the National Park was used by Dene, Métis and European trappers in search of valuable Arctic fox pelts. Although there is little of this activity in the area of the proposed National Park today, the remaining trapping cabins, staging camps, trails and trading posts are a defining feature of the proposed National Park.

12.7.4.2.2 Process to Establish the National Park

Parks Canada indicates that it can take years to move through all the steps of establishing a national park. Referring to the national park creation process in general, Parks Canada indicates that "many issues, including the need for local community and provincial or territorial government support, competing land-use pressures, consultation with and engagement of Aboriginal groups and the need to secure funds for the establishment and operation of new parks make the pace of advancement hard to anticipate and at time impossible for Parks Canada to control" (Parks Canada 2009b, internet site).

The National Parks System Plan (Parks Canada 1997) guides park planning on a national scale (Parks Canada 2008). The Plan divides Canada into 39 distinct natural regions. The goal of Parks Canada is to have each natural region represented by at least one national park. The proposed East Arm National Park is representative of the North Western Boreal Uplands. There are five steps in the creation of a national park (Parks Canada 2009b, internet site).

- Steps 1 and 2: Identify areas representative of a natural region and select a potential park proposal.
- Step 3: Conduct a feasibility study, including consultations of the park proposal.
- Step 4: Negotiate park agreement.
- Step 5: Formally protect the national park or park reserve under the Canada National Parks Act.

The proposed East Arm National Park is currently in Stage 4, the 'negotiate park agreement stage' (Parks Canada 2010, internet site). This stage involves negotiations to determine the final designation of park boundaries and decisions about land acquisition. Negotiations may involve working with local and regional landowners, provincial governments, and comprehensive land claims by Aboriginal peoples. This step in the creation of the Park is completed when the Minister (with Cabinet approval) signs the negotiated park establishment agreement. At that time, Parks Canada is responsible for the operation of the national park (Parks Canada 2009b, internet site).

Lands for the proposed National Park at the East Arm of Great Slave Lake were given interim protection under the *Territorial Lands Act* in 1970. However, consultations on the proposed Park were halted shortly thereafter at the request of the then NWT Indian Brotherhood, and the community of Łutselk'e, due to their concerns about the possible effects of the proposed National Park on their traditional use of the land (Parks Canada 2001). In 2001, the community of Łutselk'e expressed a renewed interest in the National Park proposal, at which time discussions between Łutselk'e and Parks Canada recommenced (Parks Canada 2001).

The final boundary of the proposed National Park has yet to be established. There is currently a permanent land withdrawal from 1970, and a larger 12-year land withdrawal made in 2007 (also known as the National Park Study Area, Figure 12.7.4). The final Park boundary will likely be different from both of these. To be conservative in this effects assessment (i.e., to not underestimate the effects), the 2007 boundary will be used in this subject of note since it is the closest boundary to the Project (Figure 12.7-4).

12.7.4.3 Effects Analysis

At its closest point, the study area for the proposed National Park comes to within 1 km of the Project airstrip. The Subject of Note: Proposed National Park requires consideration of the direct and indirect effects of the Project. The potential direct effect of the Project on the proposed National Park includes the following:

- changes to vegetation within the Park;
- changes to the visual aesthetics of the Park;
- the Project may cause anthropogenic noise in the Park;
- changes to access to the Park;
- changes to the availability of wildlife for viewing; and
- changes to the cultural landscape of the Park.

The Project may affect the distribution of wildlife in the proposed National Park, where the proposed National Park overlaps with the Project zone of influence. This may in turn affect the availability of wildlife for viewing. However, the indirect effects of the Project on wildlife and tourism have been assessed in Sections 7, 11.10, 11.11, 11.12 and Section 12.7.3, respectively. As such, effects of the Project to wildlife in the proposed National Park were not included in this section.

The Project will change the cultural landscape and, therefore, may influence the perception of cultural resources inside the proposed National Park. As this effect is considered in more detail in Subject of Note: Culture, Heritage, and Archaeology (Section 12.7.5), it will not be considered further in this section.

Effects to the proposed National Park cannot be predicted accurately because the final boundary has not yet been decided. The assessment assumed that the boundary will be the larger 2007 land withdrawal, at least with respect to its boundary near the Project.

12.7.4.3.1 Vegetation

The Subject of Note: Vegetation (Section 11.7) assessed the potential effects of the Project on vegetation. Most effects are limited to the Project footprint and should not influence vegetation within the proposed National Park. Of the mechanisms causing effects to vegetation, dust has the largest reach. As there is mitigation to reduce dust from most sources, the greatest generators of dust are from traffic on the gravel roads, and from blasting.

The largest effects to ecosystems and vegetation from fugitive dust will likely occur within 100 m of the Project (Section 11.7). Overall, direct effects from dust deposition are predicted to be largely confined within the Project development area boundary and are anticipated to result in a minor change to vegetation communities. Subsequently, residual effects to the persistence of vegetation ecosystems, listed plant species, and traditional use plant species are predicted to be negligible. Regardless, some dispersion of smaller particles (<100 µm) will extend into the proposed National Park.

12.7.4.3.2 Visual Aesthetics and Noise

Due to the length of time that is expected to develop the proposed National Park and the timing for the Project, the Park will likely be established during the operational phase of the Project. Permanent changes to the landscape after closure will consist of mine rock piles on the shores of Kennady Lake, visible up to 30 km from the Project in some directions. This effect might influence users of Walmsley and Fletcher Lakes, which are approximately 30 km away from the Project and within the Park boundary.

Noise will be generated from mobile and stationary mining equipment, blasting, and aircraft at the Project. The distance for noise attenuation to reach background levels for mining operations (including blasting) is predicted to be 3.5 km (Appendix 7.II). Aircraft noise will be limited to a few minutes during takeoff and landings and a maximum of two round-trip flights per day are expected during Project construction and operations. The distance for noise attenuation to reach background levels from the airstrip is 5.5 km (Appendix 7.II). However, disturbance from large aircraft is expected to be infrequent and short-term (less than five minutes in duration). The effects from noise and other sensory disturbances on the movement and behaviour of wildlife are anticipated to stop after closure of the Project (i.e., the effect will likely last a few years after closure) (Sections 7, 11.10, 11.11, and 11.12).

The analysis of blasting activity indicated that the maximum distances at which the criteria for peak ground (12.5 millimetres per second [mm/s]) and airborne vibration levels (120 linear decibels [dBL]) would be met are 596 and 730 m, respectively (Appendix 7.II). Monitoring studies at the Ekati Diamond Mine found that although caribou responded to blasting 60% of the time within 1 km of the blast, the response was low; animals were alert but typically did not move (BHPB 1999). It is not anticipated that ground vibrations from the Project will extend into the proposed National Park.

12.7.4.3.3 Access

The Project has the potential to increase access to the Park, via the Winter Access Road. However, the Winter Access Road to be constructed and maintained by De Beers does not enter the proposed National Park boundary (i.e., the Proposed East Arm National Park Study Area, Figure 12.7-4). Also, Project interim closure is expected to be completed in 2027 and a winter road may not be constructed after that time. De Beers does not expect that the winter road will be used by tourists to access the proposed National Park as it is located over 280 km from Yellowknife and most tourist operators operate much closer to Yellowknife. Extending the winter road into the proposed National Park boundary would require separate land use permits, and would be subject to the regular screening and assessment process. Further, this winter road would provide access to an indistinct area of the proposed National Park, which is similar in many respects to areas that are closer to Yellowknife.

De Beers will not allow its airstrip to be used for commercial or tourist purposes. Further, the airstrip will be reclaimed near the end of the site closure phase of the Project. Therefore, the proximity of the Project to the proposed National Park will not create an air access point to the Park.

12.7.4.4 Residual Effects Summary

There remains some uncertainty in the effects of the Project on the proposed National Park, as the final Park boundaries are unknown. This assessment assumed that the Park boundaries would follow the 2007 land withdrawal boundary, at least with respect to the boundary near the Project. This was considered to be the most conservative approach and would tend to over-estimate effects.

The largest effects to ecosystems and vegetation from fugitive dust will likely occur within 100 m the Project. Thus, residual effects to vegetation in the Park are predicted to be negligible.

Based on the proposed National Park boundary used for this assessment, visual aesthetics may have the greatest effect on the north-western arm of the Park near the Project. This effect might influence users of Walmsley and Fletcher Lakes, which are approximately 30 km away from the Project.

Changes in noise levels will influence individuals in the proposed National Park within 3.5 km from the Project site (at the edge of the proposed Park boundary), and periodically up to 5.5 km during departure of aircraft.

12.7.4.5 Mitigation

Environmental design features to limit Project effects are provided Table 12.7-20 (Section 12.7.4.1.3). No other mitigation is proposed.

12.7.4.6 Residual Impact Classification and Determination of Significance

12.7.4.6.1 Methods

The potential impacts from the Project on the proposed National Park were assessed for all the effect pathways. Because the changes to the environment from the Project represent biophysical and socio-economic effects on the Park the impact criteria in Section 12.7.1.6.1 can not be used to assess all pathways. Consequently, impact criteria from the biophysical environment were also used to classify effects. The definitions for each of the residual impact criteria for assessing effects to the Park are provided below.

Direction: Impacts are described as being positive, or negative with respect to changes on the integrity of the National Park.

Magnitude: Magnitude (i.e., intensity) is assessed as either an absolute or relative difference between predicted changes from the Project and baseline (existing) conditions. The following scales are defined.

- Negligible – impact is not detectable from natural variation or baseline values.
- Low – impact is within the range of natural variation or baseline values.
- Moderate – impact is at or slightly exceeds the limits of natural variation or baseline values.
- High – impact is beyond the upper or lower limit of natural variation or baseline values, so there is likely a change of state from baseline conditions.

Geographic Extent: Geographic extent is based on two scales: local and regional.

- Local – uses the local study area (LSA) for the terrestrial environment (200 km²; e.g., Section 11.7) to define spatial extent and focuses on impacts from the Project footprint, lake dewatering, and dust deposition; and

- Regional – uses the regional study area (RSA) boundary for the terrestrial environment (5,700 km²; e.g., Section 11.7) to define spatial extent and focuses on impacts from the Project footprint, and cumulative impacts from other developments in the region.

Duration: Duration of the impact is classified as:

- Short-term – impact is reversible at the end of construction;
- Medium-term – impact is reversible at the end of closure;
- Long-term – impact is reversible within a defined length of time beyond closure; and
- Permanent – impact cannot be reversed or the duration of the impact is unknown.

Reversibility: Reversibility is the likelihood and time required for a system to recover after removal of the stressor, and is a function of resilience. The impact from disturbance may be reversible, but the exact nature of ecosystem properties and services may be different.

- Reversible – impact will not result in a permanent change of state of the ecosystem compared to “similar” environments not influenced by the Project (“similar” implies an environment of the same type, region, and time period); and
- Irreversible – impact is not reversible (i.e., duration of impact is unknown or permanent).

Likelihood: Describes the likelihood or probability of an impact and/or event occurring:

- Unlikely – the impact is likely to occur less than once in 100 years;
- Possible – the impact will have at least one chance of occurring in the next 100 years;
- Likely – the impact will have at least once chance of occurring in the next 10 years; and
- Highly Likely – the impact is very probable (100% chance) within a year.

Frequency: Frequency identifies how often an impact or disturbance event will occur over the duration of the Project:

- Isolated – confined to a specific discrete period;

- Periodic – occurs intermittently but repeatedly over the assessment period; and
- Continuous – will occur continually over the assessment period.

12.7.4.6.2 Results

The impact to vegetation is largely confined to the Project footprint and dust deposition outside the immediate Project footprint (Section 11.7). Within the proposed National Park boundary dust deposition may occur, but the impact is anticipated to be negligible. However, dust may enter the proposed Park boundary, and will be created for the duration of Project, making the impact regional and long-term. Impacts to vegetation in the Park following Project closure are predicted to be reversible (Table 12.7-18).

Should the proposed National Park boundary be the full extent of the 2007 land withdrawal, there will be areas within the Park from which the Project is visible. The presence of the mine rock and PK piles within the viewshed of a National Park is a departure from baseline values, but considering that the viewshed will only be influenced within about 30 km of the Project, and in a remote arm of the Park, the effects were considered to be of moderate magnitude. The geographic extent of the impact is regional and irreversible, as the mine rock and PK piles will be permanent features on the landscape.

Noise from the Project may extend up to 5.5 km into the proposed National Park. The greatest sources of noise are anticipated to be aircraft, which is an intermittent source of noise. As noise attenuation is dependent upon wind and the nature of the noise, and will only affect a small area of the Park, the magnitude of the impact is anticipated to be low, local in geographic extent, and periodic in frequency. The impact of noise will be reversed as the Project is closed (medium term).

Although there are both positive and negative aspects to new access into the Park, it is predicted that new access created by a mining project will be perceived as a negative impact to the Park. As the Winter Access Road for the Project will not enter the Park, and provides potential winter access only, the impact is considered to be of low magnitude and periodic frequency. As the Winter Access Road will not be maintained following closure, the impact will be reversible in the medium-term. It is unlikely that the Winter Access Road will be used by visitors to gain access to the Park.

Table 12.7-18 Classification of Residual Impacts on the Proposed National Park

	Direction	Magnitude	Geographic Extent	Duration	Reversibility	Likelihood	Frequency
Vegetation	negative	negligible	regional	long-term	reversible	possible	continuous
Visual Aesthetics	negative	moderate	regional	permanent	irreversible	highly likely	continuous
Noise	negative	low	local	medium-term	reversible	likely	periodic
Access	negative	low	not applicable	medium-term	reversible	unlikely	periodic

Environmental significance is used to identify predicted impacts that have sufficient magnitude, duration, and geographic extent to cause fundamental changes to the proposed National Park. A non-significant impact is defined as one where impacts are measurable at the local scale, and strong enough to be detectable at the regional scale, but are not likely to change the pristine nature of the Park, its ecological resilience, and value to society or aesthetics. A significant impact could occur when impacts are measurable at the regional scale and likely alter the proposed National Park's ecological resilience and perceived value. A number of high magnitude and irreversible impacts to the Park at the regional scale would be significant.

This assessment assumes that the Park will be established during the operational phase of the Project, and that it will include the boundaries defined by the 2007 land withdrawal, which pass near the Project. If these assumptions reflect reality, then there would be some detectable impacts from the Project within the Park boundaries (notably noise and visual aesthetic impacts). There would be improved access to the Park boundary from the Winter Access Road. However, because the Winter Access Road is seasonal and a long drive from Yellowknife, it seems unlikely that it would become a travel route for visitors entering the Park.

The Park boundary within the zone of influence of the Project contains only a minor fishing camp, and the Project should not affect any of the waterbodies used by canoeists. In most respects, the area of the proposed National Park near the Project is not distinctly unique from the adjacent areas outside the Park, and is not a defining feature of the Park. The impacts from the Project should not change the wilderness character the Park (Section 12.7.3), or impede the future establishment of the Park. Thus, the impacts from the Project on the Park are predicted to be not significant.

12.7.5 Subject of Note: Culture, Heritage, and Archaeology

12.7.5.1 Introduction

12.7.5.1.1 Context

The Subject of Note: Culture, Heritage, and Archaeology is linked to the following other parts of Section 12:

- Key Line of Inquiry: Family and Community Cohesion (Section 12.6.2); and
- Subject of Note: Proposed National Park (Section 12.7.4).

Family and community cohesion are also affected by attachment to cultural practices (e.g., participation in traditional activities), and retention of language skills. This key line of inquiry overlaps substantially with the Subject of Note: Culture, Heritage, and Archaeology.

Information from the NWT archaeological permit reports written between 1996 and 2010 has been summarized and is presented in the Archaeological Baseline (Annex L, Heritage Resources Baseline). The effect of the Project on archaeological resources is presented in the Archaeological Assessment, Appendix 12.III, which is appended to this subject of note.

12.7.5.1.2 Purpose and Scope

The purpose of the Subject of Note: Culture, Heritage, and Archaeology is to meet the Terms of Reference (Gahcho Kué Panel 2007). Specifically, this subject of note requires consideration of the following:

- reduced involvement in communal activities including communal hunts;
- potential for growing sense of disempowerment;
- increasing out-migration and skills drain to regional centres;
- reduced harvesting success and loss of traditional skills;
- loss of language;
- loss of spiritual connections and knowledge;
- physical impact on heritage and archaeological sites;
- loss of spiritual value of place;
- loss of aesthetic value of place;

- hunting restrictions around mine sites;
- effects on Lockhart River sacred site;
- Artillery Lake as the original site of Łutselk'e; and
- Our Lady of the Falls (also known as Old Lady of the Falls).

12.7.5.1.3 Project Features that Reduce Effects

During the development of the Project, many features were incorporated into the design to reduce or eliminate potential impacts. These features can be found in the Project Description (Section 3). The Environmental Design Features that are related to this Subject of Note are listed in Table 12.7-19. This table also includes the potential environmental effect that has been reduced or eliminated, and a brief explanation of how this is achieved.

Table 12.7-19 Environmental Design Features that Reduce Effects on Culture, Heritage, and Archaeology

Project Component	Potential Effect	Environmental Design Feature
English as the on-site working language	<ul style="list-style-type: none">• loss of Aboriginal languages	<ul style="list-style-type: none">• encourage the practice of Aboriginal languages at the worksite when it does not compromise health and safety
Physical disturbance	<ul style="list-style-type: none">• loss of cultural landscape features• loss of archaeological resources• gain in knowledge of archaeological resources	<ul style="list-style-type: none">• minimize footprint• do systematic data collection for sites that cannot be avoided during construction and operations• avoidance of archaeological sites

12.7.5.1.4 Content

This subject of note covers three interrelated themes: effect on language; changes to the cultural landscape, which include loss of access to cultural areas and aesthetic changes, and loss of spiritual value; and effect on archaeological resources. These three themes form the following structure of this subject of note:

- language;
- cultural landscape; and
- archaeological resources.

This section describes the existing environment and the residual effects (i.e., effects after mitigation) of the Project; cumulative effects of the Project in

combination with past, present, and reasonably foreseeable future developments are addressed in Section 12.8.

12.7.5.2 Language

12.7.5.2.1 Existing Environment

Language is the anchor of a culture. It is critical for the transmission of culture and identity from one generation to the next. Language “is not only a means of communication, but a link which connects people with their past, and grounds their social, emotional and spiritual vitality” (Norris 1998). In Łutselk'e, language is understood to be important for the transmission of oral histories, to relate with Elders and other older land-users, and generally to maintain and foster culture and identity of people (LKDFN 2003, internet site).

Generally, across the NWT, the ability to speak Aboriginal languages has decreased across all age groups except for those individuals who are 65 years or older (GNWT Department of Education, Culture and Employment 2004). As shown in Table 12.7-20, the territory-wide percentage of the Aboriginal population 15 years and older who could speak an Aboriginal language has been decreasing, from 56% in 1989 to 38% by 2009 (GNWT Department of Education, Culture and Employment 2004; GNWT Bureau of Statistics 2010c). The decrease varies across the NWT. For example, in 2009, the percentage of people who could speak an Aboriginal language in the Tłıchǫ Region was 90%; 18% in Yellowknife; 25% in the South Slave Region; and 22% in the Beaufort Delta (GNWT Bureau of Statistics 2010c). Among the Yellowknives Dene, Detah has experienced a large decrease, from 94% in 1989 to 60% in 2009.

Table 12.7-20 Percentage of Aboriginals who Speak an Aboriginal Language, 1989 to 2009

Region	Year		
	1989	1999	2009
NWT	55.6	45.1	38.0
Beaufort-Delta	34.4	27.5	22.1
Dehcho	78.6	64.9	58.2
Sahtu	85.6	64.0	53.3
South Slave	39.5	32.7	25.0
Tłıchǫ	96.1	98.1	90.4
Yellowknife area			
Detah	94.0	77.4	59.9
N'Dilo	-	-	46.2
Yellowknife	36.6	21.9	18.0

Source: NWT Bureau of Statistics 2009.

While these numbers show a general decline of Aboriginal language use, the early to mid 2000s coincided with increasing Aboriginal participation in the diamond-mining workforce, the settlement of land claims, and the incorporation of Aboriginal languages into the school system. For these and other reasons, the LSA communities are not experiencing language decline equally. For example, a comparison of survey results between 2001 and 2006 (Statistics Canada 2008) showed that use of Tłıchǵ as the mother tongue²⁴ had increased by 10% and knowledge²⁵ of Tłıchǵ had increased by 17%. In 2009, the Tłıchǵ language had the largest number of speakers of any of the Aboriginal language communities in the NWT; an estimated 2,617 people in the NWT could converse in the language, representing about 36% of the total NWT residents who could converse in an Aboriginal language (NWT Bureau of Statistics 2009).

Given the cultural diversity of the NWT, educational programming exhibits a NWT perspective (GNWT Department of, Education, Culture and Employment 2005a). It reflects cultural needs and priorities, as related to language and traditional knowledge. The Dene Kede and Inuugatigiit programs developed to incorporate language and culture are two key Aboriginal programs. Bilingual educational programs include first language, second language, and immersion language programs in one or more of the 11 official languages of the NWT.

Students from kindergarten through grade nine in the NWT have access to Aboriginal language programs. These programs average two hours weekly of instructional time. Some high schools offer credit courses in these languages (GNWT Department of Education, Culture and Employment 2007b).

Some services in the NWT are also provided using an Aboriginal language. For example, the Tele-Care NWT service operated by the Department of Health and Social Services is a toll-free family health and support line that provides information and advice 24 hours/day, 365 days/year. Callers can access registered bilingual (English and French) nurses. Services are also translated in any of the NWT official languages plus over 100 other languages on request. From 2005 to 2006, Tele-Care NWT handled an average of 425 calls per month. Most calls were new mothers and others seeking advice to support self-care (GNWT Department of Health and Social Services 2007).

²⁴ Mother tongue means the first language learned at home in childhood and still understood.

²⁵ Knowledge of language refers to its use as a second language.

12.7.5.2.2 Effects Analysis

Based on the above trends and programs, it is expected that the Project will have a negligible effect on language use or language loss. Still, recognizing that language loss is of concern and important for cultural maintenance, De Beers will continue to support community cultural programming and will support Aboriginal languages being spoken at the worksite if it does not generate any health and safety issue.

12.7.5.3 Cultural Landscape

12.7.5.3.1 Existing Environment

The Terms of Reference outlined a series of concerns related to the loss of place, and the value lost if that place is changed. These concerns included the following:

- loss of spiritual connections and knowledge;
- loss of spiritual and aesthetic values of place, especially Lockhart River, Artillery Lake and Old Lady of the Falls sacred site;
- loss of alternative uses of the land; and
- the impact on heritage and archaeological sites.

Each of the above issues highlights the importance of cultural landscapes and the role that landscape plays in personal and community identity. Cultural landscapes embody cultural, social, economic, psychological, spiritual, and historical values, in addition to having ecological importance (Evans et al. 2001; Parks Canada 2004; Collignon 2006). Analyzing cultural importance requires consideration of what makes a place special and how one place relates to another. The issues are discussed in this section on cultural landscapes with the exception of the impact on archaeological sites, which follows and is analyzed separately.

Cultural identity for many is at the core of community life. If people wish to understand the meaning landscapes have, then it is best to regard them as part of the people that created them and not separate from them. One part of the cultural landscape cannot be separated out from the other pieces (Evans et al. 2001).

As Chief Darrell Beaulieu of the Yellowknives Dene First Nation stated:

... [W]e don't want our cultural identity treated like points on a map that can be simply managed and mitigated or made less important.

Those places, the cultural representations, the landscape and the information those places contain are not just archaeological sites. They're part of our social, spiritual and cultural identity. They represent a small fragment of our current, recent and distant past. Those places out there are how we communicate who we are and pass on our culture to our children (MVEIRB et al. 2003: lines 9-21, page 12).

Place Names and Legends

The Dene often name places where activities have taken place (e.g., a kill site or fishing eddy). The name of a place frequently refers to a specific event, which occurred at the time it was first used (Collignon 2006; Saxon et al. 2002; Legat et al. 2001; Hanks and Winter 1986). Unlike Western place names, which often refer to individuals, Dene names normally reflect the activities, events, aesthetics, and rewards associated with places (e.g., Ne'dzee W'ee Tu'we', "place where people watch caribou cross a narrows"). Ne'dzee W'ee Tu'we' not only names the actual narrows where the hunt would take place, but implies a system of sites connected with hunting caribou around this narrows (Hanks and Winter 1986).

For example, research conducted with the Tłıchǫ (Saxon et al. 2002; Legat et al. 2001) found that place names provide essential information, such as water flow, topography and biodiversity of areas within their traditional territory. Many place names serve the purpose of providing vital information about how to survive on the land. Place names may also carry information on places where resources should be available, and places to be avoided because they are hazardous (Legat et al. 2001). Tłıchǫ Elders emphasize that if individuals know the place names, they will know what to expect and will be able to manage and monitor traditional lands (Saxon et al. 2002).

The Denesǫline also have place names and legends that demonstrate the long-lived relationship that people have had with their landscape (Parlee et al. 2005a: 30; LKDFN 2001). Names such as ʔeda "caribou crossing", desnethch'e "where the water flows out", and des delghai "white river", provide specific details about landscape features. Names such as "small portage", "open water" provide details regarding where to travel and where not to travel in both summer and winter (LKDFN 2001: 53).

Along with the culturally significant places, the area is a topographic record of places travelled to places inhabited, and places where life was lived. These areas have been given names that connote where activities have taken place (e.g., a kill site or fishing eddy). The name of a place frequently refers to a specific event, which occurred at the time it was first used (Collignon 2006;

Saxon et al. 2002; Legat et al. 2001; Hanks and Winter 1986). For example, the Tłı̨chǫ have Ne'dzee W'ee Tu'we', meaning the "place where people watch caribou cross a narrows". Ne'dzee W'ee Tu'we' not only names the actual narrows where the hunt would take place, but implies a system of sites connected with hunting caribou around the narrows (Hanks and Winter 1986).

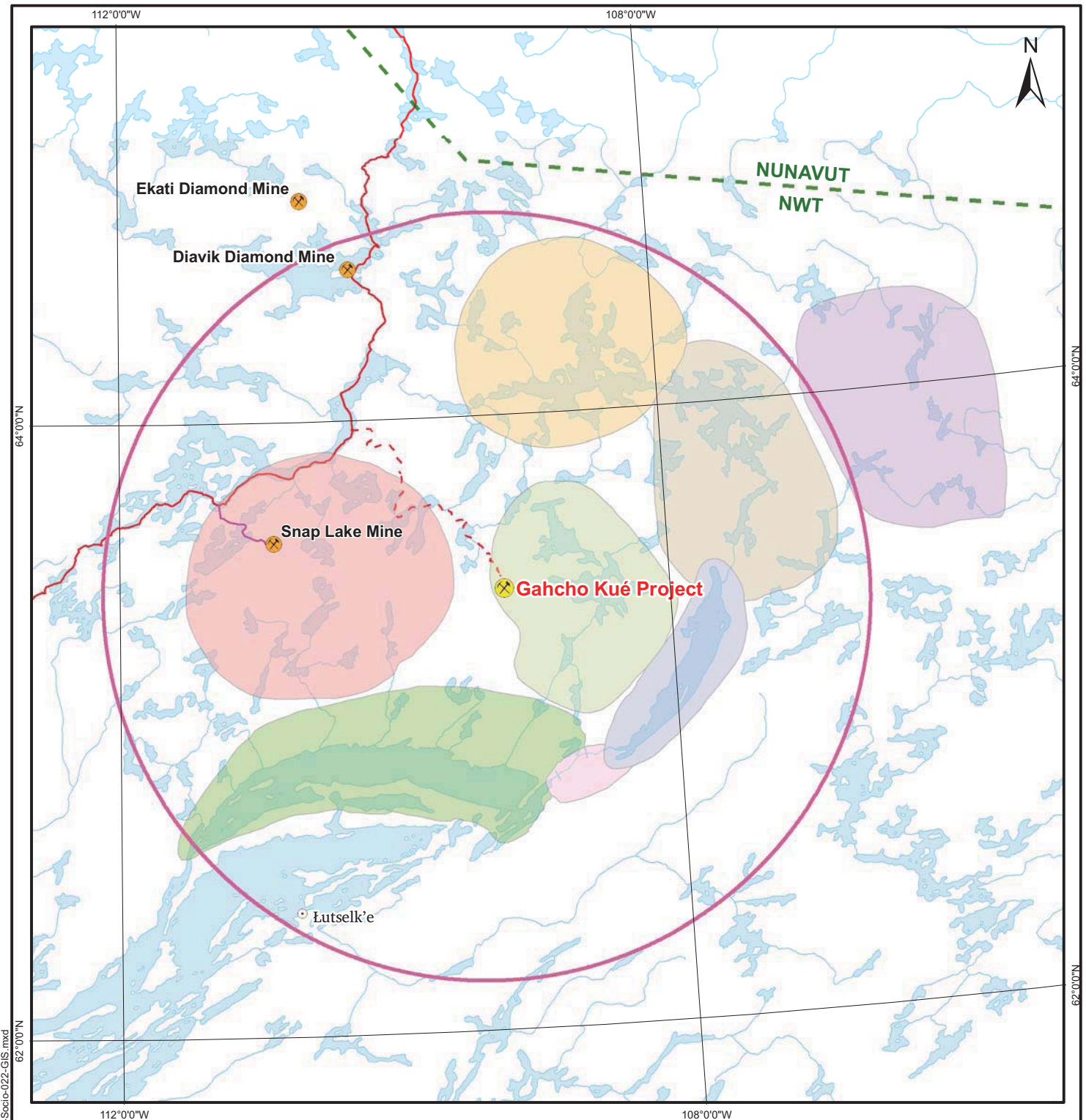
Being told about a place is often not enough, and many of the most important stories can only be meaningfully related at the narrator's home (Hanks 1997:179). Thus, it is not solely the landscape or the individual place names that are of importance. It is also the place name being experienced in the context of the land to which it refers that is meaningful. Place names stimulate story telling that contain knowledge of socio-political relationships, social behaviour, resources, ancestral use, graves, and obstacles while traveling and camping in an area. Often a place name will be mentioned to stimulate the listener's memory, hoping to encourage them to think and act in a certain way (Legat et al. 2001:15).

These place names reflect many different social, cultural, spiritual, and ecological values as an integrated whole. An example of this is Ts'anTui Theda -"The "Old Lady of the Falls" located on the Lockhart River. Many of the Denesǫliné visit the site every year to seek spiritual guidance and direction. The Denesǫliné have named, used, and recognized the places referred to in their place names and their traditional stories for thousands of years, and have regarded them as critical for their own well-being as well as the well-being of the many wildlife species (Parlee et al. 2005b).

Łutselk'e Denesǫline Cultural Landscape

The Łutselk'e Denesǫline have described their traditional territory as Denesǫline Nēne (Chipewyan Land), as shown inside of the circle in Figure 12.7-5. The Denesǫline Nēne is the heart and spirit of the Denesǫline way of life. It is within this area that the cultural and environmental features of value to the Denesǫline people manifest themselves (LKDFN 2003, internet site).

Within the Denesǫline Nēne is the Kakinēne (also referred to in the literature search as *Katthinēne* or *Kakinçne*), an area described by Denesǫline Elders as a region "beyond the end of the lake" and as an area rich with resources (LKDFN 2001; LKDFN 2003). The Kakinēne encompasses Kaché Tł'azı (McLeod Bay) and the East Arm of Tu Nedhe (Great Slave Lake). It extends from Nıdıtagh Tué (MacKay Lake) and Tł'a Gai Tué (Aylmer Lake) in the North, to Æedacho Tué (Artillery Lake) in the east and Łu Tué (McKinlay Lake) in the west (LKDFN 2003, internet site).



LEGEND

- | | | | |
|--|----------------------------------|--|---------------------------------|
| | Gahcho Kué Project | | Waterbody |
| | Existing Mine | | Territorial/Provincial Boundary |
| | Territorial Capital | | Kaché Kué |
| | Populated Place | | Desnedhe Che |
| | Highway | | Æedacho Kué |
| | Existing Winter Road | | Bedaghé Tué |
| | Tibbitt-to-Contwoyto Winter Road | | K'ásba Nýné |
| | Winter Access Road | | Tłá Gai Tué |
| | Watercourse | | Na Yaghé Tué 1 |
| | | | Na Yaghé Tué 2 |
| | | | Denesôhine Nýné |

NOTES

Base data source: The Atlas of Canada
Land classification from "Results and Implications of 2002-2003 Monitoring Activities in the Traditional Territory of the Autsel K'e Denesoline - Final Report (2003).

GAHCHO KUÉ PROJECT

Denesôhine Land Region Classifications in the Kakinëne

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:2,000,000
25 12.5 0 25
Kilometres



FILE No:

B-Socio-022-GIS

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December 3, 2010

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09-1365-1004

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1

OFFICE:

GOLD-CAL

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RM

Figure 12.7-5

One concept used by Łutselk'e Dene to talk about Kakinëne is "nëne", which is commonly translated as "the land". In addition to the land itself, "nëne" appears to refer to everything that depends upon or affects the land, including changes in the weather, climate, animals and people (LKDFN 2001:24). Thus the health of Kakinëne as a whole is intimately related to the health of the community (LKDFN 2001:82).

Within the Kakinëne is a more defined area reflective of the traditional seasonal movement of the Łutselk'e Dene. The Denesłıne have identified eight regions, with each region reflecting a different use and movement across the Kakinëne (Figure 12.7-5). These are as follows:

- Bedaghé Tué;
- Desnedhe Che;
- K'ásba Nÿné;
- Kaché Kué;
- Na Yaghé Tué 1;
- Na Yaghé Tué 2;
- Tła Gai Tué; and
- Æedacho Tué.

Each of these areas has cultural importance to the Denesłıne. Some, like Æedacho Tué and Kaché Kué, were important for harvesting, especially caribou, as the caribou pass through these regions during their seasonal migrations. In others, such as Desnedhe Che, reside numerous spiritual areas for the Denesłıne. In Desnedhe Che, the spiritual sites of Ts'anTui Theda or "Old Lady of the Falls", Hagoche's Shovel and the Beaver Lodge at Artillery Lake are located. Ts'anTui Theda is still a location where Denesłıne people still regularly visit for spiritual guidance.

To the north of Kaché Tué and Æedacho Tué is the region called Bedaghé Tué. It is in this region in which the Project is located. Bedaghé Tué features one of the main routes used by the Denesłıne to access the barren lands. Stories conveyed by Elders tell of how groups of Denesłıne families would travel together from Kaché Tué into the Bedaghé Tué region. It is in Bedaghé Tué that the group would split off into smaller family units and head to their traplines and winter hunting grounds. In the springtime, these families would regroup in the region for the journey back to Tu Nedhe (Great Slave Lake). The name, Bedaghé Tué, means "bag lake", because families would cache bags and sleds

in the spring and these could be seen on the shores of the main lakes (LKDFN 2003, internet site).

Central to the Bedaghé Tué region are Tué Cho (Fletcher Lake), Datthi Tué (Walmsley Lake), and K'ezus Tué (Cook Lake). These lakes are valued for the fish and water that feeds the Hoarfrost River. This region also contains some of the Bathurst caribou migration trails as they move from Lac de Gras region down to Aedacho Tué in the fall. Many caribou crossings are found on the larger lakes in the region, and associated with these are Denesöliné camps and travel routes (LKDFN 2003, internet site; Parlee and Marloweal. 2001).

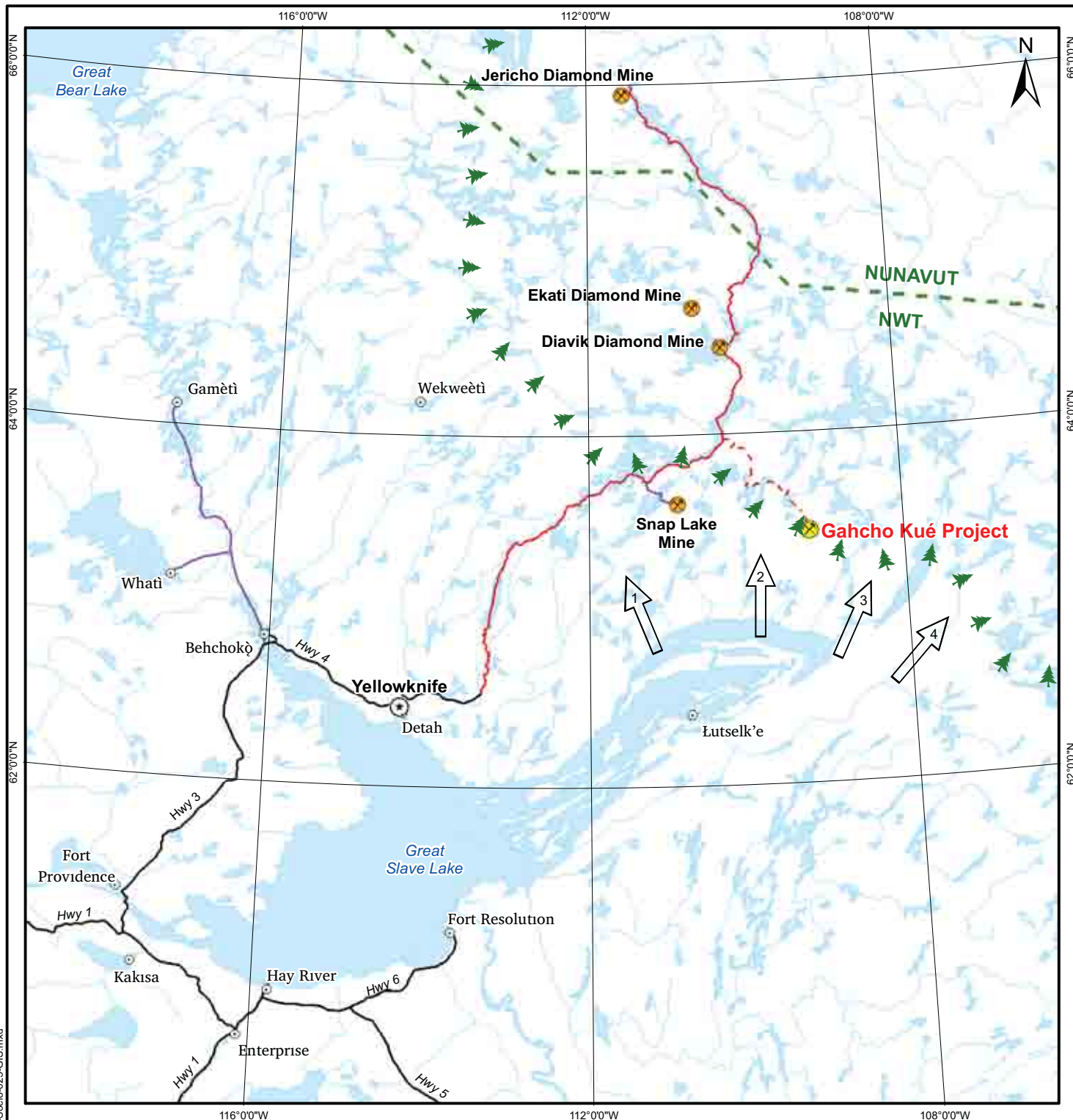
The Denesöline Elders do not consider the areas within the Kakinëne as independent from one another, nor do they apply greater importance to one area more than another. The health and integrity of each of these regions are vital to maintain the overall environmental health and integrity of the Kakinëne. This connectivity is re-iterated by the interconnectedness of its watersheds, all of which feed into Tu Nedhe.

The North Shore area of Great Slave Lake is a mix of socially, culturally, ecologically, and spiritually significant sites. Many of these sites can be found along the well-traveled winter trails and summer portage and canoe routes that led the Denesöline throughout the Kakinëne and into the Barrenlands. There are four main trail routes radiating northward: T'atha Ła Deze, Des Delghai Deze, Des Tsöl Che Deze and Desnethch'e Deze, as shown in Figure 12.7-6. Each of the trail systems begins at camps along the shore of Great Slave Lake and stretch North to the waters of the Lockhart River at Nidítagh Tué (MacKay Lake) and Tłā Gai Tué (Aylmer Lake) (LKDFN 2001).

As Elder Maurice Lockhart described, these trails and portages were created generations ago by the Thai Denesöline (ancient people):

These canoe routes and trails into the barren lands have been here for generations. Our ancestors (Thai Denesöliné) used these routes and trails. Now we still use them to go hunting for caribou. It has been passed on from our great ancestors to today – from Taltheilei to Fort Reliance (ML 08 31 00) (LKDFN 2001:52).

As stated above by Elder Maurice Lockhart, these travel routes have been used and followed by many generations of Denesöline. Evidence of this history includes the presence of graveyards, trail markers, arrowheads, and campsites distributed along the paths and portages of these routes (Parlee et al. 2005a).



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary
- Treeline
- Traditional Travel Routes of the North Shore (Great Slave Lake)
 - 1: T'atha La Deze
 - 2: Des Delghai Deze
 - 3: Des Tsël Che Deze
 - 4: Desnethch'e Deze

NOTES

Base data source: The Atlas of Canada
Travel routes adapted from: Traditional ecological knowledge in the Kache Tse study region: Final Report (2001)

GAHCHO KUÉ PROJECT

Traditional Travel Routes into the Barrenlands

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:3,500,000

40 20 0 40
Kilometres



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B-Socio-025-GIS

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November 09, 2010

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Figure 12.7-6

The continued importance of these routes has been summarized in *Ni hat'ni Watching the Land Study* (LKDFN 2003, internet site). Participants in the study stressed that the way in which Łutselk'e Denesłine expressed their culture was primarily through on-the-land or land-based practices such as hunting, trapping, fishing, camping, and working with country materials (e.g., hides, plants) (LKDFN 2003, internet site). The continued practice of traditional activities on the land with other community members and those who have traditional knowledge of the Kakinēne (i.e., the trails, and routes northward from Tu Nedhe) is very important to the transmission and maintenance of Denesłine culture.

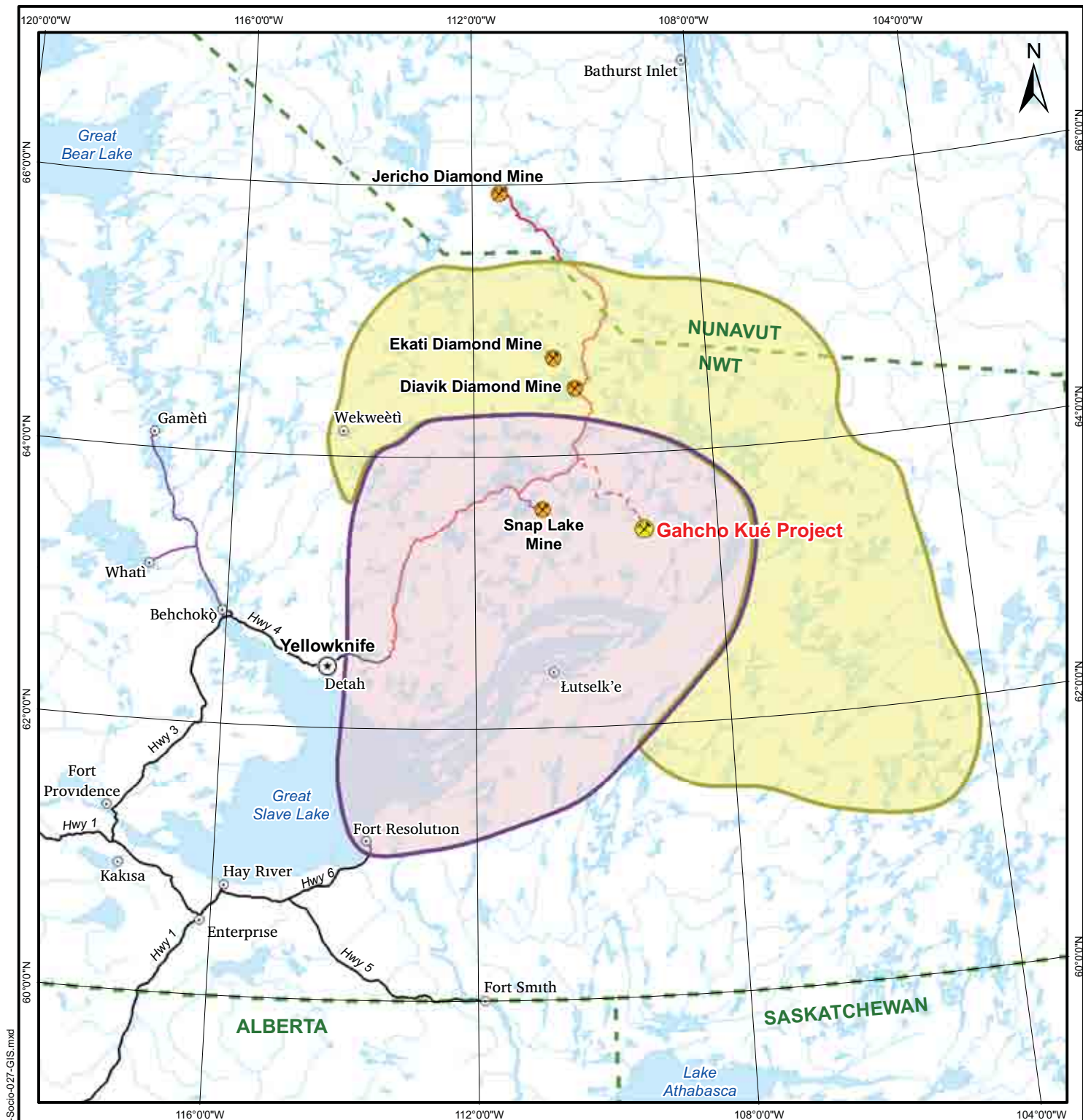
The following quote from J.C. Catholique further illustrates the connection Denesłine have to the land and their movement throughout it:

As far as the Chipewyan people are concerned, they like to live off of the land. They like to go out – sometimes they go flying out by plane, away out to Artillery Lake, or the barren lands. That's where people used to live up there, before. A way out – Artillery Lake, the barren lands, Thelon River – all over the place. They say there are still historical marks like tipi rings, rock, things that you can find out there, like arrowheads. There are also spiritual places out there. There is a lot of animals out there. Like the caribou (J.C. Catholique in Raffan 1992: 104-105).

Supporting the J.C. Catholique statement above, Figure 12.7-7 shows the extensive range used for hunting and trapping activities, historically and in more recent times. The primary difference between historic and present times is the extent of travel. Today, travel on the land stays closer to Great Slave Lake, whereas earlier, more extensive travel was probably linked to following both the Bathurst and Beverly caribou herds for survival (Kendrick et al. 2003). The need to travel such distances is not as necessary today.

Tłjchq Cultural Landscape

The Tłjchq traditionally occupied the area between Tideè (Great Slave Lake) and Sahti (Great Bear Lake), extending from Kôk'èetì (Contwoyto Lake), Ts'eèhgooti (Aylmer Lake) and Æedacho Tué (Artillery Lake) in the barren lands, to Dehtso (Mackenzie River) in the west as shown in Figure 12.7-8 (Legat et al. 2001).



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Winter Access Road
- Tibbitt-to-Contwoyto Winter Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary
- Approximate Historical Traplines
- Approximate Recent Traplines/Historical Camps

NOTES

Base data source: The Atlas of Canada
 Trapline and cabin information drawn from:
 NiHat'ni: Watching the Land-Final Report 2003-2005.

GAHCHO KUÉ PROJECT

Historical Traplines, Historical Camps/Cabins and Recent Traplines

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:4,500,000
 50 25 0 50
 Kilometres



FILE No:
B-Socio-027-GIS

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November 09, 2010

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09-1365-1004

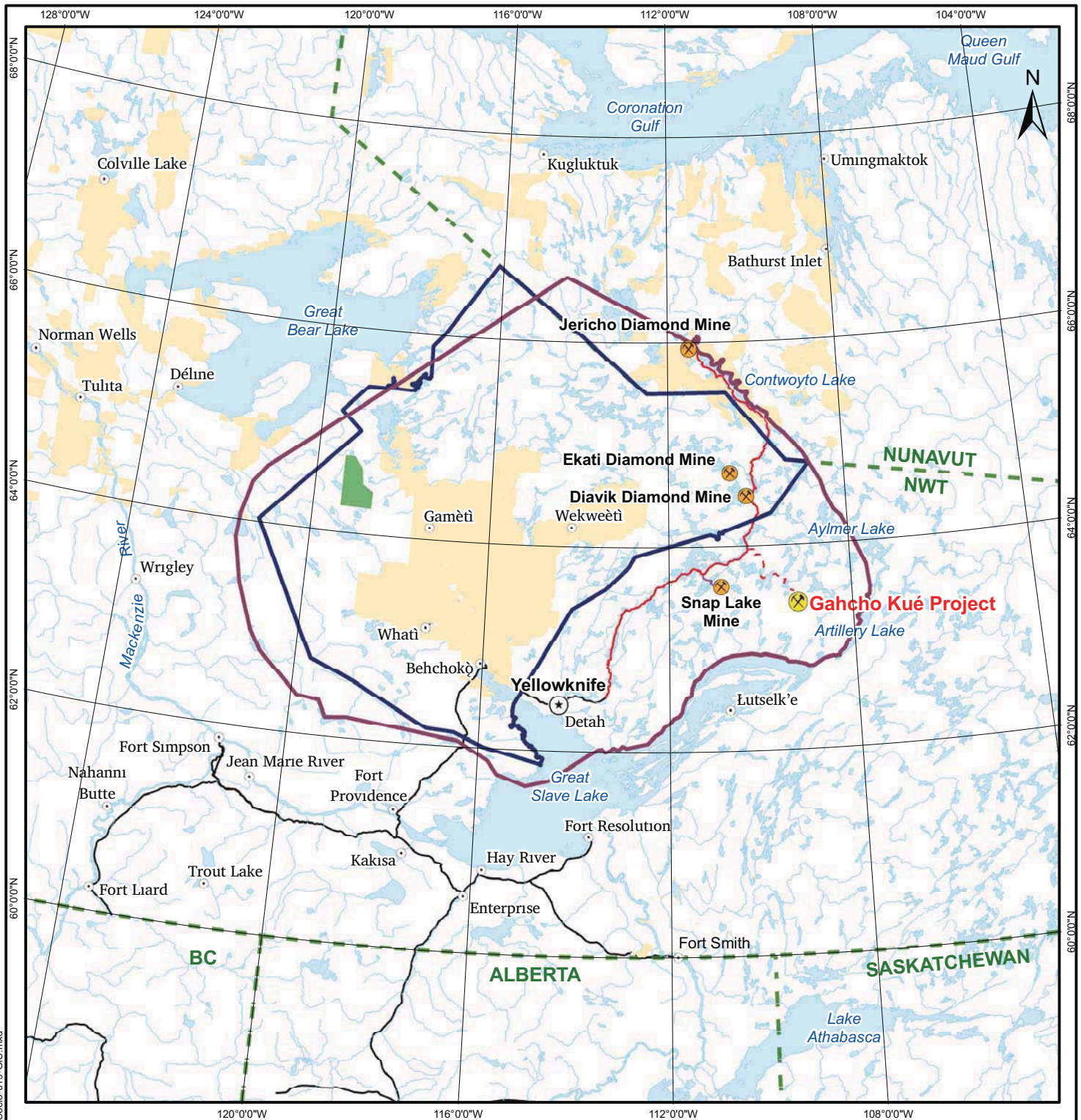
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Figure 12.7-7



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary
- Ezǫdzítí - Historical and Cultural Importance
- Mǫwhí Gogha Dé Nǫttée - Traditional Use Area
- Wek'éezhíí - Resource Management Area
- Thchǫ Lands - Owned in Fee Simple

NOTES

Base data source: The Atlas of Canada
 Akaitchol Interim Land Withdrawal provided by DIAND are for illustrative purposes only.
 Tlcho land claim area obtained from Her Majesty Queen in Right of Canada, Department of Natural Resources. All rights reserved.

GAHCHO KUÉ PROJECT

Mǫwhí Gogha Dé Nǫttée, Wek'éezhíí, Thchǫ and Ezǫdzítí Lands

PROJECTION: Canadian Lambert Conf. Conic
 DATUM: NAD83

Scale: 1:6,000,000
 50 25 0 50 100
 Kilometres



FILE No: B-Socio-019-GIS

DATE: November 30, 2010

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REVISION NO: 1

OFFICE: GOLD-CAL

DRAWN: JH

CHECK: RM

Figure 12.7-8

Like the Kakinëne of the Denesöline, the Mqwhí Gogha Dé Nijhtée of the Tłıchq can be categorized into four main environmental regions of traditional importance. The names for these areas are as follows: Nqđıı, Detsıta, Detsılaa, and Hozıı. Nqđıı is a large plateau, west of Camsell River including the Horn Plateau, where both woodland and barrenland caribou are hunted, where fur bearing animals are trapped, and where several important medicinal plants are found. Detsıta is a general term used for a forested area consisting of spruce, poplar, and birch, which is east of the Camsell River. This area is heavily forested to the west and thins on the Canadian Shield, and becomes progressively more sparse and stunted towards the Detsılaa or treeline. The area just below the treeline is known as detsıts'qneè. The fourth category is hozıı, which refers to the barren lands (Legat et al. 2001).

Important Places

The following sections describe locations considered important to the Łutselk'e Denesöline, Tłıchq, or Deninu Kué.

Artillery Lake

Within the Kakinëne, one of the areas of particular importance to the Denesöline is Æedacho Tué (Artillery Lake). The Tłıchq know it as ʔedaàtsotı. It is a place of unique location near the treeline where caribou would over-winter. It has been a place of food and shelter with the resources needed for survival for thousands of years (LKDFN 2001). The Denesöline traditionally would gather at Æedacho Tué to meet the fall caribou migration and then continue on to the barren lands.

Although Artillery Lake is situated well upstream of the Old Lady of the Falls site on the Lockhart River, the lake is part of the creation story of the Old Lady of the Falls. The following section describes the story of the Old Lady of the Falls, and its importance.

Old Lady of the Falls

One area of particular importance within Æedacho Tué is Ts'anTui Theda or the "Old Lady of the Falls". The following story conveys the importance of this location to the Denesöline.

I will tell you a true story about how it was in the beginning and how Ts'anTui Theda (the "old lady of the falls") came to be. This story was passed on to me as it was passed on from generation to generation. The "old lady of the falls" has been there since the earliest of times.

It started in the place called Kaché (Fort Reliance) and Æedacho Tué (Artillery Lake). It used to be called Beaver Lake in those days because there was a beaver living there. You could see the beaver's lodge if you happened to be out at Æedacho Tué. People were often in that area because that is where they went caribou hunting in the fall time. Even today Dene people still go there to hunt caribou.

In those days there used to be a man. His name was Hachoghe. He was a big man. One day Hachoghe saw the beaver's lodge. He could see it because it was on top of a small hill. He decided he wanted to kill the beaver but saw that he would have to get the beaver out of the lodge. So he started to push the dirt to one side. (Today you can even see where he pushed the dirt to one side.). He was so busy digging and moving the dirt that he didn't notice that the beaver had another lodge in the narrows close to the main land. It wasn't far from the main route that the Dene people used when they traveled in that area.

But the beaver did not stop at that lodge. Instead he went down the Lockhart River to the main lake – Tue Nedhe. The people there were starving. When they saw the beaver they thought they may be able to kill him. It was then that Hachoghe saw the beaver and ran after him with a shovel. He threw the shovel into the water but the smart beaver swam away. The handle of the shovel broke and Hachoghe had to leave it there, sticking out of the water. That is why when you go to the north end of Æedacho Tué you see a rock sticking out of the water. That is the handle of Hachoghe's shovel.

After Hachoghe broke his shovel, he didn't give up. He continued to follow the smart beaver back up the Lockhart River. By then the Dene people from Tue Nedhe were following Hachoghe. The river was strong and the beaver soon got tired and Hachoghe killed him. The Dene people were so hungry they went after the meat right away. There was enough meat from that beaver for all the Dene people for two or three days. But there was one woman who asked for the beaver's blood. Hachoghe told her he could not give her the

beaver blood because there was not very much left. So the woman sat down at the falls and waited.

All of the other Dene people followed Hachoghe who was chasing another beaver down the river. They were heading toward the east arm of Tue Nedhe. After a while, the people noticed that the woman was still back at the falls. So Hachoghe picked two healthy people to go back and look for her. They went all the way back up the Lockhart River and they found her sitting at the falls. She had been sitting there a long time and so she was stuck in the earth. The two people told her that Hachoghe was asking for her to return to Tue Nedhe. She said, "I cannot return with you. I have been sitting here too long and now I will be here for all eternity." Then she said, "Go back to where you came from. Go back to Hachoghe and the others and give them this message." So the two people returned to Hachoghe and the others and gave them the message. This is how the Dene people learned about the "old lady of the falls" (Ts'anTui Theda). From that day forward the Dene people have gone to visit the Ts'anTui Theda to pay their respects, share their worries and to ask for help. (Zep Casaway, Translated by Archie Catholique in LKDFN:44).

Today, the Old Lady of the Falls site remains an important location for various cultural groups in the NWT. For example, every July, there is a large spiritual gathering near the mouth of the Lockhart River during which people are taken to visit the Old Lady of the Falls site. The spiritual gathering is attended by people from Yellowknife, the Tłıchǫ nation, Hay River, Fort Resolution, and Fort Smith. While visiting the Old Lady of the Falls, people may seek healing from sickness or may seek spiritual guidance on the location of caribou (Morris Lockhart in Raffan 1992: 124-125).

Tłá Gai Tué (Aylmer Lake)

Tłá Gai Tué (Aylmer Lake) as it is known by the Denesłıne, or Ts'eèhgooti as it is known by the Tłıchǫ is another of special significance to both peoples. Like Denesłıne Tué (Artillery Lake), Tłá Gai Tué represents a diversity of important values: cultural, social, spiritual, and ecological. As part of the waters of Desnethch'e, (the Lockhart River watershed), its significance is even greater because of its connection to the "Old Lady of the Falls" (LKDFN 2001).

Elders describe the area based on their experiences hunting, trapping, and traveling through the area. Many Elders who lived at Æedacho Tué (Artillery Lake) know about Tłá Gai Tué (Aylmer Lake), as it was a common destination for

hunting and trapping. Elders also used to travel there enroute to MacKay Lake to the west, or to the Thelon region to the east (LKDFN 2001).

I used to go to Aylmer Lake (Tla Gai Tué) only in the winter with my father and to Fletcher Lake. This was just for trapping. There are a lot of people who used to go to Aylmer Lake (Tla Gai Tué) from Łutsël K'e. I traveled from Aylmer Lake (Tla Gai Tué) to the Thelon River (Thelon Deze) a few years back (NA 01 15 01) (LKDFN 2001:61).

Denesłhine Elders also call Tla Gai Tué (Aylmer Lake) - Thai T'ath Tué - the lake where there are lots of eskers. The many eskers have always been important for trapping, as well as for camping. Eskers are used as denning habitat for many species, including wolverine, wolf and white fox (LKDFN 2001), and their varied plant life attracts animals such as caribou and grizzly bear. Finally, eskers provide shelter where people could camp in the small groups of trees and use dechën (drywood) for fuel and setting tents (LKDFN 2001).

The vegetation around Aylmer Lake (Tla Gai Tué) is very healthy – it's not disturbed or polluted. The plants there are very small. Even the Labrador tea, rosehips, and other plants – they are very short and small. We used to live at Artillery Lake (Łedacho Tué) so we knew the area very well. (JM 01 15 01) (LKDFN 2001:61).

Lockhart River

The spiritual importance of the Lockhart River as a result of its connection to the "Old Lady of the Falls" was discussed above. Additionally, The Deninu Kué and the Łutselk'e Dene have expressed concern for the protection of water in general and for the Lockhart River watershed in particular.

Regarding the protection of water:

The Akaitcho Dene has both the inherent and treaty right to use and enjoy the Creator's gift of water. Our rituals and stories teach about the sacred right to live with water, a responsibility to use traditional knowledge and cultural practices to protect and sustain pure water for the continued cleansing and healing of our communities. (Deninu Kué First Nation 2007: 3).

The following concern was stated regarding the Lockhart River watershed:

You should protect the areas and waterways that flow into the Lockhart River. Even as far as McKinlay Point to MacKay Lake should be protected. At one time in the dry years – it may not seem like the water flows that way but in the spring you can see it. - it all flows into Great Slave Lake (PC 01 29 01) (LKDFN 2001: 64).

12.7.5.3.2 Effects Analysis

When new features (e.g., mines, cabins, airstrips, and communities) are added to the landscape the retelling of the cultural story on the landscape is affected. Once stories are lost, the narrative structure is weakened since most stories are interconnected (Kelley and Francis 1994). Unfortunately, when access to the land is interrupted and the stories and place names are lost, there is a corresponding decline in local land use (Kelley and Francis 1994).

The Project is located in the Denesöline traditional area. The Project area is an area in which traditional trapping and hunting used to occur, and through which the Denesöline used to travel to the barren lands to hunt caribou. Today, travel on the land stays closer to Great Slave Lake.

Specifically-identified spiritual and cultural sites included Aylmer Lake, Artillery Lake, the Lockhart River, and “Old Lady of the Falls”. The Lockhart River/Artillery Lake system, including the “Old Lady of the Falls”, and Aylmer Lake is approximately 70 km from the Project. The north shore of the east arm of Great Slave Lake is about 75 km from the Project. As a result, the Project will not be visible from any of these sites. Noise from Project mining operations will be noticeable up to 3.5 km from the site, and people may notice noise from flights arriving and departing from the mine if they are within 5.5 km of the airstrip. Ground vibrations due to blasting are not expected to be perceivable more than 4.4 km away from the blasting site. As a result, noise from Project activities will not be heard at the culturally-important areas.

Mine construction is expected to last 2 years, after which mining operations are planned for 11 years. Following operations, there will be 2 years of reclamation to interim closure, and another 6 to 14 years for lake refilling. During this time, there will be disturbance to an area that has had traditional activity in the past, but not currently. Following closure, the Project infrastructure will be removed, the area will be reclaimed, and the open pits and other areas will be flooded as the water level of Kennady Lake is returned to previous levels. The remaining change on the landscape will be two mine rock piles and the Coarse PK Pile that will be covered with mine rock. These piles will be visible should someone travel near the site in the future. As a result, the Project is expected to cause a small permanent change in the cultural landscape.

12.7.5.4 Archaeological Resources

12.7.5.4.1 Existing Environment

The archaeology LSA (for definition, see Appendix 12.III Archaeological Assessment) contains 80 recorded archaeological sites. More than half of these sites are within 1 km from the Project site. The Winter Access Road Study Area yielded another 130 sites for a total of 210 recorded archaeological sites. Most of the winter road sites are well removed from the actual route or are located on elevated terrain near portions of the route situated on frozen lakes. In addition, 44 sites have been recorded in surrounding areas and are well removed from Project activity, but contribute to the archaeological database as 254 sites associated with the Project.

Most of these 254 sites consist of stone tools or the pieces of stone discarded in the process of manufacturing stone tools. Such sites are assumed to relate to prehistoric use of the LSA and Winter Access Road Study Area. Occasionally, sites containing features, such as stone circles and caches, are encountered. Most of the archaeological yield is suggestive of the last 2500 years of prehistory, although potential for earlier occupation is suggested by the presence of tools similar to those from the Arctic Small Tool tradition (2500 to 3500 years before present) and earlier use may be encountered in the future (Annex L).

Most sites are defined as lithic scatters, which are locations with a scatter of stone tools or flakes (discarded pieces) on the surface. Some tested sites have also yielded buried archaeological material or contain archaeological features. The sites found in the vicinity of the Project may represent camps where hunting and fishing were conducted, workshops where stone tools were manufactured or repaired, and lookouts for hunting.

All sites in the archaeology LSA that have moderate to high impact potential have been assessed through subsurface testing and/or intensive surface examination. This detailed examination determined the archaeological significance of each of these potentially threatened sites. A total of 49 sites have been assessed. Because of revisions to the development plans, not all of these sites still have moderate to high impact potential. Three sites along the Winter Access Road have been assessed for archaeological significance.

Three archaeological sites were identified as having high archaeological significance. Two of these sites may be avoidable. The third site may require subsurface excavation and surface collection as well as more detailed mapping and recording, if the Project goes ahead. Seven sites were identified as having moderate archaeological significance; one of these may be avoidable.

Systematic data recovery (as described for the high importance site) may also be required for the remainder.

12.7.5.4.2 Effects Analysis

It has been predicted that the Project could have moderate to high impact potential at 35 of the 80 recorded sites in the archaeology LSA. Eleven of the 35 sites are judged to have moderate impact potential and the remaining 24 to have high impact potential. Moderate impact potential has also been identified at three of the 130 sites associated with the Winter Access Road. Three additional sites along this route have high impact potential; two of these sites have been mitigated. Impact is most likely to occur during the construction phase within the archaeology LSA, but may occur during the operation phase in association with Winter Access Road Study Area. Direct impacts have been predicted primarily on the basis of distance from an activity and the nature of the proposed activity. Indirect impacts to archaeological sites may occur as a result of increased human presence, regardless of distance.

Avoidance is always the preferred option, and De Beers is committed to avoiding the 45 sites that are more than 1 km from the Project footprint and the 125 sites along the Winter Access Road that are well removed from the route. Varying levels of additional archaeological work will be required at most sites within 1 km of the Project footprint, although some have been mitigated by work conducted to date. Site protection and/or monitoring will be required at four sites that are within 30 m of the Winter Access Road and two sites have been mitigated by work conducted to date. Because mitigation through surface collection and subsurface testing (systematic data recovery) is destructive, it is not conducted at most sites until after the final Project footprint has been determined in case avoidance, the preferred management option, is feasible.

12.7.5.5 Residual Effects Summary

The Project will have little effect on language and cultural resources, and a moderate effect on archaeological resources.

Language. The Project will have little effect on the use and continuation of Aboriginal languages in the NWT. Aboriginal language use as the mother tongue has been declining in the NWT throughout the 20th century and not just since the first diamond mines. Despite the concern expressed regarding language loss, language loss may be slowing. Efforts on the part of communities and the introduction of Aboriginal language classes in the school system have increased Aboriginal language use in the home; if not as the mother tongue, as a second language.

De Beers recognizes and understands that with language comes spiritual, moral, and ethical values, and that Aboriginal language use is the greatest in isolated, small communities where people have tended not to change their place of residence (Burnaby 1996), and where the cultural and political climate has allowed for the language to be continued (Norris 1998). With this in mind, De Beers allows the use of Aboriginal languages in the work place, as long as it does not interfere with health and safety. Likewise, through its literacy efforts, De Beers will continue to support Aboriginal language programming in communities.

Cultural Landscapes. While De Beers recognizes that the Project will disrupt the landscape, it does not believe that the Project will contribute to an overall loss of connection with the land and a loss of the inter-relationships between the areas. De Beers recognizes that connections with the land exist, and it will work with Łutselk'e and Parks Canada, once the Park is established, on initiatives that might be identified as essential to keep the story on the land alive.

Archaeology. Potential direct impacts to 35 archaeological sites with moderate to high impact potential have been identified. When the detailed design of the Project and the final site plan is determined, the sites will be mitigated by avoidance, if possible, or by systematic data recovery before disturbance, if the activity cannot be moved. As a result of the mitigation and monitoring that will occur, the residual effects (i.e., effects after mitigation) will be minimized. One remaining site with high archaeological significance and six sites with moderate archaeological significance will likely be impacted; however, site data will be recovered and the requirements of the Prince of Wales Northern Heritage Centre will be met.

The Project, while located in the vicinity of a number of sites, will not directly affect identified special places or interfere with access to other areas. In particular, many of the sites of special interest may eventually be protected inside a National Park (e.g., "Old Lady of the Falls", Artillery Lake, most of Bedaghé Tué and a portion of the Lockhart River system)

12.7.5.6 Mitigation

The mitigation for the Subject of Note: Culture, Heritage, and Archaeology, including the environmental design features incorporated by De Beers, is summarized in Table 12.7-21.

Table 12.7-21 Summary of Mitigation for Culture, Heritage, and Archaeology

Effect	De Beers		Government	Government, Individual, Family, Community
	Environmental Design	Other Mitigation	Other Mitigation	Other Mitigation
Effect on Aboriginal Languages	<ul style="list-style-type: none"> encourage the practice of Aboriginal language at the worksite when it does not compromise health and safety 	<ul style="list-style-type: none"> continued support for Aboriginal language initiatives in the communities through De Beers Literacy Programming work with community agencies to ensure that literacy programs will be directly linked to other kinds of upgrading, education, and training programs, so that participants may further improve their qualifications towards employment 	<ul style="list-style-type: none"> GNWT continuing with Aboriginal language programming in the schools 	<ul style="list-style-type: none"> continued use of language in the home
Effect on the cultural landscape	<ul style="list-style-type: none"> minimal footprint relatively short life-of-mine only two mine rock piles visible post-closure 	<ul style="list-style-type: none"> work with Łutselk'e and Parks Canada, once the Park has been established, on programming that reflects the story on the land and the continuation of the relationship with the landscape financial or in-kind support for on-the-land programming run by schools 	<ul style="list-style-type: none"> Parks Canada establishment of the proposed National Park on the East Arm of Great Slave Lake 	
Effect on archaeological resources	<ul style="list-style-type: none"> avoidance of archaeological sites systematic data collection for sites that cannot be avoided 			

12.7.5.7 Residual Impact Classification and Determination of Significance

12.7.5.7.1 Methods

The criteria used to describe the residual impacts of the Project (e.g., magnitude, duration) and the definitions of the scales used (e.g., low magnitude, short-term duration) are provided in Table 12.7-5 in Section 12.7.1.6. The methods used to assess socio-economic impacts are also described in detail in Section 12.5.

12.7.5.7.2 Results

The Terms of Reference raised the possibility of language being lost as a result of employment with the Project. As discussed, Aboriginal language loss, especially the mother tongue, has occurred. However, Aboriginal language use as a second language may actually be improving. Based on these observations and the mitigation proposed by De Beers, the Project may possibly have an effect of low magnitude on use of Aboriginal languages (Table 12.7-22).

Table 12.7-22 Classification of Residual Impacts to Culture, Heritage, and Archaeology

	Direction	Magnitude	Geographic Extent	Duration	Likelihood
Aboriginal Language Use	negative	low	local	long-term	possible
Changes to Cultural Landscape	negative	low	local	permanent	highly likely
Effects on Archaeological Sites	negative and positive	moderate	local	permanent	highly likely

The Project is located in an area that was used traditionally. Impacts from the operation of the Project will not reach identified culturally important sites, except for expected low Project visibility to the unaided eye at Cook Lake.. At closure, the Project will leave a small footprint on the cultural landscape. There will be new landscape features. However, this will not interfere with travel on the land, or access to cultural areas in the region around the Project (Table 12.7-22).

As a result of the Project, 254 archaeological sites have been identified; approximately 84% are in locations where they will not be impacted by the Project. They, however, confirm the use of the area in the past and add to the body of knowledge for this area, which is considered a positive effect. Of the three sites with high archaeological importance that could potentially be impacted, two can likely be avoided. Of the eight sites of moderate archaeological importance, two can likely be avoided. The Project will result in systematic data collection for seven sites that cannot be avoided. Systematic

data recovery will ensure that a representative sample of archaeological material in each site is recovered before disturbance. The intensive archaeological investigations that have been occurring since the exploration phase leave a high confidence that few sites were missed. As a result of these efforts, the potential negative residual effect is moderated and is judged to be moderate rather than high. The residual impacts related to archaeological sites are summarized in Table 12.7-22. The residual impacts to culture, heritage, and archaeology are predicted to be not significant.

12.7.6 Subject of Note: Aboriginal Rights and Community Engagement

The Terms of Reference indicate that, during the environmental assessment, potential impacts were linked to possible infringements on Aboriginal rights. De Beers understands that while the responsibility for consultation on Aboriginal rights rests with the government, procedural aspects of this consultation may be satisfied by environmental impact review (EIR) proceedings.

To ensure that this requirement is met, this EIS provides a record of community engagement in Section 4, Community, Regulatory, and Public Engagement. This section includes the concerns or issues that were raised and how they would be accommodated through Project design or other mechanisms. Section 4 provides an overview of De Beers' community engagement activities in support of the Project dating back to the exploratory phase of the Project. Section 4 also indicates how the consultations generated environmental design ideas to be used in the EIS.

De Beers' policy related to Aboriginal communities is outlined in Section 1 of this EIS. De Beers' engagement approach (Section 4) assumed that broader public engagement led by the Gahcho Kué Panel will occur following submission of the EIS. De Beers also understands that the Crown will need to undertake its own consultation following EIS submission.

12.8 CUMULATIVE EFFECTS AND SUSTAINABILITY

12.8.1 Introduction

The *Terms of Reference for the Gahcho Kué Environmental Impact Statement* (Terms of Reference) (Gahcho Kué Panel 2007) identified both the need to evaluate the cumulative effects from the Gahcho Kué Project (Project) and its contribution to sustainability in the Northwest Territories (NWT). Specifically, for cumulative effects, De Beers was to create a stand-alone section where the

residual effects of the key lines of inquiry and subjects of note for the Project would be considered “*in combination with past, present and reasonably foreseeable future developments*”. Also, at different points in the key lines of inquiry and subjects of note, the Terms of Reference have identified specific cumulative effects and sustainability issues that should be considered. Specifically referenced are the following:

- adding to the impact load already being felt by some potentially affected communities;
- the effect of the Project and other past, present, and reasonably foreseeable developments on political and social development, cultural landscapes, traditional practices, and language in potentially affected communities;
- the issue of potentially “lost opportunities”. The developer proposes to extract a resource at a time when northerners may not be in a position to fully benefit;
- contribution of this development to the cumulative long-term effects on communities from an increasing pace of development, considering local capacities to respond to, plan for, and benefit from development;
- single resource dependency, or over-reliance on one economic resource; and
- if and how the development will contribute to opportunities to diversify the economic base at the local, regional, and territorial levels.

What are cumulative effects? These are the successive, incremental, and combined effects, both positive and negative, of an activity on society, the economy, and the environment. Cumulative effects are the combination of multiple effects from existing projects, the Project, and anticipated future projects that may result in significant adverse and/or beneficial impacts that would not be expected in the case of one project. They can arise from the compounding activities of a single operation such as the Project, or those of multiple mining and processing operations, as well as the interaction of other past, current, and future activities unrelated to mining (Franks et al. 2010). The choice of projects to include in a cumulative effects assessment hinges on an interpretation of the word “anticipated”. In order to assess multiple effects, some estimation of other projects’ anticipated effects is required.

Socio-economic cumulative effects result not just from interrelationships between large projects, but are also a function of government policy, trends in economic development, increasing mobility of people, and other factors. These changes can be positive, negative, or both. Changes to labour and financial needs may

have a positive cumulative effect on training and education opportunities for individuals. These changes may also have a negative cumulative effect on social inclusion, cohesion, and disparity. Also, the physical changes to the landscape, along with other changes in the Local Study Area (LSA) and the NWT related to other development, may have a negative cumulative effect on cultural and tourist landscapes. Collectively, these changes need to be assessed to predict the incremental and cumulative effects from the Project and previous, existing, and reasonably foreseeable developments on the sustainability of the socio-economic and cultural environments.

Cumulative effects also include changes from natural processes in the socio-economic system and cultural environment that are not related to industrial development. One example would be the effects of climate change on wildlife habitat, which in turn could affect hunting, trapping, and fishing activities. A warmer climate could also cause changes in the NWT winter road system by decreasing the time available for road construction and operation, or by reduced ice thickness shortening the available travel period over lake surfaces. These changes could affect people's livelihoods and cultural values. It is the objective of the cumulative effects assessment to predict the contribution of these types of effects, in addition to Project effects, to the amount of change in the valued components associated with the socio-economic and cultural environments.

12.8.2 Approach and Methods to Cumulative Effects Assessment

Conventional assessment methods were applied to evaluate socio-economic cumulative effects. De Beers reviewed the 2007 Guidelines (MVEIRB 2007) issued by the MVEIRB for socio-economic impact assessment, Appendix G. While the Terms of Reference leaves the exact approach and method to the discretion of De Beers, the approach should include the four key steps (elements) summarized on page 98 of the Guidelines, which include:

1. identifying valued components, or VCs (Section 12.5);
2. determining what other human activities substantially affect the same valued components;
3. predicting the combined effect of the proposed development in combination with these other activities; and
4. identifying ways to mitigate and manage the combined impacts, particularly from a sustainability perspective.

The approach and methods for analyzing and assessing the cumulative effects from the Project and other developments on the long-term sustainability of the economic, social, and cultural environments includes the following elements:

1. identification of VCs and associated residual Project-specific (incremental) effects;
2. determination of other developments and activities that may overlap through time and across space with residual Project effects on VCs;
3. screening of residual Project effects for potential cumulative effects; and
4. analysis and assessment of cumulative effects, which includes:
 - quantitative and/or qualitative analyses of incremental and cumulative effects from the Project and other developments and activities on VCs;
 - proposed mitigation and management strategies for reducing negative effects and increasing the likelihood of positive effects; and
 - classifying residual impacts and determining the significance of cumulative impacts on VCs and the long-term sustainability of the socio-economic and cultural environments.

12.8.2.1 Identification of Valued Components and Residual Project-Specific Effects

This section identifies the list of VCs and associated residual effects from the Project that were analyzed and assessed in Sections 12.6 and 12.7. These associated residual socio-economic effects represent the potential pathways that may combine with other projects to generate cumulative effects. Table 12.8-1 includes the three key lines of inquiry, five subjects of note (as explained in Section 12.7, the Subject of Note: Aboriginal Rights and Community Engagement is not included here), and VCs, along with the associated residual effect pathway, residual effect direction, and significance of each VC.

Table 12.8-1 Summary of Valued Components and Associated Residual Effects from the Project Assessed in Key Lines of Inquiry and Subjects of Note

Key Line of Inquiry or Subject of Note	Valued Component	Pathway	Residual Effect Direction	Significance
Long-term Social, Cultural, and Economic Effects	Production, employment, and income	Workforce and procurement requirements during construction and operation of the Project may increase family and disposable incomes in the LSA and NWT	positive	not significant
	Labour Force	Workforce and procurement requirements for the Project may increase economic activity (gross domestic product) in the LSA and NWT	positive	not significant
	Inflation	The Project may increase inflation in the NWT	negative	not significant
	Local Business	Workforce and procurement requirements during construction and operation of the Project may increase employment for Aboriginal and northern residents in the LSA and NWT	positive	not significant
	Government Revenues	The Project may result in a modest increase in NWT tax base as a result of the payment of royalties and taxes	positive	significant
Family and Community Cohesion	Rotation	The Project may result in time away from the family / community	negative to neutral after a period of adjustment	not significant
	Lifestyle choices	Increased lifestyle choices, including greater mobility, may result from incomes associated with Project employment	positive	not significant
	In-migration	Increased lifestyle choices and mobility may result from incomes associated with Project employment	negative to neutral	not significant
Social Disparity between Communities	Education and Skills Up-grading	The Project may increase opportunities for education and training on Project-related trades and careers	positive	not significant
	Social Assistance	The Project may continue the trend of reduced need for social assistance and other government transfers as a result of increased employment and income	positive	not significant
	Unemployment	The Project may affect unemployment in the LSA	positive	not significant
	Inflation	The Project may increase inflation in the NWT during construction and operation	neutral	not significant
Social Disparity within Communities	Education and Skills Up-grading	Increased community capacity may result as workers gain greater skills and education through employment, procurement and training opportunities	positive	not significant
	Loss of Skilled Labour / Volunteers	The Project may lead to reduction in community volunteer capacity due to hiring of local workers	neutral	not significant
	Employment Access for Women	The Project may lead to increased employment and training for women	positive	not significant
	Inflation	The Project may increase inflation in the NWT during construction and operation	neutral	not significant

Table 12.8-1 Summary of Valued Components and Associated Residual Effects from the Project Assessed in Key Lines of Inquiry and Subjects of Note (continued)

Key Line of Inquiry or Subject of Note	Valued Component	Pathway	Residual Effect Direction	Significance
Employment, Training, and Economic Development	Maximized Direct Employment	Workforce and procurement requirements during construction and operation of the Project may increase employment for Aboriginal and northern residents in the LSA and NWT	positive	not significant
	Skills Development	The Project may increase opportunities for education and training on Project-related trades and career	positive	not significant
Demands on Infrastructure	In-migration	The Project may increase potential for in-migration	negative	not significant
	Costs for Infrastructure and Services	The Project may increase demand for LSA and NWT infrastructure (mainly airports and roads) from the transport of material and people to the Project site	negative	not significant
	Costs to Monitor and Regulate	Increased government revenues may be spent on infrastructure and services; The Project may result in pressure on government services	negative	not significant
	Volunteerism	The Project may lead to reduction in community volunteer capacity due to hiring of local workers	negative	not significant
Tourism Potential and Wilderness Character	Tourist Potential	The Project may affect tourist enjoyment including the proposed East Arm National Park	negative	not significant
	Wilderness Character	The Project may affect people's sense of wilderness character	negative	not significant
Proposed National Park	Wildlife Population and Distribution	The Project may affect the availability of wildlife (including fish) for harvesting or viewing	negative	not significant
	Vegetation	The Project may affect vegetation within the Park	negative	not significant
	Visual Aesthetics	The Project may change visual aesthetics within the Park	negative	not significant
	Noise	The Project may lead to anthropogenic noise in the Park	negative	not significant
	Access	The Project may change access to the Park	neutral	not significant
Culture, Heritage, and Archaeology	Aboriginal Language Use	The Project may affect the continued use of traditional languages	negative	not significant
	Changes to Cultural Landscape	The Project may affect the ability to carry out traditional activities (hunting, trapping, fishing, cultural events) The Project may affect people's spiritual and cultural attachment to the land	negative	not significant
	Effects on Archaeological Sites	Construction of the Project may cause disturbance or destruction of known and unknown archaeological sites	negative and positive	not significant

From a socio-economic perspective, the only significant residual effect of the Project will be its positive impact on government revenues, which will benefit the NWT overall. Some VCs that will experience positive (not significant) effects include: jobs and income; local business; lifestyle choices; unemployment; social assistance; education and skills up-grading; and employment access for women. Examples of other VCs that will experience negative (not significant) effects include: costs for infrastructure and services; costs to monitor and regulate; volunteerism; tourist potential; wilderness character; and changes to the cultural landscape. Residual effects that were determined to be neutral (or close to it) include loss of skilled labour and volunteers, and access to the proposed National Park. In-migration and inflation were rated as slightly negative to neutral. One VC that was determined to have both negative and positive residual effects (not significant) was the disturbance or destruction of known and unknown archaeological sites.

The information in Table 12.8-1 will be used in the following sections to assess cumulative effects based on the VCs and associated residual effects from the Project. Project residual effects are examined along with other projects and activities, as selected for temporal and geographical overlap, to determine if direction or determination of significance may change.

12.8.2.2 Other Developments and Activities that Overlap with Effects from the Project

Not every VC requires an analysis of cumulative effects. The key is to determine if Project-specific (incremental) effects on the socio-economic VCs overlap through time and throughout the LSA and the NWT (for economic effects) with the effects of one or more additional developments and activities (Section 6.6.2). These other developments and activities are explained below in two sections: previous and existing developments and activities, and reasonably foreseeable projects.

12.8.2.2.1 Previous and Existing Developments and Activities

Effects from previous and existing developments that combine with incremental Project effects on VCs of the socio-economic and cultural environment include the following:

- Ekati Diamond Mine;
- Diavik Diamond Mine; and
- Snap Lake Mine.

In addition to the direct effects from these developments and the Project, there are associated indirect and induced effects from business-related activities. These activities include:

- diamond cutting and polishing;
- goods and services providers;
- annual construction of the Tibbitt-to-Contwoyto Winter Road; and
- the transportation of materials to the projects.

12.8.2.2.2 Reasonably Foreseeable Developments

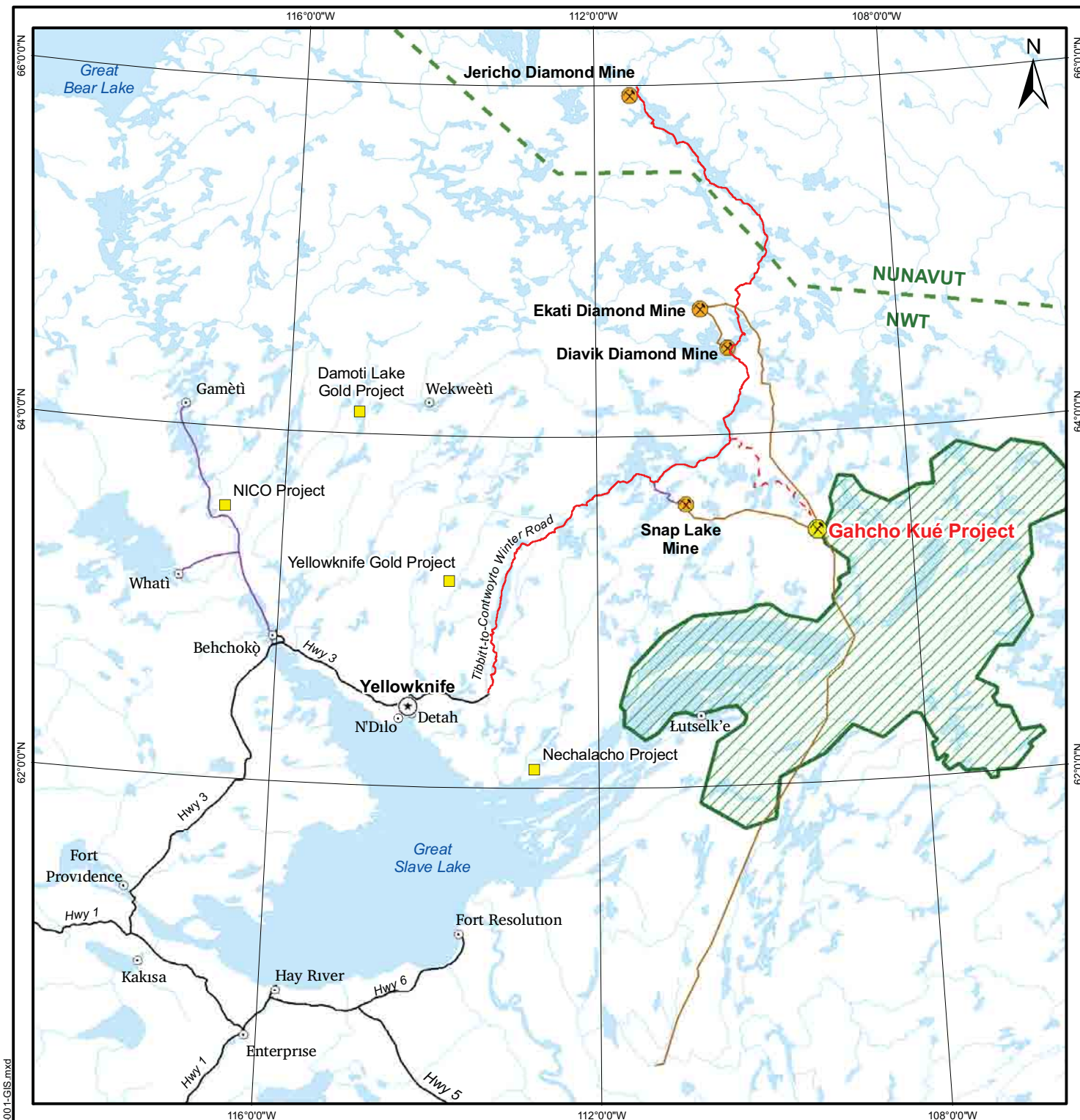
The analysis of cumulative effects must not only include changes from previous and existing developments and activities, but also include the influence of reasonably foreseeable developments. The following criteria were used to identify reasonably foreseeable developments:

- projects that are currently undergoing or recently completed a regulatory review, or are in the environmental assessment process;
- may be induced by the Project; or
- have the potential to change the Project or the impact predictions.

For the purposes of this assessment, it is assumed that each of the reasonably foreseeable future projects are carried forward to full development, and their effects have both spatial and temporal overlap with the Project. Using these criteria, the following proposed projects have been selected as a suite of major developments that may occur in the foreseeable future:

- the Yellowknife Gold Project;
- the Nechalacho Project;
- the Damoti Lake Gold Project;
- the NICO Project;
- the Taltson Hydroelectric Expansion Project;
- the East Arm National Park; and
- the Prairie Creek Project.

The existing and reasonably foreseeable developments for the socio-economic cumulative effects study area are shown in Figure 12.8-1. One reasonably foreseeable development not shown on the figure, since it lies outside of the LSA, but is listed above, is the Prairie Creek Project.



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Territorial / Provincial Boundary
- Highway
- Existing Winter Road
- Winter Access Road
- Tibbitt-to-Contwoyto Winter Road
- Watercourse
- Waterbody
- Mining Project
- Talston Hydroelectric Expansion
- Proposed East Arm National Park

NOTES

Base data source: The Atlas of Canada; INAC; Derived from GNWT - ENR Data

GAHCHO KUÉ PROJECT

Socio-economic Cumulative Effects Study Area

PROJECTION: Canadian Lambert Conf. Conic
DATUM: NAD83

Scale: 1:3,500,000
50 25 0 50
Kilometres



FILE No:
E-Socio-001-GIS

DATE:
December 15, 2010

JOB NO:
09-1365-1004

REVISION NO:
2

OFFICE:
GOLD-CAL

DRAWN: CW
CHECK: JV

Figure 12.8-1

Except for the Taltson Hydroelectric Expansion Project (for which the anticipated footprint is known), effects analyses for the future case are mostly qualitative due to the large number and degree of uncertainties. There are uncertainties associated with the rate, type, and location of developments in the LSA and NWT. There are also uncertainties in the direction, magnitude, and spatial extent of future fluctuations in the biophysical, cultural, and socio-economic environments, independent of project effects. Consequently, potential cumulative effects from reasonably foreseeable developments (future case) are discussed in the section on uncertainty.

A summary of each project and possible overlapping effects with the Project are provided below.

The Yellowknife Gold Project

The Yellowknife Gold Project proposed by Tyhee NWT Corporation anticipates a combination open pit and underground mining operation with a lifespan of 8 to 13 years depending on production rates. It is expected that approximately 190 people would be employed at the site when in full operation (Tyhee 2010). The property is located 90 kilometres (km) north of the City of Yellowknife on the former Discovery Mine site, an existing contaminated area. Access would be via an existing winter road route and by air. Currently, there is no operations start date, and further work needs to be done to demonstrate economic viability.

The Nechalacho Project

The Nechalacho Project is a rare earth elements deposit, owned by Avalon Rare Metals Inc. The property is located approximately 100 km southeast of the City of Yellowknife near Hearne Channel on the East Arm of Great Slave Lake. Rare earth elements such as cerium, lanthanum, and neodymium along with associated zirconium, niobium, and tantalum will be mined underground from the Nechalacho deposit. Production would peak at 2,000 tonnes per day, mining approximately 12 million tonnes over a period of approximately 18 years of operations, with construction beginning in 2013 and operations in 2015 (Avalon 2010).

The Nechalacho Mine infrastructure will include a 150 person camp, airstrip, diesel power generation and concentrate loading and storage areas. Concentrates will be loaded into bulk transport containers, hauled to the seasonal dock facility along the north shore of Great Slave Lake and barged during the summer to a purpose-built hydrometallurgical plant, possibly located near the site of the old Pine Point mine on the south shore of Great Slave Lake (Avalon 2010).

Damoti Lake Gold Project

The Damoti Lake Gold Project is a gold deposit owned by Merc International Minerals Inc. The property is located approximately 20 km south of the Colomac Mine, and accessed via the winter road to Colomac and Wekweèti. A bulk sample was completed in 1996 by previous owners, and Merc has completed drill programs since then to expand known resources (Merc 2010). As the Project is currently in exploration stage and a mine plan has not yet been developed, there is uncertainty regarding the size and duration of the Project.

The NICO Project

The NICO Project is cobalt, gold, and bismuth deposit located in the Tłıchǫ region, approximately 50 km northwest from the community of Whatì. Fortune Minerals Ltd. proposes to mine the deposit using open-pit and underground methods. The Project is located in the Marian River basin, draining into the East Arm of Great Slave Lake. The NICO Project would require an all-season road connection to Highway 3 near Behchokǫ. The NICO reserves will support a minimum 15-year mine life at 4,000 tonnes per day (Fortune 2010). Gold would be extracted from the ore at the NICO site, but cobalt and bismuth concentrate would be trucked to a purpose-built smelter in Saskatchewan (Fortune 2010). The NICO Project is currently undergoing an environmental assessment by the Mackenzie Valley Environmental Impact Review Board (MVEIRB).

The Taltson Hydroelectric Expansion Project

The Taltson Hydroelectric Expansion Project is proposed by Dezé Energy Corporation to enhance existing power generating facilities at the Taltson hydroelectric station and the construction of a new power transmission line to the Project, then branching to the Snap Lake, Diavik, and Ekati mines (Dezé 2010). The proposed project would offset the diesel-generated electricity at the existing mines and at the Project. This would lead to some environmental benefits, such as reduced greenhouse gas emissions and fewer haul trucks on the Tibbitt-to-Contwoyto Winter Road. The Taltson Project would not cause any new flooding in the Taltson River basin. However, it would require a new winter road from Fort Smith to Nonacho Lake and new spur roads from the Tibbitt-to-Contwoyto Winter Road during the three-year construction period (likely 2012 to 2015). Further, approximately 690 km of new transmission line would be required to link the Taltson generating station to the existing diamond mines and the Project (Dezé 2010). Full operations of the expansion are still unknown. Once operational, the amount of employment generating wages will be negligible.

Discussions have been held with the Dezé Energy Corporation regarding the potential supply of hydroelectric power for both the Snap Lake Mine and the Project from the Taltson expansion project. However, an agreement for supply of electricity has not been reached prior to submission of this environmental impact

statement (EIS) and there is currently no certainty that a hydroelectric power project will be realized in time to meet Project requirements.

The East Arm National Park

The proposed East Arm National Park would include McLeod Bay, Reliance, Pike Portage, the Lockhart River, and Artillery Lake at the East Arm of Great Slave Lake. In 1970, an area of 7,407 square kilometres (km²) in the East Arm of Great Slave Lake was permanently withdrawn or set aside from further development and land disposition to allow a national park proposal to proceed (the East Arm National Park Land Withdrawal area on Figure 12.8-1). Since 1970, lack of progress in resolving Aboriginal land, resource, and governance issues meant that there was not a suitable context to advance the park proposal (Environment Canada 2010).

In 2005, the Łutselk'e Dene First Nation delineated an area it calls 'Thaidene Nene' as part of its traditional territory that it proposes to protect through the establishment of a national park and other conservation actions (Environment Canada 2010). This, in part, prompted Parks Canada to reassess the boundaries of the 1970 East Arm National Park proposal, proposing a new study area of 33,525 km² (the Study Area for the East Arm National Park area on Figure 12.8-1).

There remains ambiguity in the status of the existing fishing, hunting lodges, and camps in the proposed park area. Overall, the proposed East Arm National Park would be beneficial to the environment, and may lead to local jobs (Environment Canada 2010). It is not clear when this Park would be fully established, but the existing permanent land withdrawal has already removed the core area from further development.

The Prairie Creek Project

The Prairie Creek Project is proposed by the Canadian Zinc Corporation, and is situated in the southern Mackenzie Mountains of the NWT, approximately 100 kilometres northwest of Nahanni Butte. Although the Project lies outside the LSA, it has potential to draw employment and procurement from Yellowknife and its surrounding communities, and will impact the overall economy of the NWT. While its impact on the North Slave Region of the LSA is likely small, if built, it will have a cumulative impact. In addition, it has a proven resource and is currently undergoing an Environmental Assessment by MVEIRB.

12.8.2.3 Potential Future Developments that Overlap with Effects from the Project

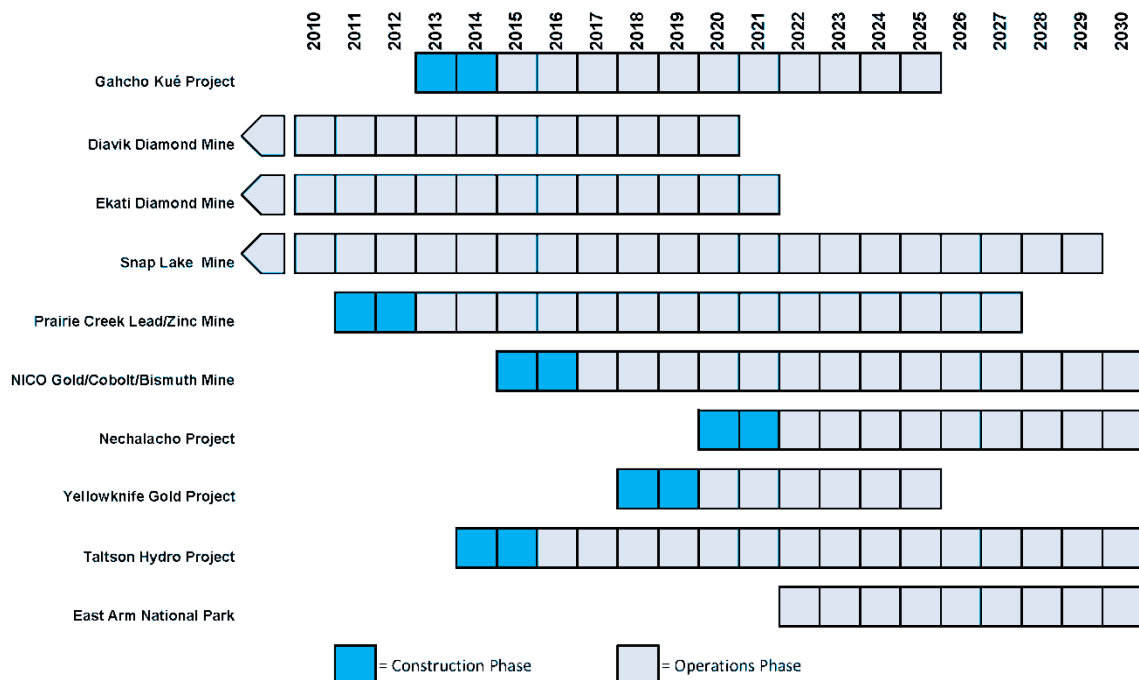
The reasonably foreseeable developments overlap geographically and/or temporally with effects from the Project, with potential cumulative effects on social, cultural, and economic VCs. Potential linkages between socio-economic effects of the different projects are not as geographically constrained as they are for physical and biological effects. There is potential for socio-economic cumulative effects with the addition of the Project to mining sector activity in the NWT.

From a geographic perspective, with the exception of the Prairie Creek Mine as explained above, all of the projects shown in Figure 12.8-1 are located within the LSA. Of these, besides Snap Lake, Ekati, and Diavik, which are all relatively close (e.g., less than 200 km) to the Project, the closest reasonably foreseeable developments include Yellowknife Gold, Nechalacho, Taltson Hydroelectric Expansion Project, and the East Arm National Park. Most of these projects have either already implemented or plan to develop some form of socio-economic agreement with LSA communities.

As shown in Figure 12.8-2, however, the primary overlap among the existing and reasonably foreseeable projects is in temporal terms. In particular, most of these projects either already are or will be sourcing workers from the same labour pool, not only in the LSA but throughout the NWT and elsewhere. Existing and reasonably foreseeable (potential future) projects in different stages of development; some are already in full production (Snap Lake, Ekati, Diavik), some are currently undergoing or have recently completed an Environmental Assessment by MVEIRB (Prairie Creek, NICO, Nechalacho, Yellowknife Gold, Taltson Hydroelectric Expansion Project); two will not be developed for likely 10 or more years (Damoti Lake Gold, East Arm National Park).

For the purpose of describing cumulative effects, detailed information is lacking on the economic aspects and financial viability of most of the proposed projects. All projects will depend to some extent of sourcing of labour within the LSA, however, and much of this demand for labour will be overlapping. In other words, there will be a clear cumulative effect.

Figure 12.8-2 Project Resource Development Scenario for the NWT, 2010 to 2030



Note: The timelines associated with these projects are estimations based on the information currently available.

12.8.2.4 Screening of Residual Project Effects for Potential Cumulative Effects

Residual effects from the Project that have the potential to result in cumulative effects to VCs are identified in Table 12.8-2 as a screening process. Not all of the VCs presented have potential cumulative effects. Only those pathways that will not likely contribute to cumulative effects are explained here. For those residual effects that can potentially result in cumulative effects, no explanation is provided as the analysis is completed in the following sections.

The only VC without a measurable cumulative effect is inflation. Existing and reasonably foreseeable projects will continue to procure goods and services both in the NWT and other parts of Canada. Many materials and supplies will be manufactured outside the NWT because the Territory is not a manufacturing base. The previous mining operations did not contribute to inflation or other price changes in the NWT in the past decade. Rather, the rate of inflation lagged behind changes in the rest of Canada as evidenced by the Consumer Price Index. In reality, existing businesses have expanded, new ones have been created, and viable Aboriginal development businesses have emerged furthering

the size and extent of economic benefits flowing from the diamond industry. Through all this, inflation has also remained below the Canadian average. This is not unexpected because the economy of the NWT is small and “open”; there is relatively little domestic production and the demand for most goods and services is filled by imports (i.e., goods are shipped into the NWT, not made in the NWT) (Appendix 12.II).

Notwithstanding the fact that the diamond projects have not resulted in inflation, inflation was raised as an issue by the communities. It is acknowledged that the cost of living is high in NWT communities. The cost increases that communities are experiencing are likely the result of the cost of goods being shipped into the NWT, which is expected to continue. There have been inflationary pressures in other parts of Canada, which have had an influence on the prices in the NWT. If there are inflationary pressures related to capital expenditures, most of these pressures will happen outside the NWT. For these reasons, inflation will not contribute to cumulative effects.

Table 12.8-2 Identification of Residual Project Effects that have Potential Cumulative Effects

Key Line of Inquiry or Subject of Note	Valued Component	Residual Project Effect	Potential Cumulative Effect Yes / No
Long-term Social, Cultural, and Economic Effects	Production, employment, and income	More employment options	Yes
	Labour Force	Stable financial resources	Yes
	Inflation	Little effect on inflation	No
	Local Business	More opportunities for local business	Yes
	Government Revenues	Increased government revenues	Yes
Family and Community Cohesion	Rotation	Rotations will continue, although proximity of some projects to communities may offer flexible options	Yes
	Lifestyle choices	Individuals with skills have more options	Yes
	In-migration	Some increase in in-migrations for jobs, but overall tendency to increased out-migration	Yes
Social Disparity between Communities	Education and Skills Up-grading	Career development, which improves capacity of local labour force	Yes
	Social Assistance	Less reliance on social assistance (unemployment)	Yes
	Unemployment	Less unemployment	Yes
	Inflation	Little effect on inflation	No
Social Disparity within Communities	Education and Skills Up-grading	Career development, which improves capacity of local labour force	Yes
	Loss of Skilled Labour / Volunteers	Less time to participate in community activities, including volunteering for activities with children	Yes

Table 12.8-2 Identification of Residual Project Effects that have Potential Cumulative Effects (continued)

Key Line of Inquiry or Subject of Note	Valued Component	Residual Project Effect	Potential Cumulative Effect Yes / No
	Employment Access for Women	Greater opportunities for training and employment of women	Yes
	Inflation	Little effect on inflation, although housing and goods and services costs remain high	No
Employment, Training, and Economic Development	Maximized Direct Employment	More jobs created	Yes
	Skills Development	Greater opportunities for training	Yes
Demands on Infrastructure	In-migration	Continued in-migration, offset by higher out-migration	Yes
	Costs for Infrastructure and Services	Use of existing infrastructure increases cost for maintenance, need for expansion	Yes
	Costs to Monitor and Regulate	Increased costs to the government to upgrade infrastructure and to monitor and regulate developments	Yes
	Volunteerism	Less time to participate in community activities, including volunteering for activities with children	Yes
Tourism Potential and Wilderness Character	Tourist Potential	Additional tourism opportunities created	Yes
	Wilderness Character	Infrastructure by some projects may affect visual aesthetics	Yes
Proposed National Park	Wildlife Population and Distribution	Some changes to wildlife movement and behaviour are expected	Yes
	Vegetation	Dust from traffic on gravel roads and blasting may affect vegetation	Yes
	Visual Aesthetics	Viewsheds may be affected	Yes
	Noise	Increased noise from mobile and stationary mining equipment, blasting, aircraft and trucks	Yes
	Access	New road and use of airport may increase Park access	Yes
Culture, Heritage, and Archaeology	Aboriginal Language Use	Continued but varied loss of Aboriginal language	Yes
	Changes to Cultural Landscape	Altered or removed cultural landscape feature	Yes
	Effects on Archaeological Sites	New / additional cultural knowledge	Yes

12.8.2.5 Methods for Analysis and Assessment of Cumulative Effects

Except for changes in some economic measurement endpoints (e.g., GDP), socio-economic cumulative effects are presented qualitatively. Impact criteria such as magnitude, duration, and geographic extent are discussed in context of the changes to the socio-economic and cultural environments from the addition of the Project and reasonably foreseeable developments to the existing environment. Numerical expressions of magnitude and duration are not used. It is difficult to quantitatively assess the amount and temporal extent of change brought about by the cumulative influences of potential future projects on social and community disparity and cohesion, work rotational schedules, cultural and spiritual values, and tourism and wilderness potential. The significance of cumulative effects from development on the attributes of the economic, social, and cultural environments are predicted, which is based on the definition of provided in Section 12.7.4.2).

12.8.3 Assessment of Cumulative Effects to the Economic Environment

In this section, the cumulative effects to the economic environment by the projects and other activities mentioned in 12.8.2 are discussed. The VCs include government revenues (economic growth), labour force and employment, and demands on infrastructure. This section concludes with a brief discussion of the end of economic benefits in relation to the closure and post closure of many of the existing and future mines.

The economic cumulative effects discussion assumes that the reasonably foreseeable projects will start according to the schedule presented (Figure 12.8-2). The economic effects were estimated using the NWT Economic Impact Model (Impact Economics), public information from the project proponents, and past experience in forecasting effects from other mining and construction projects in the NWT.

12.8.3.1 Economic Growth

The Project represents the addition of a mine to the other mines presently operating in the NWT and other proposed developments that are in various application stages. At issue is the degree to which a critical mass of mining operations has been established and can be maintained over time (on the basis of continuing exploration); both as a stimulus to businesses which serve the mining sector establishing themselves in the RSA, and as a stimulus to the development of a skilled, experienced mining sector workforce.

The Project will be the fourth diamond mine to open in the NWT, but there are other major reasonably foreseeable projects that will affect the region's economic outlook. Figure 12.8-2 contains an estimation of when these other major potential future projects will start within the LSA, and in the case of the Prairie Creek Project, within the RSA. The Taltson Hydroelectric Expansion Project and East Arm National Park are the only reasonably foreseeable projects outside the mining sector. They are discussed later under infrastructure and diversification, respectively.

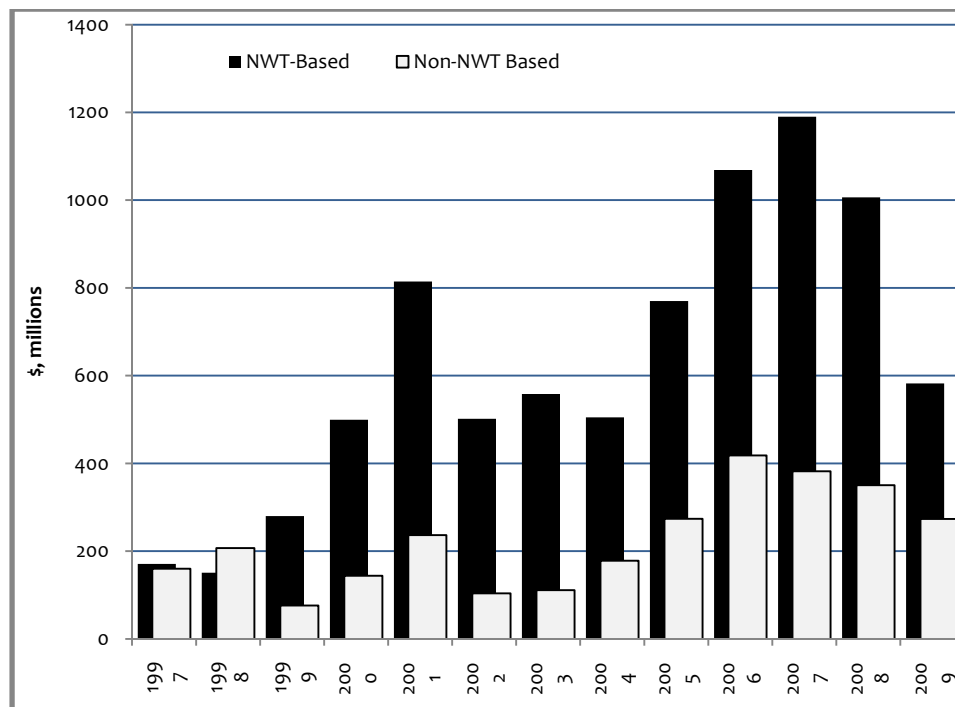
There are risks associated with predicting the start date of any project, but especially resource projects which are influenced by several factors, such as: world demand and supply conditions, international capital markets, regional regulatory systems, and local issues. A change in any one of these variables could delay or speed up a project's start date by several years. A change in timeline of this magnitude would have implications for the cumulative effects analysis.

Therefore, the timeline shown in Figure 12.8-2 is an estimate based on the information currently available. The Prairie Creek and NICO Projects are the most advanced in terms of the exploration work and regulatory review. The other potential future projects are at various stages of exploration or development and not enough economic data are available for these projects to know the precise magnitude of effect they will have or their precise start date.

Each of the proposed future projects will add to the NWT's economy. This means there will be an increase in direct labour income, indirect tax revenues, and other operating surplus from each successive project. The extent to which the NWT benefits as a result of these projects depends on the ability of its residents and businesses to capture the projects' expenditures on labour and capital (i.e., needed project resources such as fuel, equipment, and supplies). It also depends on the ability of local businesses to capture an increased share of the indirect or spin-off activities. Furthermore, the extent to which local labour participates in the direct and indirect jobs created by these projects has a direct effect on the size and extent of induced effects.

The NWT economy has a limited manufacturing base and labour pool. As a result, any major project taking place in the Territory must import most of its capital expenditures and a portion of its labour for construction and operations. Since 1997, the NWT business community has grown through participation in the expanding diamond industry (see Figure 12.8-3). Over their lifespan, the existing diamond mines are estimated to collectively generate over \$10 billion in royalties and taxes for the NWT.

Figure 12.8-3 Operating and Capital Expenditures by the Ekati, Diavik and Snap Lake Mines (\$ millions)



Growth and diversification of northern-based businesses has enabled the Territory to increasingly capture procurement opportunities within the mining sector. This means that the NWT is able to increase the overall benefit it will receive from new projects; something that is captured in the effect on gross domestic product (GDP). Under current labour and business conditions, the construction of a mine adds 25% to 40% of its total gross output to the region's GDP, while an operating mine can expect to contribute 50% to 80% of its total gross output to GDP. This GDP to gross output is called an "intensity ratio". The current Input-Output tables for the NWT show intensity ratios calculated from the Ekati and Diavik diamond mines²⁶. This is not a good representation of the economics of future mining operations; therefore, some variation must be considered when evaluating new developments.

Estimates presented in Appendix 12.II indicate the Project will annually raise GDP by \$302 million. The annual direct and indirect contribution of the Project to

²⁶ The latest Input-Output Tables produced by Statistics Canada are for 2007. At that time, the only mines operating in the NWT were Ekati and Diavik. Snap Lake was in the final year of construction while the other mines were also undertaking major construction projects. These are the activities that are reflected in the Input-Output tables and would not be representative of all future mining operations.

current GDP is equal to 7.3% of the territory's 2009 production of \$4.1 billion, making a sizeable contribution to the NWT's GDP. Estimates of GDP are also available for the Prairie Creek Project, which show it will contribute \$68 million annually to the territory's GDP during operations (Canadian Zinc 2010, internet). To calculate the effect on GDP for the remaining projects requires estimates of their gross output. Preliminary information is available for the NICO Project and Yellowknife Gold Project. The *2007 Bankable Feasibility Study* (MICON Ltd. for Fortune Minerals, internet) shows an estimated revenue stream equal to \$1.5 billion using 2007 price estimates over a 15 year mine life. Assuming an intensity ratio of 65%, this project will contribute \$65 million annually, on average, to the NWT's GDP. Similarly, information in the *2008 Preliminary Assessment of the Yellowknife Gold Project* (Fier et al. 2008, internet) for the Yellowknife Gold Project can be used to show a resource valued at \$670 million using 2008 price estimates over a seven year mine life. Using the same assumptions as for the NICO project, this project would raise GDP in the NWT by \$62 million annually.

Not enough information is available for the Nechalacho Project or Damoti Gold Project to calculate the GDP effect for those projects. Greater details on the size and extent of the resources and some initial information on the mine plan are needed. In all likelihood, each would contribute \$50 million to \$100 million annually, unless the profitability of the projects is higher or lower than the average mining project.

The operating life of these projects will vary according to the schedule shown in Figure 12.8-2. All projects described (i.e., the Project, and the Prairie Creek, NICO, Yellowknife Gold, and Nechalacho projects), with the exception of the Damoti Gold Project, will be operating at the same time between the years 2022 to 2026. An estimate for their combined contribution to the NWT's GDP in those years is between \$550 million and \$600 million, depending on the contribution of the Nechalacho Project. This is a smaller contribution than what is currently generated by the diamond mines. However, the difference can be misleading. The primary difference between a diamond mine and a base metal mine or a gold mine in terms of their contribution to GDP is the relative size of the projects' other operating surplus, which is essentially the return on investment. Otherwise, mining operations are generally the same from an economic perspective and vary only as a result of the size of operation.

12.8.3.1.1 Diversification

The potential future projects represent a broad set of minerals that could be viewed positively given the mining sector is currently reliant on diamonds. At the same time, the fact that future economic growth will come from new opportunities in mining (as opposed to another sector of the economy) should be seen as a

positive development from the perspective of local businesses. The labour and capital expenditures required by these new projects will be essentially the same as the diamond mines. All mines require heavy equipment operators, camp service, geologists, and maintenance staff. Thus, there will not be a need to retool or retrain existing labour or capital expenditures.

Further horizontal and vertical diversification can be expected over time as existing and newly-formed businesses expand their operations alongside the diversification in the mining sector. Not only can local business take on more of the same kind of work (see Annex K, Appendix K.II Survey Questionnaires for Communities) through an expanded mining sector, local businesses have the potential to secure procurement opportunities in new lines of business. For example, the Nechalacho Project might consider shipping its resource to Hay River via Great Slave Lake, which would represent a new business line for existing or new marine shipping companies. The NICO Project might consider the railway from Hay River to transport its concentrate south. This could revitalize that operation, especially if combined with Nechalacho Project's use of the same railway.

12.8.3.1.2 Fiscal Effects

The cumulative effects discussion has centred on a continuation of mining as the economic driver in the NWT. From the perspective of public finances, the Government of the Northwest Territories (GNWT) would benefit most from this outlook if it were to receive a greater share of the tax revenues that these projects represent. It also benefits from a larger population.

Currently, under the Territorial Formula Financing Agreement, the Territory does not receive any of the resource royalties and has a majority of its new revenues from personal and corporate taxes and most indirect taxes clawed back through a reduction in the annual transfer. The formula determines the annual transfer by subtracting eligible revenues from a general expenditure base whereby the eligible revenues are determined from the revenue potential that exists within a standardized tax base and from an additional revenue block formulated to approximate the GNWT's ability to raise funds by additional tax means. All eligible revenues are applied to the formula as a three-year moving average with a two-year lag. Furthermore, an economic development incentive of 30% is applied to the eligible revenues. This does not equate to a 70% claw-back because the eligible revenues in the formula are determined using the NWT revenue capacity, not its actual revenues. Thus, the claw-back would be 70% only in a situation whereby actual revenues and revenue capacity were identical.

Without a change to this formula or the fiscal relationship between the GNWT and the federal government, the majority of tax revenues generated from these projects will go into the federal government's general revenues.

Of the reasonably foreseeable projects, proponents of the Prairie Creek Mine and the Taltson Hydroelectric Expansion Project have published estimates of potential revenues. Production at the Prairie Creek Mine could generate as much as \$130 million in corporate taxes and resource royalties over its scheduled 14 years of operations and another \$51 million in personal taxes (Canadian Zinc 2010, internet). The Taltson Hydroelectric Expansion Project is predicted to raise GNWT tax revenues by \$20 million and federal government revenues by \$100 million over the initial 17 years of operations (Deze Energy Corporation Ltd. 2009, internet). The report does caution readers that the estimates are preliminary and subject to numerous assumptions. It does not clarify whether these revenue streams were calculated before or after the Territorial Formula Financing Agreement.

The full fiscal implications of the other potential future projects are unknown. Corporate tax and resource royalties are a function of a mine's profitability after accounting for capital costs, the corporate taxation regimes at the federal and territorial levels, and the Canadian Mining Regulations. The NICO Project will likely be similar to the Prairie Creek Project in terms of overall size and profitability, thus it is expected that tax revenues from this operation would also be similar. Yellowknife Gold is a much smaller project and tax revenues would likely be disproportionately smaller because of ability to discount the capital costs before paying corporate taxes and royalties. Not enough is known about the profitability of the Nechalacho and Damoti Gold Projects to provide an estimate of tax revenues.

12.8.3.1.3 Summary

The Project and all of the existing and reasonably foreseeable projects include expenditures on labour and capital for the production and processing of the resource, operation of camp facilities, building roads, running power generators, and other standard mine operation requirements. These projects are anticipated to have positive and significant cumulative effects on the following pathways:

- Workforce and procurement requirements for the projects will cumulatively increase economic activity (GDP) in the LSA and NWT.
- The projects will cumulatively increase the tax base for the NWT during construction and operation.

12.8.3.2 Labour Force and Employment

The capacity within the local labour force and business community has grown over the past decade. Investments by government and mining companies on training and skills development are improving the quality of labour and competitiveness of local businesses. This growth should continue given an expectation that both the private and public sector intend to pursue these investments further.

From a temporal perspective, the timeline associated with the reasonably foreseeable projects results in construction of at least one major project in 8 of the next 10 years when including the Taltson Hydroelectric Expansion Project with the mining projects. The Project has been shown to create just over 1,000 direct full-time equivalent (FTE) jobs during construction with local participation equaling 267. Another 120 local jobs will be created through indirect and induced effects. The Prairie Creek Mine and Taltson Project are outside the North Slave Region, and thus would draw most of their local labour from the Dehcho and South Slave regions, respectively. The Developer's Assessment Reports for these two projects state that local employment would equal 30 and 75 FTE jobs, respectively, on an annual basis during their respective construction phases (Canadian Zinc, 2010, internet, and Deze Energy Corporation Ltd. 2009, internet).

Details for construction of the potential future projects are not available. The NICO and Nechalacho Projects are likely to require a workforce of up to 300 people annually for a two-year period. Assuming a 25% local participation rate means direct employment in the NWT would rise by 75 jobs annually for each project according to the schedule outlined. The Yellowknife Gold Project is smaller, and would likely require half that number. Not enough is known about the potential mine plan for the Damoti Gold Project to develop a workforce estimate. Each project's construction would generate indirect and induced job effects for the local workforce.

Once into operations, these projects will create longer-term jobs in the mining sector, which will then result in additional jobs through indirect and induced effects. The Project will create an average 365 jobs on an annual basis, with local labour filling an average of 137 of these jobs. Direct employment for NWT labour at the Prairie Creek Mine could peak at 140. The NICO and Nechalacho Projects would have similar job creation for the local population. Yellowknife Gold's employment numbers would be approximately half that number. Combined, all of these projects will result in an additional 500 to 600 jobs for NWT labour assuming current participation rates. This number could double if all

indirect and induced job opportunities are considered. Again, this is dependent on local participation rates.

This schedule for the potential future projects predicts strong demand for NWT labour for the next 15 to 20 years. That means 15 to 20 more years of work experience, skills development, business development, and wealth creation. These projects also create an economic environment in the NWT whereby labour can withstand the closure of Ekati and Diavik diamond mines, which are the largest employers in the NWT mining sector. Moreover, the diversity of projects offers NWT labour some degree of choice. This is important because it maintains an element of competition between employers and adds some assurance that the current standards of employment will be upheld well into the future.

Other activities related to the diamond mines and involving NWT labour include diamond cutting and polishing. The NWT government requires a portion of diamonds be made available locally. As of October 2010, only one out of four diamond polishing plants that opened in Yellowknife during the past decade is currently operating. This operation employs 11 workers and polishes \$17-18 million worth of diamonds annually (Northern News Services 2010, internet site). It is not known whether diamond cutting and polishing will continue to employ workers in the NWT, but the business closures are indicative of some challenges facing this industry.

Other factors need to be considered that may impact the labour pool in the NWT, independent of the existing and reasonably foreseeable projects. For example, the rise of the mining industry in the Kitikmeot and Kivalliq regions of Nunavut may have employment and related impacts on the NWT, such as drawing upon experienced labour from existing and planned mining developments. This could possibly generate additional skilled labour shortages in the NWT, which is already being experienced as many businesses need to recruit new employees from outside of the NWT.

12.8.3.2.1 Non-Mining Developments

From an employment perspective, the Taltson Hydroelectric Expansion Project's greatest effect will occur during the three-year dam expansion and transmission line construction. The estimated local job creation would equal 75 FTE jobs each year for three years. Once into production, the total workforce will shrink down to 8 to 10 skilled jobs. Presumably, NWT labour could fill some if not all of these positions in time.

The proposed East Arm National Park represents an opportunity for tourism in the NWT, though economics or economic diversification is rarely the driving force behind park creation. The economic benefits of this particular park have not yet been estimated by either Parks Canada or proponents at the local level.

In a study completed for Parks Canada on the economic effects from the expansion of the Nahanni National Park Reserve, it was shown that the expansion along with an initial investment of \$10 million would result in the creation of 5.9 FTE jobs on an annual basis and raise GDP by \$7.9 million in the initial year. Revenues associated with the park expansion would result in an annual increase in GDP of \$44,000. The study did not evaluate the opportunity cost of the park expansion (Parks Canada 2007, internet site). This study may not be relevant to the East Arm National Park, but does illustrate the limits of economic growth associated with parks.

It is more than likely that the Ekati and Diavik diamond mines will have closed by the time the park is established. It will create a small number of seasonal jobs since the park would likely be open for only a short period during the summer months. Some of those jobs would be created in Łutselk'e, which would be a benefit to that community and might prevent some out-migration. Indirect jobs and spin-off businesses such as fishing guides and outfitters would only grow should the land within the East Arm National Park attract more visitors than it does currently without the park status. There have been no studies to show whether visitation would increase.

12.8.3.2.2 Summary

All of the existing and proposed future mining projects assessed in this section include expenditures on labour for the production and processing of the resource, operation of camp facilities, building roads, running power generators, and other standard mine operation requirements. Likewise, the Taltson Hydroelectric Expansion Project will require labour. These projects are anticipated to have positive and significant cumulative effects on the following pathway:

- Workforce and procurement requirements during construction and operation of the Project will cumulatively increase employment for Aboriginal and northern residents in the LSA and NWT.

12.8.3.3 Infrastructure

Infrastructure and services are essential to economic growth, health and well-being, education, and employment, particularly in the smaller communities. Community infrastructure includes a wide range of services and facilities such as

schools, roads, airports, communication networks, utilities, and public housing. These are developed, funded, and maintained by the GNWT.

There are other possible indirect infrastructure developments and increased activities resulting from the cumulative effects of existing and reasonably foreseeable projects; in particular, air, land, and water (or ice) transportation routes. As of 2010, there are 33 communities in the NWT distributed across a landmass of 1,171,918 km². Fifteen communities and more than 15% of the NWT population live in communities that do not have year-round road access (Alternatives North 2009), and rely on air travel for access to the outside world. These challenges mean that some communities do have to seek some services, especially medical and education, in larger centres. Seasonal delivery of goods is also a crucial part of their survival. When combined with difficult land access and a complex regulatory environment, this remoteness may have an adverse effect on development (GNWT Department of Industry, Tourism and Investment 2009). However, improved infrastructure such as new bridges, more paved roads, airport expansions, and increased social services (health and education) have been decreasing this sense of “remoteness” in many smaller communities.

Airlines also play a major role in the LSA and throughout the NWT, carrying passengers and freight far beyond the reach of roads and barges. All of the communities have runways with the exceptions of Detah and N'Dilo. All communities have scheduled services with the exception of Fort Resolution and Fort Providence (GNWT Transportation 2007). First Air and Canadian North are the largest airlines in the Territory, and Air Canada initiated scheduled trips to Yellowknife from Edmonton and Calgary in 2006. The Yellowknife Airport Passenger Terminal is the territory's principal airport and an important transshipment centre. In 2003, approximately 23,000 tonnes of air cargo passed through Yellowknife, and this number was expected to increase to between 32,000 and 40,000 tonnes by 2013 (GNWT Department of Transportation 2004, internet site). Cargo includes couriered packages and mail, food and groceries, and supplies and equipment for the exploration camps and mines.

The Yellowknife Airport Development Plan addresses future airport infrastructure needs to meet forecasted passenger aircraft movement and air cargo demands. The plan allocates over \$100 million in upgrading and improvement costs over the next 20 years. An initial expansion of the airport was completed in 2006, and plans for a staged runway expansion, reconfiguration of existing terminal facilities, and development of a new terminal complex on the west side of the airport lands are underway.

Six all-weather highways serve the LSA communities. Highway 1, the Mackenzie Highway, is the NWT's longest highway and the main route from southern

Canada. It joins Highway 2 at Enterprise and Highway 3 south of Fort Providence. Highway 2 links Enterprise with Hay River and Highway 3 links Fort Providence with Behchokǫ̀ and Yellowknife. Highway 4, known primarily as the Ingraham Trail, extends 70 km east from Yellowknife and winds through parks, day use areas, and “cabin country”. Winter roads are built over frozen lakes and tundra and are only open in winter, usually from approximately January to March or April. Winter roads are also built annually into remote exploration and mine sites. Industry depends heavily on the Tibbitt-to-Contwoyto Winter Road for transporting construction equipment, building materials, equipment parts, power generators, fuel, and food to the existing diamond mines, including the Snap Lake Mine.

The trucking industry in the NWT is large and rapidly expanding, and truck traffic is a substantial source of wear on the roads leading to frequent and costly maintenance (GNWT Department of Transportation 2005). However, according to the analysis in Section 12.7, peak truck traffic during the construction and operation phase of the Project can be accommodated without jeopardizing the viability of the other users and their operations. The addition of the Project will add to this overall truck traffic for at least the first five years. After that, it is expected that the Ekati and Diavik diamond mines will start to wind down operations, reducing the volume of truck traffic.

Other infrastructure that is important to discuss is the power and utilities sector. Plans to develop additional hydropower in the LSA have been underway for several years. The Taltson Hydroelectric Expansion Project, proposed by Dezé Energy Corporation, would enhance existing power generating facilities at the Taltson hydroelectric station. The proposal also includes the construction of a new power transmission line to the Project, then branching to the Snap Lake, Diavik, and Ekati mines (Dezé 2010).

The Taltson Hydroelectric Expansion Project is a major infrastructure project for the NWT. Still, it will proceed only if there is long-term demand for the power it would produce, which means it is dependent on a positive outlook for resource development. Should all of the proposed future projects listed in this cumulative effects analysis proceed according to the schedule given, this hydro project would likely also proceed and be financially sustainable. In that sense, it can be considered an indirect effect of growth in the mining sector.

The Taltson Hydroelectric Expansion Project will replace power currently generated from oil fired generators used by the mining industry. Therefore, the

overall effect on the production of utilities in the NWT will be neutral²⁷. Where GDP will increase, however, is through a reduction of imports such as oil. The effect on GDP can be thought of as the value of oil currently imported to generate power at the existing mines.

12.8.3.3.1 Summary

The NWT continues to expand and improve its infrastructure and services, including roads and airports, to meet the demand of expanded economic development. Very moderate demographic growth is also driving the need for infrastructure. The Taltson Hydroelectric Expansion Project, if constructed, will increase power supply in the LSA. The Project and existing and potential future projects are anticipated to have mainly positive and significant cumulative effects on the following pathway:

- The projects may increase demand for LSA and NWT infrastructure (mainly airports and roads) from the transport of material and people to the project sites.

12.8.3.4 End of Economic Benefits

Cumulative effects on migration suggest that potential future projects will combine to preserve the population base already established in the Territory for an extended period of time. The magnitude of the change to the associated increase in transfers from the federal government depends on future fiscal arrangements and the level and extent to which out-migration is mitigated by these additional projects. The Economic Impact Report (Appendix 12.II) demonstrates that the current transfer (for the 2010-2011 fiscal-year) equals approximately \$21,000 per person. It also includes calculations that show with the Project, NICO, and Prairie Creek projects added to the economy (a scenario whereby no new projects are added and the existing diamond mines eventually close), the NWT's population would exceed that of the current estimate by over 1,000 people. The addition of Nechalacho, Yellowknife Gold, and Damoti Gold projects would further preserve the population base. This would result in higher federal transfers.

By 2028, there will be three projects still operating from the cumulative effects list of projects. Should there be no other developments or prospects for development between now and then, the NWT would certainly go through a period of demographic change as some labour relocates to other jurisdictions in Canada.

²⁷ Utility production is an industry as defined by the North American Industrial Classification system.

It is important not to overstate such predictions. The cumulative effects assessment does not include unknowns. A new discovery in the mining sector, a change in world supply and demand conditions for commodities, or the emergence or rise of a new industry would have immediate and profound effect on this analysis. What the cumulative effects analysis for economics does show is that the territorial economy will not end with the end of diamond mining. There are other mining possibilities, albeit less profitable ones. This scaled-down mining industry can potentially maintain the existing benefits to the NWT economy through greater reliance on local resources, which by the mid-2020s will have 30 years of experience in the mining industry and should be in a position to compete with labour and businesses from other jurisdictions.

In summary, the cumulative effects of closure and post closure of the mines will have negative economic effects on the economy of the NWT, including labour and income. There is no mitigation except for sequenced development so that the NWT can take full advantage of the benefits.

12.8.4 Assessment of Cumulative Effects to the Social Environment

In this section, the cumulative effects on the social environment from the Project, and existing and reasonably foreseeable projects are discussed. The VCs include lifestyle choices, education and skills up-grading, and social disparity.

12.8.4.1 Lifestyle Choices

In Section 12.7, the Subject of Note: Family and Community Cohesion assessed the potential effects of the Project on lifestyle choices, including in-migration (movement of workers and their families from outside the NWT into the LSA) and work rotations.

12.8.4.1.1 Rotation

Since the establishment of the first diamond mine, studies on the effect of rotation were undertaken by the companies and the GNWT. In all cases, support systems have been put in place to assist employees with the periods of adjustment. The surveys of mine employees in the NWT indicates that they have adjusted to the rotation and that participation in the wage economy has allowed them to pursue activities on the land, such as hunting and fishing, which they might not have been able to do without wage employment.

There are some downsides to rotational work. Mining is also male oriented and the rotations make it hard for women to work. It affects gender relations; roles become more rigid, and women's dependency on men tends to increase. Attracting women from small communities to work in mines is also difficult, as they tend to be the primary caregivers of children and are unable to work either full time or outside the community.

While the existing diamond mines offer similar rotation schedules, a trend which is likely to continue, the opportunity to work closer to home may still be a draw for some people. This is especially so if it results in a noticeable reduction in travel time (e.g., direct and short range flights rather than longer flights with routing through Yellowknife). Some of the existing and potential future projects and other activities (e.g., diamond cutting and polishing) may allow some workers to spend greater time at home if some flexible arrangements can be made.

In response to the opportunities provided by new development, local businesses may also adapt their recruitment efforts on people who do not fit the "mold" of typical mining employees. Specifically, businesses will continue to adapt their staff mix to include those that require flexible work schedules, such as mothers or part-time workers, and those that do not prefer to work in remote camps on the two-week rotation schedule.

12.8.4.1.2 Migration

Both out-migration and in-migration are assessed from a cumulative effects perspective. Out-migration is assessed as it has been an ongoing concern since at least the mid-2000s.

Population growth for the territory is largely determined by inter-provincial migration. Because birth rates are declining and the population is aging, natural increase is playing a lesser role in population growth in the NWT. It was demonstrated in Annex K, that the development of the third diamond mine at Snap Lake had virtually no effect on the migration trend and that net migration has been positive in only two years in the last ten years. However, the existing and potential future projects will have an effect on the rate of out-migration. It can be expected that these projects will help prevent an exodus of residents that would otherwise occur as a result of the Ekati and Diavik diamond mines slowing production, and eventually closing in 2021 and 2022, respectively.

The Economic Impact Report presented in Appendix 12.II demonstrates the extent of this out-migration in the absence of any new projects for the region. It shows the effect of the Project on the overall population and then how the addition of two more projects (NICO and Prairie Creek) combine to have a

positive cumulative effect on the territory's population. Essentially, these projects have a significant effect on the out-migration of labour directly and indirectly affected by the diamond mine closures.

The addition of Nechalacho Project would likely have a similar cumulative effect since it is predicted to be similar in size to these other projects. The Yellowknife Gold Project is relatively small, with a seven-year mine life. Its effect would be centred on Yellowknife, N'Dilo, and Detah and would likely have a small effect on migration in these communities. It is not known whether the Damoti Gold Project would have a neutral or positive effect on overall migration. Its timing suggests it would have a positive effect, however, because its opening coincides with closures elsewhere.

With respect to intra-regional migration, the movement of people from small, rural, and remote communities to larger, more urban, and central towns and cities is a concern for the rural and remote communities. It is unclear whether economic growth is having a positive or negative effect on this movement of people. Previously, the two operating gold mines in Yellowknife and the Pine Point Mine near Hay River required workers to live in close proximity to those projects. One would have to relocate if they wanted to access a job. The recent growth in the mining sector and the advent of fly-in/fly-out work schedules has allowed residents living in communities, where economic opportunities were limited, to gain employment and establish a career. As the sector has grown, the number of communities represented in mining has also grown and now includes residents from all regions of the Territory. Theoretically, this should help preserve the population base in these rural or remote communities.

Counter to this are concerns that residents of these rural or remote communities are afforded the opportunity to relocate to a larger centre only after securing a well-paid job at one of the mines. People have lifestyle options, which include taking their newly acquired skills and applying them elsewhere. People may assess their options and move to other communities either within or outside of the NWT to various points of hire. While positive from a job and income viewpoint, this movement of working labour and their families robs the smaller communities of their primary income earners, and in some cases, community leaders.

Yellowknife is the "big story" of this continuing trend toward urbanization in the NWT. Overall, Yellowknife has increased from 28.6% of the territorial population in 1976 to 44.6% in 2003 (values adjusted for division of the NWT). Movement to other regional centres has occurred at a slower rate. Both intra-regional migration and out-migration are expected to continue along with continued mining and other developments in the NWT. Some community members,

especially young people, may increasingly prefer to move to “where the action is”; in some cases, this may mean out of the NWT entirely.

These migration changes suggest that careful consideration of current programs and services will be required. Given the changing nature of the population, programs and services will need to be adjusted and priorities may change. Additionally, new approaches to program delivery may be required.

12.8.4.1.3 Summary

The cumulative effect of the Project and potential future projects will be positive for increased lifestyle choices. Major changes are not expected to the typical rotational schedule for mining projects. These rotations, while not without their downsides, appear to offer the best alternative for community members in the LSA who are already working or desire to work in mining. In contrast, migration patterns will continue to change as a result of the additional projects. The expectation is that these projects will not have a large effect on in-migration, though certainly some people will move to the Territory as a result of the developments. The Project and existing and reasonably foreseeable projects are anticipated to have positive and significant cumulative effects on the following pathway:

- The projects may increase lifestyle choices, including greater mobility, as a result of the incomes associated with employment.

12.8.4.2 Education and Skills Up-grading

Mining is known to require a highly trained and skilled workforce. A human resource needs assessment completed across the NWT mining industry in 2008 identified the need for as many as 5,000 new semi-skilled, skilled, and professional workers over the next five years (MTS 2009). This number reflects turnover and retirements as well as growth, and is almost double to previous forecast of 2,700 (Mining Training Society 2008; 2009).

Since the emergence of diamond mining as the dominant economic driver in the NWT, considerable effort has gone into creating a trained labour force in the NWT to fill mining related positions. The push to fill positions with local labour as indicated by employment targets in benefit agreements with LSA communities has been partly driven by economics. It is less expensive to hire locally than bring workers in from outside the NWT. Over the past decade, mining related training programs (e.g., Northern Women in Mining, Oil and Gas, MTS) have been developed usually in partnership with the mines themselves (Section 12.3). Aurora College has also been tailoring its programs to the needs of the territory's

mining industry such as introducing underground mining training in 2007. The Project and existing and reasonably foreseeable projects are anticipated to have positive and significant cumulative effects on the following pathway:

- The Project may provide training / skills up-grading to those employees who are interested.

12.8.4.3 Social Disparity

The Terms of Reference states as a concern that communities may not benefit from the Project and that there are groups in the population who are left behind but must contend with an increased cost of living, coupled with a decrease in their standard of living or quality of life. Changes to income, income support assistance, unemployment rates, and inflation have been tracked since before the first diamond mine. The trends in the data suggest incremental and cumulative effects from existing projects, and provide an indication of what may occur with the addition of the potential future projects.

Economic development in the North has facilitated greater access to consumer goods, changing the perception of what is a “necessity” and putting additional strain on income allocations. Rapid industrial development has also created divides in communities between those who are benefiting from the development and those who are left out. Non-renewable resource development has fostered inequality in the distribution of wealth and economic opportunities between the genders, as some men have benefited disproportionately with jobs in the mining and industrial sectors.

Some people will be adversely influenced from the Project and other developments. Increased access to money has also aggravated addictions and strained family structures. Income-earners must often work outside their communities for employment in resource extraction. The rapid development in the LSA has also been accompanied by an increase in housing prices and rents, which contributes to housing insecurity among those not benefiting during periods of high economic growth. Continued upward pressure on prices is difficult to cope with for people on fixed incomes. According to the data and reports, construction and operations of the existing mines have not brought about inflation because they have yet to create demand for goods and services in the NWT.

Rapid cultural change is also well documented as a central determinant of social pathology (negative social behaviours, for example, that include alcohol and drug abuse, crime, and domestic violence). Socio-economic and cultural data on the LSA communities in the NWT *Communities and Diamonds* reports that have

been published annually since 1998 have generally indicated positive or neutral trends to issues such as crime and substance abuse, although variations do exist as has been discussed in Sections 12.3, 12.6, and 12.7. With mining, new or expanded programs and services have grown to deal with many of the social problems, which threaten social cohesion of LSA communities.

On the positive side, geographic diversity in the existing and reasonably foreseeable projects will benefit local communities in the LSA. The NICO Project is located within the Tłıchǫ Region and is in close proximity to Whatì. It would likely draw heavily on Tłıchǫ labour and business. The Prairie Creek Project is in the Dehcho Region and will benefit that region first before drawing on resources from the North Slave and South Slave regions. The Taltson Hydroelectric Expansion Project is in the South Slave Region and will likely employ a majority of its NWT-based labour from communities in that region. This geographic diversification also spreads the wealth of economic growth to regions that have not had a large presence within the diamond industry. This should reduce income disparity across the Territory and lower the cost of social services in these newly-impacted regions.

Unemployment rates have also decreased with the rise in diamond mining, exploration activity in the natural gas sector, and other activities in the LSA, and this positive trend is expected to continue. Since 2001, the unemployment rate in the NWT has declined from 8.6% in 2001 to 5.4% in 2006 and is now 6.3% a year and a half after the economic slowdown (Appendix 12.II; Annex K).

12.8.4.4 Summary

Increases in social disparities and decreased social cohesion have been occurring prior to the onset of diamond mining. Effects on social cohesion and disparities can be mitigated to some degree by government policies and programs, and specific support mechanisms that are provided by project proponents as an integral part of development applications or on a voluntary basis.

The cumulative social effects of the Project and existing and potential future projects are not able to be predicted with high certainty due to the influence of many overlapping factors, both positive and negative. In the LSA, however, it is likely that the cumulative positive and negative effects of social disparity will continue, although the effect will likely be low and not significant. A growing inequality of incomes and education will perhaps occur in the short term, but in the long term the breadth of opportunities should encourage more local training and skills transfer. Over time, the uptake of jobs should improve for local

communities, income gaps should narrow, and fewer people should require social assistance

The cumulative effects of closure and post closure of the mines may also increase social problems (Section 12.8.3.4). This is because there will be decreased economic and employment inputs after the mines are closed. The solution to these negative aspects is to focus efforts on sustainability long before closure begins. Long-term economic growth is linked to social and cultural well-being. These issues are discussed later in Section 12.8.6: Sustainability.

12.8.5 Assessment of Cumulative Effects to the Cultural Environment

A number of issues raised can be viewed as “cultural” insofar as they relate to the changing social fabric and life ways of the communities in the LSA. Research on subsistence issues such as harvesting, an important subject in the North, suggests important intergenerational connections regarding the continuity of ecological and traditional knowledge. What is understood to be cultural change has a good deal to do with changing patterns of subsistence and resulting changes in relationships and roles. “Changing roles” is not easily tracked as an indicator of cultural change. Aboriginal language use and harvesting activity can be used as indicators to track some aspects of cultural change.

Traditional activities have been on the decline for many years. Wage labour and consumption of mass produced goods are daily realities for Aboriginal people living in NWT communities. The challenge for many appears to be how to earn the money needed to hunt while still having the time to go out and do it. Studies suggest that having the financial means to hunt is important to the continuation of the activity; it is not carried out in a “traditional” fashion. Overall, a cumulative effect on harvesting is anticipated; more people will have the financial resources to hunt but people will likely hunt closer to home.

12.8.5.1 Language

The baseline study and other statistics presented in Section 12.7 suggest a “resurgence” in Aboriginal language use, or at the very least a slower decline than was anticipated when mining began at the end of the 1990s. Aboriginal language use as a second language may actually be slightly increasing in some of the LSA communities. This suggests that those individuals exposed to an Aboriginal language as a child may be retaining it into adulthood and that other language learning opportunities outside the home may be promoting retention as

well. This is possibly a reaction to imposed policy and cultural changes, or a collective desire to maintain and expand traditional language use. Yet, there has been a noticeable and statistical decline in some languages. This decline is not attributed to mining or employment but, rather, on English media and mobility. Specifically, people will leave a community for economic opportunity in places where the dominant language is English.

It is not clear if the cumulative effects from development will result in a rapid loss of language or a decline in language use. There has been much speculation, and considerable variation by community. Greater emphasis and support for the teaching and use of Aboriginal languages in the workplace, schools, and home may be required to slow language loss, and the success of such efforts is uncertain. Therefore, it is not possible to predict with any certainty what the future holds for language use as a result of the cumulative effects of multiple projects.

12.8.5.2 Cultural Landscape

As explained in Section 12.7.5.3, cultural landscapes embody various values: cultural, social, economic, psychological, spiritual, historical, and ecological. For Aboriginal people, cultural, natural, and spiritual aspects form part of a single landscape. The connections within a cultural landscape are important, rather than just a series of parts or places (NWT Cultural Places 2007). Landscapes are constantly changing. Continual and unpredictable changes happen because of the social, economic, environmental, and even political influences occurring in any cultural landscape. These changes and events create patterns that help us understand what has been going on and why.

Cultural landscapes are sometimes mapped by the use of traditional stories, which can show how various places are connected together. Because cultural landscapes show activities that took place over long periods of time and take place in many locations, there are often many “layers” in the landscape that illustrate different time periods. These show how the same place was used by different people at different times. The layers may be physical layers as in archaeological sites, such as the remains of old camp sites or traditional trails, or they may be different stories told about a single place (NWT Cultural Places 2007).

People have continuing relationships with places and the landscape. Because of conflicting uses, interests and values some cultural landscapes may become areas of dispute. Questions about access, continuing traditional uses, respect for sacred sites, and disturbances are important cultural landscape issues. Disturbances such as human activities, forest fires, or floods cause major

changes within a landscape. Highways, logging or mining roads, seismic survey lines, gravel pits, woodcutting, development work, and settlements are also examples of disturbances.

Most of the existing and reasonably foreseeable projects (including the Project) will collectively add physical disturbance to the landscape. In the context of potential for cumulative effects, effects to the cultural landscapes in the LSA can be assessed and managed. One source was published by the NWT Cultural Places program in 2007: *Living with the Land: A Manual for Documenting Cultural Landscapes in the Northwest Territories*. The manual explains that managing large cultural landscapes not only includes identifying what needs to be changed, mitigation must also be implemented so that necessary changes are made and that too much change is avoided. Water quality must be protected, natural plant cover has to be maintained, and the animal population must be kept healthy.

Another source is the Historic Sites and Monuments Board of Canada, which has developed guidelines for Aboriginal cultural landscapes (HSMBC 2004). These guidelines help to judge places that represent a cultural tradition or way of life. The Board works with nationally significant examples of Canadian human history, and it recognizes the history of Aboriginal peoples as a nationally significant part of Canada's history. These guidelines set federal rules for designating Aboriginal cultural landscapes.

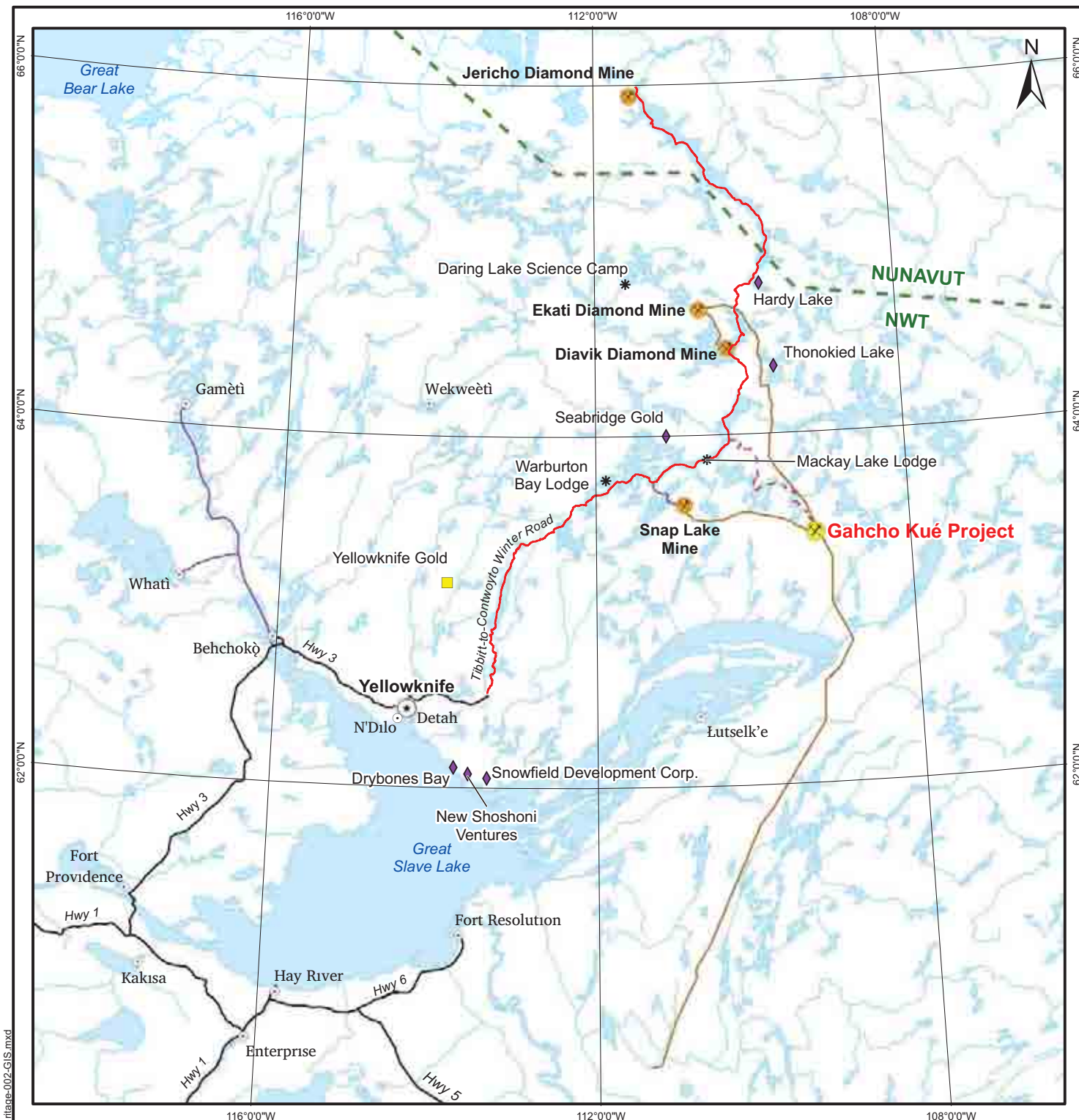
The cumulative effect of changes to cultural landscape is of overall concern in the LSA. With the limited information available, it is difficult to predict what the cumulative effects may be to the cultural landscape of the LSA. The eventual development of the East Arm National Park is a positive change to the landscape since it will help to protect both cultural and ecological values. People will not frequently see the existing and future proposed projects due to their remote location, but will be aware of them, and this may cause changes to people's sense of place.

For some of the reasonably foreseeable projects, as well as others not listed, there may be restrictions to land use so that cultural landscapes are protected. These may include relocating road or pipeline corridors, mine pits, or other infrastructure. De Beers will continue discussions with others (e.g., communities in the LSA, Parks Canada) on cultural landscape issues and adhere to the aforementioned guidelines for mitigation, as needed.

12.8.5.3 Archaeological Resources

A cumulative effects assessment on archeological resources was completed to assess environmental effects over a “regional” area that are likely to result from the Project in combination with other projects or activities that have been or will be carried out. This assessment was limited to those residual effects (post mitigation) for archaeological sites resulting from past, present or reasonably foreseeable human activities in a larger area than was considered for the residual effects assessment. The larger area was selected on the basis of relatively recent projects that included field assessment and for which detailed archaeological reports are available.

The selected study area for this Project’s archaeology cumulative effects assessment was restricted to the NWT and included archaeological studies undertaken within 300 kilometres (km) of the Project, but north of Great Slave Lake. Early archaeological surveys completed at locations throughout the NWT, in areas with high archaeological potential, have contributed to the NWT archaeological site database. However, unless such sites have been re-examined in association with more recent development activities, they have not been included in the cumulative effects assessment since most were recorded over 20 years ago and their status is unknown. Relevant project locations are identified in Figure 12.8-4.



LEGEND

- | | |
|-----------------------------------|---------------------------------|
| Gahcho Kué Project | Watercourse |
| Existing Mine | Waterbody |
| Territorial Capital | Exploration Project |
| Populated Place | Mining Project |
| Territorial / Provincial Boundary | Other |
| Highway | Talston Hydroelectric Expansion |
| Existing Winter Road | |
| Winter Access Road | |
| Tibbitt-to-Contwoyto Winter Road | |

NOTES

Base data source: The Atlas of Canada

GAHCHO KUÉ PROJECT

Study Area for the Archaeology Cumulative Effects Assessment

PROJECTION: Canadian Lambert Conf. Conic
DATUM: NAD83

Scale: 1:3,500,000
50 25 0 50
Kilometres



FILE No: C-Heritage-002-GIS
DATE: December 16, 2010

JOB NO: 09-1365-1004
REVISION NO: 1

OFFICE: GOLD-CAL
DRAWN: SK
CHECK: JB

Figure 12.8-4

12.8.5.3.1 Location of Archaeological Sites

As a result of similar past cultural activities, this study area is expected to contain similar types and ages of archaeological sites, although not all will be represented in all portions. The projects are not directly comparable as they are of different sizes and configurations and the levels of archaeological study varied.

Past experience and the research completed for this cumulative effects assessment has indicated that negative impacts to archaeological sites in the region have occurred as a result of:

- land surveys;
- mineral and oil and gas exploration;
- winter road use and operation;
- mine development;
- sand and gravel extraction;
- road construction;
- power generation facilities;
- development of airstrips; and
- the use of recreational facilities (e.g., hunting and fishing camps).

Any activity that involves modification of the ground surface can negatively impact an archaeological site. The more extensive and intensive the activities are, the more likely it is that archaeological effects will occur.

It is much easier to protect sites if their locations are known, but not all activities that have occurred in this region of the NWT have been preceded by detailed archaeological assessments, especially those completed decades ago. It is possible that unknown sites have been damaged or destroyed by past activities. The majority of the archaeological sites that have been recorded in this region of the NWT are characterized by surface or shallowly deposited archaeological material. As a result, they are easily disturbed or destroyed.

12.8.5.3.2 Development Projects in the Northwest Territories

Development activities that have resulted in detailed archaeological investigations on either a site specific or project specific basis within the NWT are listed in Table 12.8-3. Residual effects on archaeological sites resulting from these activities are the consistent with those identified for this Project, particularly

the identification, documentation, and mitigation of unanticipated archaeological sites (positive effect) and disturbance or destruction of archaeological sites (negative effect).

Table 12.8-3 Projects Considered for the Archaeological Sites Cumulative Effects Assessment

Access Projects	Mining Projects	Exploration Projects	Other
Tibbitt-to-Contwoyto Winter Road	Yellowknife Gold	Hardy Lake	Warburton Bay Lodge
Gahcho Kué Project Winter Access Road	Diavik Diamond Mine	Seabridge Gold	Daring Lake Science Camp
Snap Lake Winter Access road	Ekati Diamond Mine	Snowfield Development	Mackay Lake Lodge
Airstrip construction	Snap Lake Mine	New Shoshoni Ventures	
	Gahcho Kué Project	Drybones Bay	

Archaeological investigation in conjunction with winter road use or construction has indicated that archaeological sites can occur frequently near such routes. The winter access roads for the Snap Lake and Gahcho Kué projects are discussed in conjunction with the mine and not as separate studies for this cumulative effects assessment.

Archaeological sites have also been found in areas where diamond exploration has been completed, but impact at the exploration phase of development appears to be limited. Because exploration activities commonly cover a wider area than a proposed mine, when archaeological investigations are completed it can result in a greater contribution to our knowledge of archaeological resources.

12.8.5.3.3 Archaeology Inventories and Databases

De Beers has initiated archaeological inventory and developed an archaeological database in two areas besides the Project: the Snap Lake Mine (80 km to the west) and an exploration project near Hardy Lake (northeast of the Ekati Diamond Mine). An archaeological investigation was also completed in advance of exploration activity at the Ekati Diamond Mine and was undertaken in advance of mine development for the Diavik Diamond Mine.

The Yellowknives Dene First Nation sponsored archaeological investigations on southern MacKay Lake and near Drybones Bay on northern Great Slave Lake in response to concerns about mineral exploration. This was followed by additional archaeological inventory for two diamond exploration projects on the north shore

of Great Slave Lake. The Department of Resources, Wildlife and Economic Development (RWED) sponsored a Tundra Science Camp northwest of the Ekati Diamond Mine (not shown in Figure 12.8-4) to foster research largely as a result of diamond exploration. Part of the camp activities included archaeological survey and site recording. The route of the Tibbitt-to-Contwoyto Winter Road was subjected to a post-construction archaeological assessment, again primarily in response to diamond industry related activity.

Archaeological inventories have also been undertaken at two proposed gold mines located north of Great Slave Lake: Seabridge Gold near Courageous Lake, and the Yellowknife Gold Project near the old Discovery Mine in the vicinity of Winter and Nicholas lakes (Figure 12.8-4). Earlier mines, such as the Tundra Mine, that are within the selected archaeological cumulative effects assessment area were not subjected to an archaeological assessment prior to construction and operation and are not part of this assessment. The final project included in the cumulative effects review was an impact assessment completed prior to the construction of the existing Snare Lakes (Wekweèti) airport.

A summary of the archaeological data from the above cumulative effects assessment projects is provided below in Table 12.8-4.

Table 12.8-4 Archaeological Sites and Impact Potential by Project

Company, Project or Project Location	Type of Activity That Resulted in Site Discovery	Number of Sites	Sites with Impact/Potential	Percent (%)
Gahcho Kué Project	diamond industry	242	38	16
Diavik Diamond Mine	diamond industry	199	68	34
Ekati Diamond Mine	diamond industry	199	17	8.5
Snap Lake Mine	diamond industry	53	2	4
<i>Subtotal</i>		<i>693</i>	<i>125</i>	<i>18</i>
Tibbitt-to-Contwoyto Winter Road	diamond industry related	55	23	42
MacKay Lake (YDFN)	diamond exploration related	40	5	12.5
Hardy Lake (De Beers)	diamond exploration	40	2	5
Drybones Bay (YDFN)	diamond exploration related	69	5	7
Snowfield Development	diamond exploration	125	5	4
New Shoshoni Ventures	diamond exploration	33	4	12
<i>Subtotal</i>		<i>362</i>	<i>44</i>	<i>12</i>
<i>subtotal of diamond related</i>		<i>1,055</i>	<i>169</i>	<i>16</i>
Seabridge Gold	gold exploration	14	5	36
Yellowknife Gold Project	gold exploration	0	0	0
Wekweèti	airstrip construction	8	1	12.5
Daring Lake	RWED science camp	14	0	0
<i>Subtotal</i>		<i>36</i>	<i>6</i>	<i>17</i>
Total		1,091	175	16

% = percent; YDFN = Yellowknives Dene First Nation; RWED = Department of Resources, Wildlife and Economic Development.

12.8.5.3.4 Summary of Findings from Diamond Industry Archaeological Studies

The number of sites that have been threatened or impacted as a result of other diamond operations in the NWT varies although for two projects, similar numbers of archaeological sites have been discovered. In the following discussion, sites that have been mitigated through archaeological investigations are considered to have been impacted. The site numbers and percentages are summarized in Table 12.8-4. The predicted maximum is identified recognizing that the site numbers for the Project are tentative and could vary once development plans are finalized.

For the Diavik Diamond Mine, 199 archaeological sites were discovered and recorded in advance of construction (Fedirchuk 1995, 1999, 2000; Unfreed 1997). A relatively high proportion of these, approximately 68 sites (34%), were impacted during activities associated with mine construction. A representative sample of these sites was subjected to varying levels of mitigation.

At the Ekati Diamond Mine, there are 199 archaeological sites (Bussey 1994, 1995, 1996, 1998b, 1999, 2000b, 2001, 2002c, 2003a, 2004a, 2005b, 2006b). To date, mitigation has occurred at 13 sites and four sites were disturbed by activities that occurred prior to site identification, for a total of 17 sites or 8.5% of the total recorded sites. Varying levels of mitigation have been completed at most sites.

Only two sites were near enough to potential development activity at the Snap Lake Mine that mitigation was completed (Bussey 1998a, 2000a, 2002b, 2003c, 2004b; Thomson 2001). Fifty-three sites have been recorded in conjunction with this Project, thus, the two mitigated sites represent less than 4% of the total.

At the three existing diamond mines in the NWT, a total of 693 archaeological sites have been recorded, with an estimated 125 sites (18%) impacted or predicted to be impacted through mitigation, exploration, or development activity. Prior to the diamond industry related archaeological investigations, which were initiated in 1994, there were fewer than 10 previously recorded sites in the immediate vicinity of these three study areas.

Not associated solely with the diamond industry, but inventoried on behalf of the Joint Venture that includes the Diavik and Ekati diamond mines, the Tibbitt-to-Contwoyto Winter Road is a linear corridor that was examined for archaeological resources in 2001. Fifty-five new archaeological sites were discovered during this inventory, which was limited to land-based portions of the route since sites in areas where the road is on frozen lakes are avoidable (Bussey 2002a). Because

the inventory was completed nearly 20 years after the road was constructed, it is not surprising that 23 (42%) threatened or impacted archaeological sites were encountered (Bussey 2003b). Not all disturbances were a direct result of the Tibbitt-to-Contwoyto Winter Road, but would not likely have occurred if the winter road was not present.

The intensity of mineral exploration activities occurring in the last decade has prompted other archaeological studies. The preliminary archaeological survey of the south end of MacKay Lake between MacKay Lake Lodge and Warburton Lodge resulted in the identification of 40 archaeological sites (Thomson 2005b). It would appear that impact has occurred or is likely to occur at five sites (12.5%), as a result of recreational rather than mining related activities.

Another area of concern to the Yellowknives Dene First Nation, the Drybones Bay vicinity of northern Great Slave Lake, has had two studies. In 2003, 64 archaeological sites were recorded in an area that contained five previously recorded sites (Thomson et al. 2004), for a total of 69 sites. It would appear that impact has occurred or is very likely to occur at five sites (7%). The identified or potential disturbances include cut lines (identified by Thomson as associated with mining or exploration), an exploration camp, and a cabin. Additional work was completed by Thomson and Ratch (2005) for New Shoshoni Ventures Ltd. No evidence of site disturbance as a result of mineral exploration was noted at the 33 new sites recorded; however, potential for impact was identified at four sites (12%).

Further work in the northern portion of Great Slave Lake was undertaken in 2004. Archaeological investigations completed for Snowfield Development Corp. and the Yellowknives Dene First Nation resulted in the recording of 114 archaeological sites in an area with 11 previously recorded sites, for a total of 125 sites (Thomson 2005a). Disturbances have occurred as a result of sand and gravel extraction, cabin construction and the development of a recreational lodge; a minimum of five disturbed sites were identified (4%).

Forty new sites were found in the Hardy Lake vicinity (Thomson 2004). One was disturbed by apparent gravel extraction activities and another by a camp occupied approximately 20 years prior to the exploration work by De Beers. This represents a low percentage of disturbed sites in this project area (5%).

In summary, primarily as a result of diamond exploration and development, approximately 1,055 archaeological sites have been documented or updated (Table 12.8-4). It is possible that 169 (16%) of these sites will be or have been

disturbed or destroyed, although a small proportion of those have been affected by activities (such as recreation) not related to the diamond industry.

12.8.5.3.5 Summary of Non-Diamond Archaeological Studies

Detailed and recent archaeological studies associated with projects that are not related to the diamond industry are limited within the cumulative effects area for the Project. A preliminary archaeological study was completed in the Courageous Lake vicinity (Bussey 2003d) for the Seabridge Gold Project. Four historic/recent and 10 prehistoric sites were recorded. Five of the prehistoric sites have been impacted by previous mining activity, tourist use of this area, and/or the Seabridge exploration activity around Matthews Lake. Although portions of these sites are intact, this represents a relatively high percentage of sites affected (36%).

At the Yellowknife Gold Project, no new archaeological sites were discovered. Although two seasons of investigation were completed by Points West (Prager 2005, 2006); three previously recorded archaeological sites were not revisited since they were well removed from proposed development activity. As a result, their status is not known and they are not included in this cumulative effects assessment.

A proposed airstrip at Snare Lakes, now known as Wekweètì, resulted in the revisit of two previously recorded sites and the identification of a new site in 1992 (Andrews 1993). The latter site was within the footprint and was mitigated through excavation (Weyman and Andrews 1994). Other sites in this area were not revisited as they were not threatened and their status is not known.

At the RWED science camp on Daring Lake northwest of the Ekati Diamond Mine, 14 archaeological sites were recorded. None of these sites were impacted since the objective was to conserve any archaeological resources encountered (Andrews 1998).

Recent archaeological projects not related to the diamond industry and within the selected cumulative effects study area have resulted in the identification or consideration of a total of 36 sites, some of which were previously recorded (Table 12.8-4). Six of these 36 sites (17%) have been impacted to some degree. One of the six sites was mitigated prior to its disturbance.

12.8.5.3.6 Overall Cumulative Effects for Archaeological Sites

The archaeological site numbers are increasing as a result of the inventory completed in recent years and, provided appropriate mitigation or management

continue to be completed in advance of development, the impact of sites may be prevented by avoidance or compensated for by detailed archaeological investigations in advance of ground disturbing activities. The identification and assessment of archaeological sites is viewed as a positive effect. The mitigation of sites through surface collection and excavation contributes to the archaeological database and is both a negative effect (site is disturbed or destroyed) and a positive effect (data are collected).

As indicated in Table 12.8-4, approximately 693 sites have been discovered primarily as a result of archaeological work completed for the three developed NWT diamond mines and the proposed Project. Approximately 125 of these sites have been or will likely be impacted and/or mitigated, which represents 18% of the total. Diamond related activities have resulted in the identification or revisit of about 362 sites and it is predicted that impact will or has occurred at 44 sites (12%). On average, this means that 1,055 sites have been found and 169 (16%) are threatened or have been impacted.

Non-diamond related archaeological studies have involved only 36 sites and 6 (17%) of those have been impacted to some degree. The percentage of sites threatened or impacted is similar for diamond industry related and non-diamond projects. However, the quantity of data or sample size is much larger for the diamond industry. In total, there are 1,091 sites under consideration for this cumulative effects assessment and approximately 175 (16%) are threatened or have been subjected to impact or mitigation (Table 12.8-4).

The formal recording of archaeological sites in the NWT was initiated around 1949 (Johanis, pers. comm. 2006). Since that time, 6,212 sites have been recorded (NWT Cultural Places Program 2010). At least 1,089 have been recorded or updated primarily as a result of the diamond exploration and development industry, representing approximately 17.5% of the 6,212 recorded sites. Since approximately 2,557 sites (NWT Cultural Places Program 2010) are located in the eastern portion of the NWT where these diamond projects are occurring, it represents an even higher percentage (43%) of new sites in the region. The status of sites found much earlier in time, as a result of other activities, or in the western NWT, has not been assessed for this study. However, it is likely that the only other industry that has resulted in a similarly high number of new sites is the oil and gas industry.

Cumulative effects for archaeological sites are difficult to predict for future, unknown developments since the frequency, size, and significance of archaeological sites can vary from one arbitrarily defined (by nature of development project) study area to the next. It is evident that at the Ekati Diamond Mine, few sites have been impacted, but had they not inventoried a

larger area, the site identification rate would also have been low. At the Diavik Diamond Mine, numerous sites were found in a much smaller study area and many more were impacted because of its location on an island in a major lake. Location and the characteristics of the location are integral to archaeological resources.

Cultural landscapes embody cultural, social, economic, psychological, spiritual and historical values in addition to having ecological importance (Evans et al. 2001; Parks Canada 2004; Collignon 2006). Cultural identity is at the core of community life for all aboriginal people groups within the LSA.

The Project is located within an area traditionally used by Aboriginal people. Culturally important areas include the Lockhart River, Artillery Lake, and Our Lady of the Falls. In proximity to this traditional area are the Ekati and Diavik diamond mines. To the west and south of the Kennady Lake area are the proposed Nechalacho and Taltson Hydroelectric Expansion projects, respectively. Within traditional areas around Kennady Lake are the proposed East Arm National Park and culturally significant places. The Taltson Hydroelectric Expansion Project will affect the Lockhart River directly and may change the spiritual relevance of the river.

Along with the culturally significant places, the area is a topographic record of places travelled to, places inhabited and where life was lived. These areas have been given names that connote where activities have taken place (e.g., a kill site or fishing eddy). The name of a place frequently refers to a specific event, which occurred at the time it was first used (Collignon 2006; Saxon et al. 2002; Legat et al. 2001; Hanks and Winter 1986). For example, the Tłı̄ch̄ô have Ne'dzee W'ee Tu'we', meaning the "place where people watch caribou cross a narrows". Ne'dzee W'ee Tu'we' not only names the actual narrows where the hunt would take place, but implies a system of sites connected with hunting caribou around the narrows (Hanks and Winter 1986).

The Denesql̓ine Elders do not consider the areas within the Kakinēne as independent from one another, nor do they apply greater importance to one area more than another (Annex N, Non-traditional Land Use and Resources Use Baseline; Section 12.7). The health and integrity of each of these regions are vital to maintain the overall environmental health and integrity of the Kakinēne. This connectivity to the landscape is reinforced by the interconnectedness of its watersheds, all of which feed into Tu Nedhe (Annex N).

When new features (e.g., mines, cabins, airstrips, and communities) are added to the landscape the retelling of the cultural story on the landscape is affected.

Once stories are lost, the narrative structure is weakened since most stories are interconnected (Kelley and Francis (1994). Unfortunately, when access to the land is interrupted and the stories and place names are lost, there is a corresponding decline in local land use (Kelley and Francis 1994).

The documentation of the stories on the land can facilitate the transmission of this knowledge. Every new feature added to the landscape will change the story on the land. No amount of mitigation will remove the cumulative impacts from development to the landscape as identified in the cultural histories.

12.8.6 Sustainability

12.8.6.1 Introduction

“Sustainability” and “Sustainable Development” are not new concepts to development projects and environmental studies. The concept of sustainability stemmed from the 1987 Brundtland Report of the World Commission on Environment and Development (WCED). In that document, sustainable development was defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987). Since that publication, sustainable development and sustainability have been increasingly ingrained into a range of activities, including environmental assessment legislation such as the *Mackenzie Resource Management Act* (MVRMA). Specifically, the Guiding Principles in the MVRMA state, 115. *The process established by this Partshall have regard to*

- (a) *the protection of the environment from the significant adverse impacts of proposed developments;*
- (b) *the protection of the social, cultural and economic well-being of residents and communities in the Mackenzie Valley;*

These statements are important because they draw attention to the difference between mitigating negative effects and undertaking a project that makes a net beneficial impact. In fact, this differentiation is integral to sustainability. There is a call now for projects to not just avoid or mitigate adverse effects, but to demonstrate that the project will have an overall positive effect on society, the economy, and the environment. Hodge (2004) describes mining’s contribution to sustainability as:

An approach [that] centres on a conceptual shift from analysis and mitigation of “impacts” to analysis and encouragement of “contribution”.

The Terms of Reference for the Project require a discussion of the sustainability and the effects on future generations, in particular:

- the extent to which it makes a positive overall contribution towards environmental, social, cultural, and economic sustainability;
- how planning and design take into account its effects on achieving sustainable development;
- to what degree it promotes the present generation's ability to meet its needs without compromising the ability of future generations to do so;
- how monitoring, management, and reporting systems have incorporated indicators of sustainability; and
- the views of stakeholders and participants in the environmental review process.

The measure for sustainability is captured in the phrase, "... *well-being of residents and communities, the importance of conservation of the well-being and the way of life of the Aboriginal peoples of Canada and the capacity of renewable resources to meet future needs*".

Many of the issues summarized in the Terms of Reference refer to the long-term sustainability of communities and economic development in the NWT. In particular, the communities expressed concern for their cultural viability in light of continued involvement in the wage economy. Among the sustainability issues that arose during the MVEIRB scoping session were:

- lost opportunities, given Project timing;
- pace of development;
- boom-bust (dependency on a single resource);
- diet change – less country food;
- reliance on wage economy;
- vulnerable populations;
- diversified economy;
- social disparity – women, elders, traditional land users;
- family cohesion; and
- cultural resilience – language, story telling, cultural activities.

The challenge with discussing sustainability is putting the changes into a context that is acceptable to the people defining sustainability. In this case, the context has to be inferred from the Terms of Reference as discussed above and the results of community consultations. Another source to be consulted is the Reference Bulletin: Operational Interpretation of Key Terminology in Part Five of the Mackenzie Valley Resource Management Act (MVEIRB 2006), which provides some examples where public concern could be an issue:

- **Development scale:** Larger developments often affect more people, and their proposal may generate public concern.
- **Proximity to communities:** People are often concerned with developments in their vicinity, so the closer a development is to a community, the more concern may be caused.
- **New technology:** Where a proposed development uses a new type of technology or one that has never been used in the North before, people's unfamiliarity with the type of development could generate concern.
- **Severity of Worst Case Scenarios:** Typically, there will be a concern over a development the more severe its worst case (but plausible) malfunction scenario is.
- **Proximity to protected or sensitive areas:** There is typically more potential for public concern for developments in, around, or upstream of protected areas (such as parks or reserves), or ecologically sensitive areas (such as calving or spawning grounds).
- **Areas known for harvesting:** The closer a development is to a good hunting, fishing, or trapping area, or an area of heritage resources (important for cultural or historical reasons), the more there may be public concern associate with it.

These concerns link to sustainability because of the reasons discussed; namely, that cultural viability is tied into people's continued involvement in the wage economy of the LSA. Other factors affecting concern (hence, sustainability) could include whether the proposed development is being discussed in the media, whether letters of concern have been submitted, whether the proposed development is creating conflict in the local communities, and whether this type of development has caused controversy in the past (MVEIRB 2006).

Sustainability also has to be contextualized to the Project and the diamond mining already taking place. The contribution to community sustainability that economic development provides in a wage-based economy is having new choices, which can be transformative. In the case of the Project, these choices include the opportunity to gain wages and skills (Section 12.4).

The residents of the NWT are chasing two if not three parallel processes to secure its future. The first two are expansion of the wage economy, and societal and cultural security and well-being for NWT residents, particularly the First Nations and Métis of the NWT. The third pursuit is related more to self-governance, which is not relevant to the present discussion on sustainability.

Since the mid-1990s, the current economy of the NWT has been based on diamond mining and oil and gas exploration and extraction. The economy has been going through an unprecedented boom (Infrastructure Canada 2006), another in series of economic growth periods that have been happening since the arrival of fur traders. Sought after NWT goods required specialized skills in trapping, hunting, and fishing. However, over the past half century a fundamental shift in the nature of that economy has emerged. The economy today requires a very different set of skills and education. As of yet, the NWT does not have the full set of skills needed for the growing mining economy; the Territory has imported needed skills instead of foregoing the economic opportunity altogether.

The NWT is not only pursuing economic sustainability, it is also pursuing societal and cultural sustainability. For nearly half a century now, the Aboriginal peoples in the NWT have been seeking input and control over resource development. The model for this control is a comprehensive land claim agreement or other modern day treaties. The pursuit to reclaim some control over resources have been documented by many (e.g., Berger 1988; Fumaleau 2004) and have been pursued through the courts and modern treaty negotiations.

Sustainability for most Aboriginal communities revolves around remaining healthy and living a life defined through a mix of cultures and opportunities. To achieve a healthy balance of cultural, social, and economic priorities, most communities typically require an educated and informed membership and a secure and consistent source of private sector dollars. The mining industry has injected substantial resources for communities to maintain this mix. A far greater challenge will come from perceived fairness in the distribution of those dollars at the community level, or acquired skills and experience at the individual level. This relates to modernization and other societal and cultural changes, which are not necessarily related to mining or any other form of economic growth.

12.8.6.2 Economic Sustainability

Economic sustainability as already introduced refers to development not economic growth. Economic sustainability is more than economic activities and wealth generation. If undertaken effectively, it should lessen disparities between groups in society. With the prospect of a new mine in the north, the promise is

one of continued economic sustainability arising from on-going employment, changes in personal incomes, decrease in income support requirements, new businesses, and a well trained workforce.

The economy of the NWT has been driven by the mining and oil and gas sector for the past decade and a half (Annex K). This sector accounted for 34% of the GDP in 2008, and 33% in 2009, with diamond mining emerging as a primary economic contributor. Its emergence facilitated the expansion of service industries such as wholesale trade, retail trade, and transportation and warehousing. The expansion or contraction of the NWT economy is driven by demands for goods and services globally.

Average employment income in the NWT as a whole increased by almost 16% from 2002 to 2006. When considering only those communities already affected by diamond mining, all experienced positive change in employment income with Behchokǫ, Fort Resolution, and Gamètì exceeding the Territorial average. Łutselk'e showed the least amount of change. No data was available for Detah, N'Dilo, or Wekweètì.

Personal economic success and advancement in the wage economy improves with the completion of secondary school. The majority of mine related jobs require, at minimum, secondary school education. Positions for unskilled labour or equivalent experience are available at industrial complexes, but they are fewer in number. In 2009, the three operating diamond mines employed 295 people in unskilled positions. Of this total, 211 (71%) were Aboriginal. However, unskilled positions are in the minority in the overall workforce making up just 6% of the total jobs.

Employment rates for Aboriginal people in the NWT increased from 47.9% in 1999 to 55% in 2005. More Aboriginal people are now seeking wage employment. In addition, women in the NWT, particularly Aboriginal women, are achieving higher levels of education and more are seeking and finding work in community government, social services, health services, and educational organizations (GNWT Education, Culture and Employment 2002).

The percentage of NWT residents graduating from high school has been rising over the past decade. This is a contributing factor to the increased participation in the mining sector, especially in semi-skilled and skilled jobs. The trend toward increasing numbers of graduates is expected to continue, as students gain better access to secondary school programs, stay in school longer, and receive support from their schools, families, and communities to pursue higher levels of education and training (GNWT Education, Culture and Employment 2007e).

When considering employment income to the period before the influence of the diamond mines in the late 1990s, the diamond industry has had a marked influence on many communities in the LSA. When compared against the NWT average, it is clear that in communities affected by diamond mining, the income gap is narrowing. There has been a general rise in the number of families with incomes greater than \$60,000.

Collectively, the diamond mines generated the potential for the development of Aboriginal businesses and joint ventures providing mining related services such as food services, construction, trucking, transportation services, and communications. The number of Aboriginal persons employed by 2004 within these companies is estimated to be upwards of 1,000 with revenues in excess of \$100 million (NWT & Nunavut Chamber of Mines 2005, internet source). In 2006 and 2007, the gross revenues generated from contracts with the three mines approached \$600 million (Impact Economics 2008; NWT & Nunavut Chamber of Mines 2005, internet source).

Existing and new positions to be offered from the cumulative effect of multiple projects over the next 20 years will continue the improvements that have been made in personal income levels in the NWT. More opportunities for employment may be offered for those currently not in the job market, or others may be allowed to switch jobs and improve their skill set. More or expanded Aboriginal businesses in the LSA are also expected to meet the continued demand for local trained and experienced employees and contractors.

12.8.6.3 Social Sustainability

On the premise that the Project provides people with the opportunity to make choices, then what are the choices being made that support social sustainability? For the purposes of this evaluation, the assumption is made that social sustainability is measured by individual and social capacity and well-being, and links to the Terms of Reference through concerns over disparity within and between communities.

Personal economic success and advancement in the wage economy improves with the completion of secondary school. In studies elsewhere in Canada, the income earnings over a lifetime difference for those with a high school diploma versus no diploma range between \$0.5 and \$1 million (Howe 2004, internet source; Gingras 2002, internet source).

The majority of mine-related jobs require at a minimum, secondary school education. Positions for unskilled labour or equivalent experience are available at industrial complexes, but they are fewer in number. Approximately 18% of the

Project positions will be for unskilled labour (Sections 12.3). In 2009, the three operating diamond mines employed 295 people in unskilled positions. Of this total, 211 (71%) were Aboriginal. However, unskilled positions are in the minority in the overall workforce making up just 6% of the total jobs.

Since 2001, the unemployment rate in the NWT has declined from 8.6% in 2001 to 5.4% in 2006 and is now at 6.4% in 2010, two years after the economic slowdown (Section 12.3). The improvement in the employment rate has been linked to diamond mine construction and operations, and exploration activity in the natural gas sector.

The percentage of NWT residents graduating from high school has been rising over the past decade. This is a contributing factor to the increased participation in the mining sector, especially in semi-skilled and skilled jobs. The trend toward increasing numbers of graduates is expected to continue, as students gain better access to secondary school programs, stay in school longer, and receive support from their schools, families and communities to pursue higher levels of education and training (GNWT Education, Culture and Employment 2007e).

Creating opportunities for women in the workforce is essential to social sustainability. The Terms of Reference raises the issue that women are not adequately represented in the mining workforce. Notwithstanding their representation in the mining industry, women have been increasingly better represented in the overall workforce within the NWT over the past decade. The employment rate of male and female workers has been roughly consistent in recent years. Overall, the employment rate discrepancy between males and females has declined, from about a 9% difference in 1989 to under 3% in 2009. In 2009, the employment rate for males and females was 68% and 65%, respectively.

Social inclusion and social equity is also reflected in the degree to which traditions and cultural practices continue to be fostered. Concern for loss of culture because of increased participation in the wage economy were issues raised in the Terms of Reference. The concern has been translated as a loss of individual skills related to traditional activities and the failure to pass skills on to family members.

Participation in traditional activities is still quite strong among the middle aged Aboriginal population in the NWT. While participation in the wage economy has been connected by some to cultural loss and a reduction in participation in traditional activities, current employment rates and harvesting and consumption of country food levels in the LSA communities do not support this contention.

The majority of the communities have over 80% of the population in full-time employment, and continue to harvest and consume country foods.

Participation in the wage economy may not interfere with the pursuit of traditional activities and may actually provide the needed inputs (i.e., money for gas and equipment) to continue with hunting and fishing (GNWT Bureau of Statistics 2005; Hill et al. 1998). In the 2005 GNWT study, Aboriginal males involved in diamond mining hunted and fished at a marginally higher rate than other employed Aboriginal males. In other words, indigenous people may use the wages from development activities to pursue traditional activities, and due to the rotational work may have the time available to go on longer hunting and fishing trips.

12.8.6.4 Sustainability Policies and Programs

De Beers believes that projects must benefit and add to the sustainability of local communities. Socio-economic development will be a primary focus through community participation in employment and business opportunities in all stages construction, operation, and closure of the Project.

De Beers recognizes that Aboriginal people have a historical occupation, usage and reliance on the land as well as a respect for the land and environment, which is enshrined in their traditions and practices. Arising from this is a far-reaching wisdom and knowledge about the land and natural environment. This knowledge will be actively solicited and considered in the planning and management of De Beers' activities.

Some examples of De Beers' activities include the following:

Training of Employees: Two Aboriginal Students completed De Beers' Aboriginal Leadership Program in 2010, which is a program that was developed by Rio Tinto (Diavik Diamond Mine) in conjunction with Northern Alberta Institute of Technology. In 2010, De Beers' had its first apprentice to achieve journeyman status.

Books in Homes: Community partnerships this year for De Beers' annual Books in Homes literacy tours were with the NWT Literacy Council. These family literacy training initiatives in the communities enhanced De Beers' literacy program. The tours were accompanied by the Government of Northwest Territories Student Financial Services Officers to help high school students understand the funding and loan program supports that are available to them to pursue post secondary education.

Hospital Foundation Fundraisers: De Beers Charity Classic Golf in Hay River NWT raised over \$30,000 for the local hospital in Hay River in July 2010 and \$40,000 was raised for the Yellowknife Hospital Foundation with the “Carats to Costa Rica Campaign”. Both events involved used De Beers Snap Lake diamonds to raise funds for equipment that is purchased to support healthy communities, and involved local business partners helping De Beers to achieve these community support initiatives.

Culture: De Beers partnered with the University of British Columbia Norman Keevil School of Mining Engineering, and the Tłıchǵ Government during the summer of 2010. The program was to bring a university engineering student to work in the External and Corporate Affairs department and to involve the student in understanding community engagement, Canada’s “duty to consult and accommodate” with Aboriginal people, and the importance of traditional knowledge. The project involved the engineering student going out on the land with elders to document a historic site, including remains of historic homesteads and stone chimneys, and providing the Tłıchǵ Government with a design document to reconstruct the chimneys. The opening prayer given by Dene Drummers and the blessing by community elders of De Beers new cultural centre and permanent resident complex at Snap Lake which officially opened on December 13, 2010, illustrates how De Beers incorporates culture into work practices.

12.8.7 Conclusion

Most of the cumulative effects to the socio-economic environment in the NWT have already occurred and the incremental effects from the Project are relatively small. It is likely too soon to understand the contribution of diamond mining to sustainability in the NWT, including this Project. Twelve years is a short period of time from which to infer long-term continuity and ability to carry-on with activities indefinitely as related to the use of resources (e.g., individual, financial, natural, cultural). It is too soon to confirm long-term continuity of the wage economy, or of cultural and societal security and wellbeing.

Since the beginning, considerable effort has been focused on how to improve the hiring of northerners. Prior to the 2000s, secondary school completion was low, and few individuals had skills and training for mining-related employment. The focus of mitigation was on education advancement, skills development, and other programs and actions to improve chances of employment at the mine. By all accounts, the employment improvements in the past decade have been remarkable. Currently, less than one quarter of the diamond mine labour is Aboriginal, including many who have not achieved a high school diploma. In 2009, the overall diamond mine workforce totaled over 3,000 workers; NWT

Aboriginals accounted for 21% of that total, and Northerners accounted for 38% when including all other NWT residents (Northern News Services 2010). The mines have offered an unprecedented opportunity to participate in the wage economy when few other prospects existed. As the existing mines move underground, those lacking skills for underground mining will be able to consider opportunities available in surface mining for the Project.

While there have been employment improvements, the effect from education is more mixed. High school achievement rates, while improving, are still not consistent. There are still many youths who drop out while in grade 10 in the small communities. It is difficult to know whether employment opportunities really do provide an incentive to stay in school. Many youths cannot pass grade 10 even if they want mine employment. As a result, gaps in secondary school education have to be addressed much earlier. Several more years of stable economic prospects will also be needed to gain a true measure of whether it is understood that education is relevant to personal economic success. Education once attained cannot be taken away (Sharpe 2001).

The economy of the NWT remains vulnerable to the interests of markets outside of its borders for its resources. The NWT does not have a diversified economy with a strong manufacturing or knowledge-based sector. The addition of the Project will not change that, but it will extend the employment and skills acquisition opportunities beyond the closure of Ekati and Diavik mines. Similar to many resource-based economies, the historical NWT economy has been characterized by economic ups and downs, but it does not have to be. For the most part, the economy of the NWT has generally pursued paced development.

While there are no other new diamond mines on the horizon in the NWT, other than the Project, the successful experience with diamond mining provides some insight into the possibilities that exist in the NWT in other resource sectors. The diamond industry has done the groundwork to build an understanding in the NWT regarding how to maximize participation in NWT mining ventures. The private sector businesses that have developed alongside the diamond industry have built capacity and have become competitive with the support of northern procurement policies. Sustaining this momentum and this capacity with similar purchasing priorities will sustain this positive trend.

Societal and cultural sustainability is indirectly supported by employment. Wages provide choices including the finances to participate in cultural activities. However, societal and cultural sustainability are the product of the community. The Aboriginal communities have been strengthening their cultural position through land claim implementation in the case of the Tłıchǫ and land claim pursuit in the case of the Akaitcho. Societal sustainability is a goal, not an end

unto itself. Issues around maintenance of traditional culture existed well before diamond mining commenced. Likewise, the low level of volunteering in communities suggests an issue broader than employee absence from the community. It is also worth noting, however, that some communities may not have many formal volunteer positions.

Employment seems to be supporting the ability to participate in traditional activities by providing the financial means to acquire the necessary tools and equipment. This support seems largely focused on the immediate family and secondarily, perhaps, on other community members. Involving others in personal traditional activity participation is akin to “helping out”. This may be where the issue is really focused. Regardless, there is a substantial portion of the population involved in traditional activities and these activities are likely to continue in the communities.

Maintaining traditional languages in a region where the dominant language is English is not easy. There is some resurgence taking place in mother tongue use and ability to converse. However, this may or may not be sufficient to overcome the loss of home language speakers in Aboriginal communities. Overall, between the efforts of government related organizations, communities and companies such as De Beers, efforts are in place to support Aboriginal languages; if not as the mother tongue, then as a second language. The success is dependent on the decision of individuals and their actions in the home.

Overall, the NWT and the LSA communities in particular have seen personal and family wealth rise over the past decade and a commensurate decrease in personal and family reliance on income assistance over the same period. This increased income has also increased personal choices such as where to live for work and study, or what purchases of goods and services can be made. These changes coincide with the cumulative effects of economic development related to mining and oil and gas activities. While the economy of the NWT is not sustainable without the development of new projects, the experience gained from diamond mining has established a positive story that can be built on going forward.

Finally, it is important to recognize that, given the nature and scale of the cumulative issues and concerns raised in the Terms of Reference, it is not possible for De Beers to address and mitigate these concerns alone. Rather, the GNWT, the industry and business community as a whole, and the communities themselves share the responsibility in developing a plan and actions that will help to increase the potential for long-term community sustainability. The approach taken with this SEIA gives greater attention to current sustainability measures by

focusing attention on the limitations to community sustainability. The end point of this approach is to reorient the focus of existing relationships (especially those between the proponent, government, and communities), to one that balances the commitment to enhancing broadly-defined community assets that together provide greater contribution to the sustainability and health of communities.

12.9 FOLLOW-UP AND MONITORING

12.9.1 Commitments Implementation

De Beers has built and developed experience in the NWT since it acquired Snap Lake. De Beers has implemented environmental design features and mitigation to limit the negative effects and increase the positive effects from the Project on the socio-economic and cultural environments (Section 12.4).

In addition to environmental design features and mitigation, De Beers has other programs or actions that it carries out. These are adjusted from time to time to correspond to a community feedback or interest. These programs, (e.g., literacy) first developed in collaboration with communities for Snap Lake, will be expanded into the Project. The manner of developing and managing these programs for success is crucial. These programs were developed in collaboration with communities. De Beers also has developed a tracking system to report on the outcomes to communities and government, and make adaptive management adjustments for the most successful implementation of mitigation and other programs.

12.9.2 Monitoring and Reporting

As mentioned above, De Beers has developed a tracking system to go along with the implementation of programs and other commitments. De Beers reports annually in the form of an Annual Report to all who are interested. De Beers also reports on its commitments in the Snap Lake Socio-economic Agreement and will likely be reporting on those same indicators for the Project.

12.10 ACRONYMS AND GLOSSARY

12.10.1 Acronyms and Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ATVs	All-Terrain Vehicles
BC	British Columbia
BDIC	Business Development and Investment Corporation
CBI	Canadian Boreal Initiative
CPI	Consumer Price Index
CPR	Cardiopulmonary resuscitation
De Beers	De Beers Canada Inc.
DOT	Department of Transportation
e.g.,	For instance
EI	Employment Insurance
EIS	Environmental Impact Statement
FASD	fetal alcohol spectrum disorder
FDD	Final Domestic Demand
FFG	Formula Financing Grant
FTE	Full-time equivalent
GDP	Gross Domestic Product
GNWT	Government of the Northwest Territories
GST	Goods and Services Tax
HIV	Human Immunodeficiency Virus
HRDP	Human Resources Development Plan
i.e.,	That is
INAC	Indian and Northern Affairs Canada
IPI	Implicit Price Index
ITI	Department of Industry, Tourism, and Investment
KLOI	key lines of inquiry
LSA	Local Study Area
LFS	Labour Force Survey
LKDFN	Lutselk'e Dené First Nations
MOU	Memorandum of Understanding
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVRMA	Mackenzie Valley Resource Management Act
NGO	non-government organization
NSMA	North Slave Métis Alliance
NWT	Northwest Territories
PKC	Processed Kimberlite Containment
Project	Gahcho Kué Project
RCMP	Royal Canadian Mounted Police

RSA	Regional Study Area
SEED	Support to Entrepreneurs and Economic Development
SEIA	Socio-economic Impact Assessment
SINED	Strategic Investment in Northern Economic Development Program
STD	sexually transmitted disease
SON	subjects of note
Terms of Reference	<i>Terms of Reference for the Gahcho Kué Environmental Impact Statement</i>
VC	Valued Component
WHMIS	Workplace Hazardous Materials Information System
WTP	water treatment plant

12.10.2 Units of Measure

\$,'000	thousands of dollars
\$	dollars
%	percent
<	less than
>	greater than
°C	degrees Celsius
cm	centimetre
ft	feet
km	kilometre
km²	square kilometre
kW	kilowatts
m/s	metres per second
MW	megawatt

12.10.3 Glossary

A-weighted Decibel	A unit of sound or noise that has been filtered, so that the result is similar to the frequency response of the human ear.
Aesthetics	A pleasing appearance or effect.
Apprenticeship	A person who works for another in order to learn a trade.
Archaeology	The scientific study of the material remains of the cultures of historical or pre-historical peoples.
Asset	The term “assets” refers to specific indicators and measures of an individual’s or a community’s inherent capacity to adapt to new circumstances or changes. Typically these assets include a variety of indicators that represent the strength and weaknesses of individual or community capacity to adapt to or benefit from a new development such as the Gahcho Kué Project.
Attenuation	To reduce (the amplitude of an electrical signal) with little or no distortion.

Aurora	A luminous atmospheric phenomenon appearing as streamers or bands of light, sometimes visible in the night sky in northern or southern regions of the earth. It is thought to be caused by charged particles from the sun entering the earth's magnetic field and stimulating molecules in the atmosphere.
Birth Rate	Is the ratio of the number of live births during one year to the total population, and is usually expressed as the number of births per year per 1,000.
Capital Investment	The total funds invested in a business or enterprise.
Communities	Refer to any potentially affected settlements, towns, villages or cities, as well as any First Nations or Métis groups within the Tlicho and Akaitcho regions unless otherwise specified.
Consumer Price Index (CPI)	An index of the changes in the cost of goods and services to a typical consumer, based on the costs of the same goods and services at a base period; Is a measure of the impact of inflation on household expenditure.
Cost of Living	The average cost of food, clothing, and other necessary or usual goods and services paid by a person, family, etc., or considered as a standard by the members of a group.
Cumulative Effects	The impacts of a development taken in combination with the impacts of other past, current, or reasonably foreseeable future developments.
dè	A Dogrib term which is usually translated as "land", but does include everything in the environment that has life and spirit and the inter-relatedness of these various elements.
Death Rate	Is a mortality index that is usually expressed as the number of deaths per year per 1,000.
Demographics	Study of populations with emphasis on quantitative data.
Diamond communities	Diamond communities includes Behchoko, Wekweeti, Wahti, Gameti, Lutselk'e, Detah, N'Dilo, and Yellowknife
Direct Employment	Employment created as a direct result of Project development.
Ecosystem	A community of interacting organisms considered together with the chemical and physical factors that make up their environment.
Effect	In the EIS, the term "effect", used in the effects analyses, is regarded as an "impact" in the residual impact classification. An effect represents a change in a valued component (VC); Any response by an environmental or social component to an action's impact. Under the <i>Canadian Environmental Assessment Act</i> , "environmental effect" means, in respect of a Project, "(a) any change that the Project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by Aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance and (b) any change to the Project that may be caused by the environment, whether any such change occurs within or outside of Canada.
Employment	One's work, trade, or profession; The state of being employed or having a job; Refers to persons who did any work at all, excluding housework, maintenance around the home and volunteer work; or were absent from their job or business because of vacation, illness, on strike, or locked out, etc.
Employment Income	Refers to total income received by persons 15 years of age and over for any employment.
Employment Rate	The percentage of persons 15 years of age and over who are employed during the week prior to the survey.
Environmental Design Features (or Mitigation by Design)	The implementation of measures, including design, to control, reduce or eliminate a potential adverse impact of an activity or Project. Mitigation may address ecological, economic or socio-cultural impacts.

Final Domestic Demand Implicit Price Index (FDD-IPI)	Is determined by dividing the estimate of FDD in current dollars by the value of FDD in constant dollars. The FDD includes personal current expenditures, government and business capital expenditures and government current expenditures. Many economists consider the FDD-IPI as an excellent indicator of inflation.
Food Price Index	An index of the changes in the cost of food to a typical consumer, based on the costs of the same food in another place.
Formula Financing Grant (FFG)	A level of revenue that acts as a "floor" which is intended to enable the Territorial government to provide a basic basket of goods to NWT residents that meets the minimum standard of government services that has been established for Canadians. The FFG is intended to provide the difference between what the GNWT should be able to raise through its own tax structure and the level of expenditure required to provide the required basket of services.
Frictional Unemployment	Refers to those unemployed individuals who are between jobs, have entered the workforce in the past six months and have not yet found a job, or have a job but are temporarily laid off.
Full-time Equivalent	Full-time equivalent is a way to measure a worker's involvement in a project. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is only half-time.
Gross Domestic Product (GDP)	The total market value of all the goods and services produced within the borders of a nation during a specified period.
Gross Production	Measures the value of all economic activities involved in producing a good or service. It counts the cost of production and the value added at each stage of production. Therefore, the gross production value will always exceed that of gross domestic product (GDP), since the latter reports only the value-added component of each step in the production process.
Household	Refers to an occupied private dwelling; Basic unit of analysis in many microeconomic and government models. The term refers to all individuals who reside in the same dwelling.
Household Expenditure	Estimates of the amounts that households spend on the consumption of goods and services over a given period of time.
Human Resources Development Plan (HRDP)	A plan that includes pre-employment programs, wellness initiatives, financial management skills development, and initiatives for advancement in the labour force.
Immigrant	A person who leaves one country to settle permanently in another.
Implicit Price Index (IPI)	Is a measure of the change in prices of all new, domestically produced, final goods and services in an economy.
In-migration	To move into a different region of the same country or territory.
Income	The amount of money, or its equivalent, received during a period of time in exchange for labour or services, from the sale of goods or property, or as profit from financial investments.
Income Assistance	Financial aid provided to individuals who do not possess adequate funds with which to pay for basic food, shelter, utilities and clothing.
Income Support	A government program that provides financial assistance to individuals or families who are unable to support themselves or their households.
Income Tax	A sum of money demanded by a government for its support, or for specific facilities or services, levied upon incomes, property, sales, etc.
Indirect Effects	Subsequent purchases by suppliers of materials and services to sustain the original expenditures.
Indirect Employment	Employment indirectly created by a development Project through its suppliers, contractors and subcontractors.

Induced Effects	Emerge when workers in the sectors stimulated by initial and indirect expenditures, spend their additional incomes on consumer goods and services such as food, accommodation, and entertainment.
Induced Employment	Employment generated when employees spend their wages in a given community.
Inflation	A general and progressive increase in prices.
Inflation Rate	The rate of change of prices (as indicated by a price index) calculated on a monthly or annual basis.
Initial (Direct) Effects	The initial construction and operational expenditures on wages and materials (the direct costs of operation).
Input/Output Model	The Input-output model of economics uses a matrix representation of a nation's (or a region's) economy to predict the effect of changes in one industry on others and by consumers, government, and foreign suppliers on the economy; An Input-Output Model is widely used in economic forecasting to predict flows between sectors.
Inter-Provincial I/O Model	The Inter-Provincial I/O model is an open model and does not provide induced economic effects. However, the model does provide a comprehensive household expenditure profile for the NWT that is used to calculate the induced effects separately.
Inter-provincial migration	Those people who moved inter-provincially or internationally refer to those people who moved into or out of the NWT from elsewhere in Canada or from abroad.
Knowledge of Language	Refers to use of the "Mother Tongue" as a second language.
Labour Force	Refers to persons who were either employed or unemployed during the week prior to the survey; The total number of people employed or seeking employment in a country or region. Also called work force.
Labour Income	Labour compensation that includes wages, salaries and other supplementary compensation.
Labour Market	The total number of people employed or seeking employment in a country or region. Also called labour force or work force.
Migration	Migration is the relocation of an individual or groups of individuals who are either relocating permanently (or relatively permanently) to a new or distant location for reasons that may be associated with family, employment, or improved quality of life. Statistics Canada identifies these individuals under the broad term of "movers" and those who stay in their location as "non-movers."
Mitigation	The implementation of measures, including design, construction, scheduling and restorative measures, to control, reduce or eliminate a potential adverse impact of an activity or Project. Mitigation may address ecological, economic, or socio-cultural impacts.
Mother Tongue	Refers to the first language learned at home in childhood and still understood.
Movers	Are persons who, on Census Day, were living at a different address from the one at which they resided five years earlier.
Non-movers	Are persons who, on Census Day, were living at the same address as the one at which they resided five years earlier.
Out-migration	To move out of one community, region, or country in order to reside in another.
Participation Rate	The participation rate is the percentage of the total number of people of labour-force age (15 years and over) that is in the labour force (either working or looking for work).
Post-Secondary	Of or relating to education occurring after the completion of high school.

Potential Labour Supply	Those persons who are unemployed. They can be classified into various categories including those who want to do rotational work, gender, ethnicity, or level of schooling. Refers to persons who are unemployed, but are looking and are available for work.
Poverty	An inability for people to meet their basic needs. The state or condition of having little or no money, goods, or means of support.
Regional Centres	Within the context of the Gahcho Kué Project study area, the regional centres are identified as Fort Smith and Hay River. The regional centres have populations greater than 2,500 and share demographic characteristics.
Residual Effect	Effects that remain after mitigation has been applied.
Residual Impact Classification	A tool to describe the residual effects from the Project on various facets of the Project (i.e. Tourism and Wildlife Character; the Proposed East Arm National Park) using a scale of common words rather than numbers or units.
Royalties	Canada Mining Regulations require each mine to pay an annual royalty to the Crown based upon the value of output of the mine. The value of output is defined as the market value of the mine's production minus deductions for such items as transportation, mine and mill operations, etc. Royalties are collected by the NWT government from all companies involved in the extraction of natural resources. Companies pay a percentage of their earnings to the federal government for the use and extraction of these resources.
Secondary School (High school)	Students in grades 10 to 12.
Significance	A measure of how adverse or beneficial an effect may be on a VEC (Valued Ecosystem Component).
Social Inclusion	A subcomponent of society's ultimate goal of a high and sustainable quality of life. Included in this definition are such things as access to employment, opportunities for economic prosperity and improved socio-economic standing, greater quality and tolerance of beliefs and values, and greater social justice.
Social Support	The physical and emotional comfort given to individuals by family, friends, co-workers and others.
Structural Unemployment	Occurs when workers are unable to fill available jobs because they lack the skills, do not live where jobs are available, or are unwilling to work at the wage rate offered in the market.
Study Area	The study area is the region within which the specific environmental effects evaluations are focussed (e.g., caribou study area versus socio-economic study areas will differ).
Sustainable Community	Communities planned, built, or modified to promote living which emphasizes limited exhaustion of natural resources.
Tax Revenue	Government revenue resulting from taxation.
Taxation	Charge against a citizen's person, property or activity for the support of government.
Traditional Economy	Economies in which communities use tools and methods usually handed down from one generation to the next with respect to harvesting and hunting activities. These economies are often found in rural regions; It is an economic system that usually features a strong social network component.
Unemployment	Relates to persons who were without work, had actively looked for work in the previous four weeks and were available for work; or had been on temporary lay-off and expected to return to their job; or had definite arrangements to start a new job within the next four weeks.
Unemployment Rate	The percentage of the labour force that was unemployed during the week prior to the survey.

Value of Mineral Production	The total value of all kinds or types of minerals produced in a given period of time.
Valued Component (VC)	Attributes or components that are perceived as important for environmental, ecological, social, economic, or cultural reasons. In Section 12, are concerns about the Project as described in the Report of Environmental Assessment (MVEIRB 2006), which were raised in meetings with individuals, communities, and government that have an interest in the Project, and through De Beers' own engagement process (Section 4, Engagement).
Volunteers	People who freely choose to help or serve with an organization, community or do good without the expectation of financial compensation.
Wage Economy	Economy that involves formal wage-based employment, such as with a mine, a private business or with the government.
Zone of Influence	A geographic area, extending from an action, in which an effect is non-trivial.

APPENDIX 12.I

BUSINESS INTERVIEW GUIDE, GAHCHO KUÉ PROJECT, NWT

Appendix 12.I

Business Interview Guide, Gahcho Kué Project, NWT

Objective: About 10 businesses and government agencies as well, to be interviewed in Yellowknife during, 2010. Guide will be used to orient the interview but other questions may be asked depending upon the nature of the business. Adapt these questions for any government reps; e.g. focus on issues of service provision, current state of affairs (education, health, crime, etc.), capacity, plans for expansion, comments on diamond mining, and other industrial projects, etc.

INTERVIEWS

#1

Company (Agency) Name: _____
Business Lines (Types of Services Provided): _____
Direct or Indirect Contracts with Mining Industry (yes/no): _____
Number of Employees (full-time/part-time/seasonal): _____
Years Operating in NWT: _____

1. What is the current economic situation for NWT (2010)? Outlook for future growth? (short term to long term, up to 20 years)

2. How has your business changed over the past ten years (since 2000)?

3. What is your ability/capacity to expand if demand were to increase? To decline?

4. It is often said that the NWT's labour market is at capacity. Have you found this to be true in your line of business? Is the labour market stable? Enough skilled trades people?

5. Does the mining industry affect your business in any way?

6. What are the most pressing concerns for your business in moving forward in the NWT? List top 3. Are there others?

7. Can you recommend other businesses for us to contact, either within your industry, your suppliers, buyers, etc?

APPENDIX 12.II

ECONOMIC IMPACT REPORT

Economic Impact Report

Gahcho Kué Diamond Project

Impact Economics

12/13/2010

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12.II.1 VALUED COMPONENTS FOR THE ECONOMIC IMPACT REPORT

The Terms of Reference for the Gahcho Kué Environmental Impact Statement emphasises the need to understand the social, cultural and cumulative impacts of the past decade of economic development on the human environment within the Regional Study Area and how the Gahcho Kué Project (Project) will impact these areas. But there is also a need to understand and evaluate the economic impacts of the Project. In this Economic Impact Report, the evaluation of the Project's economic impacts on the human environment is presented. The areas of study include the following Valued Components:

- Gross Production;
- Gross Domestic Product;
- Labour Income;
- Employment;
- Government Revenues;
- Labour Market;
- Population; and,
- Inflation.

12.II.2 IMPACT ASSESSMENT CRITERIA

The results from this assessment are summarized according to the direction, geographic range, magnitude, and duration of the impact. The criteria for each of these impact categories are provided in Table 12.II.2-1. In all cases, the impact is assessed relative to the current baseline conditions, the history of which is described in Annex K Gahcho Kué Baseline Study.

This approach for the impact assessment has been adapted from those used when assessing impacts on the natural environment and is based on the suggested significance determination schedule outlined in the Terms of Reference. Frequency, likelihood and reversibility criteria are not typically used when evaluating economic impacts on the human environment. As a result they are introduced into the assessment only when warranted.

Even with some modifications, this impact assessment schedule is not always the best evaluation tool. For instance, the range of an impact can be broad such as in the case of employment. However, the magnitude of that impact lessens as one moves further and further away from the Project's actual location and its employment access points. In some cases it is necessary to note these differences, but as the notes become increasingly complex, the usefulness of the tool diminishes.

Table 12.II.2-1 Definitions of Criteria Used in the Impact Assessment

Direction	Range	Magnitude	Duration
Neutral: no measurable change from existing conditions	Local: Lutselk'e, N'Dilo, Detah, Yellowknife, Fort Resolution, Tlicho communities	Negligible: statistically insignificant (no measurable change) from existing conditions	Short Term: less than two years
Negative: a decrease relative to existing conditions	Regional: the entire Northwest Territories	Low: the impact is within the natural variation of existing conditions	Medium Term: two years to five years
Positive: an increase relative to existing conditions	National: the impact is measureable (statistically significant) beyond the territorial boundary	Moderate: the impact is approaching but still within the upper or lower limits of variation from existing conditions	Long Term: five years to the end of the Project life
		High: the impact is beyond the upper or lower limit of variation from existing conditions; causes a shift from baseline	Indefinite: beyond the life of the Project

12.II.3 STUDY AREA FOR ECONOMIC IMPACTS

A Local Study Area for the socio-economic impact assessment is defined to include the following communities.

- Behchoko,
- Detah,
- Fort Resolution
- Gameti,
- Lutselk'e,
- N'Dilo,
- Wha Ti,
- Wekweeti,
- Yellowknife.

These communities encompass the human environment in which the majority of economic impacts will be felt. This does not preclude other communities from within the NWT, defined as the Regional Study Area in this report, from participating and thus benefiting from the Project. However, their relationship to the Project will likely be defined exclusively in terms of labour supply and the broader implications of economic growth in the Territory.

The results from the economic impact analysis on gross production, GDP, labour income, employment and government revenues are compared to those from the NWT baseline. It is accepted that the majority of economic impacts will occur in the Local Study Area, but there is no practical reason to quantify economic variables such as GDP on a local basis.

The impacts on gross production, GDP, labour income and employment are also estimated for Canada as a whole.

12.II.4 TEMPORAL BOUNDARY

There are three phases to the proposed Project. Construction will take place over a two-year period. Operations will span eleven years. Closure, which includes reclamation and lake refilling and long-term environmental monitoring, will last for nine years. The purpose of the Economic Impact Report, it was assumed that the Project's start date will be 2013.

12.II.5 IMPACTS MEASURED

All dollar values in this Report are presented in 2010 Canadian dollar terms. Results are given in terms of the total impact and annual average.

The economic impacts of the project were analyzed using five variables. They are: (1) Gross Production, (2) Gross Domestic Product, (3) employment, (4) labour income, and (5) government revenues. Separate estimates were produced for direct, indirect and induced impacts. Results were produced for the NWT and for Canada.

In addition to those above, impact predictions were made for population, labour force and inflation. The impacts on demographics have additional implications such as that for the demand on community services and infrastructure and government transfers. In the case of population, the impacts were studied relative to a baseline forecast of population growth that did not contain the Project.

12.II.6 METHODOLOGY

The data used to conduct the economic impact study were provided by De Beers Canada Inc. (De Beers). This data includes estimates of construction, operation and closure costs including direct labour requirements, wages and salaries, and the expenditures on goods and services. These data were organised such that Statistics Canada's Interprovincial Input-Output Model could be simulated in order to determine the full extent of the direct and indirect impacts. The Northwest Territories Economic Impact Model (NWTEIM) was used to determine induced impacts as well as the impacts on population, labour force and some government revenues. An overview of the modelling process is provided below.

The measured economic impacts reported by the Interprovincial Input-Output Model do not take into account potential capacity constraints that would influence local participation for employment opportunities. Local participation was determined exogenously from the model. The NWTEIM was introduced to determine the impacts from this local participation.

12.II.6.1 DESCRIPTION OF ECONOMIC MODELS AND MODELLING TECHNIQUES

A model is a scaled-down representation of something larger. In the same manner in which a model airplane is a small representation of a real airplane, an economic model is a scaled-down representation of an economy in whole or in part. Broadly speaking, the discipline of economics can be defined as the study of choices. Economic models improve the study of these choices and their outcomes. Economic models are used in this research because they provide an approximation of the economic outcomes that flow from the construction and operations of the Project.

12.II.6.1.1 Input-Output Models

Input-Output models are one of many tools used in economic analysis. They are best suited when investigating the economic impacts of a change in production, and especially in cases where that change can be thought to occur without significantly altering the structural make-up of an economy.

An input-output model utilises the expenditure patterns from an existing or potential producer to depict the impact those expenditures will have on an economy. Essentially, this is a comparative study where the control case is defined as the current economy and the test case is simply a change in the existing production schedule of a firm or industry. Adopting this approach allows

us to assess the economic value of Project's production; that is, its diamond mining and milling activities.

Determining the value and location of the thousands of transactions that occur as a result of construction and operations at Kennady Lake, the site of the Project, would be virtually impossible to do manually. Input-Output models perform these calculations for us through a complex system of resource allocation. They track the value-added component of every round of transactions that occur along the supply chain when a change is introduced to the economy.

In Canada, Statistics Canada builds and maintains the Inter-provincial Input-Output Model. In addition to calculating the impacts of a change on Canada's gross domestic product, this model has the added complexity of tracing trade flows between Canada's provinces and territories as well as international imports and exports. As of 2003, it separates the economies of Nunavut and the Northwest Territories, enabling one to better understand the results of the Project's operations in the NWT.

Input-Output models can calculate both direct and indirect impacts. Direct impacts are those generated immediately from the expenditures on goods and services required to build, maintain and operate a business (in this case the Gahcho Kué Project).

Indirect impacts are those generated by the new expenditures made by the directly-impacted business sector as a result of their need to deliver their good or service to the Project. The majority of indirect impacts flow from the manufacturer of goods because of their need to purchase more inputs. The producers of these inputs are then impacted, causing further rounds of transactions. Indirect impacts are typically low in the NWT regardless of the industry being studied because of its limited manufacturing base.

Input-Output models are useful for studying impacts of changes in production, but one must be cautious when interpreting the results. Like any other model, Input-Output models are predicated on numerous assumptions that alter or influence the results. Therefore, any results should be viewed as approximations and be combined with other knowledge of the firm or industry being studied. Other important considerations include the fact that:

- Input-Output models are linear, meaning they do not make adjustments for the size, scale or direction of any change to an economy.
- Input-Output models do not reflect limitations of capital and labour; that is, there are no capacity constraints.

- Input-Output models are static, meaning they are based on the economy as it exists at a single point in time.
- The data used to develop the relationships between industrial sectors are the result of surveys. They must be treated as approximations of actual relationships because an unknown variability results from possible survey error.

With the areas of caution noted, Input-Output models provide a starting point for understanding economic impacts. They provide reasonable estimates of gross production, gross domestic product, employment and labour income and indirect taxes.

A third round of impacts that flow from a change in production must be considered. The labour income gained or lost by employees affected by the direct or indirect effects of a change has an impact on disposable income and thus a change in consumer expenditures. The change in household spending has its own impact on gross production, GDP, employment and labour income. These impacts are called the induced effect of a change in production.

Adding the induced effects brings additional challenges. While accounting for the response of households to the change, the model does not do the same for government or industry. Determining induced effects requires assumptions on the level of taxation, consumer imports, and household savings, all of which would be affected by the gain or loss of income. These assumptions are exogenous to the Input-Output model. Other complexities arise when someone is working in one jurisdiction, but resides and pays taxes in another. The combination of these issues has a measureable effect on the results of changes in production in the NWT. As a result, Input-Output modelling is not the primary tool used in this report to determine induced effects. Instead, a satellite model within the NWTEIM that was built specifically to deal with these and other 'local' issues is used. The National Input-Output Model was simulated to gain an estimate of the consumer expenditure pattern and national level effects from the induced impacts.

12.II.6.1.2 NWT Economic Impact Model

The NWT Economic Impact Model (NWTEIM) was developed to help understand and explain the impact of industrial developments on the people of the NWT. Specifically, it couples a financial accounting and taxation model with the NWT Input-Output model maintained by the NWT Bureau of Statistics as the basis for additional analytical models. It includes a demographics model and territory impact model.

Each sub-model (or “satellite” model) is linked to one another to produce a dynamic response to a change in production.

- The financial accounting and taxation model demonstrates the potential for public revenue streams and computes a project's viability.
- The Input-Output model calculates impacts on GDP, employment and labour income and can be supplemented by the results flowing from Statistics Canada's Inter-provincial Input-Output Model.
- The results from these two models feed the demographic and territory impacts models that collectively demonstrate impacts on population, labour force, and migration as well as the induced impacts.

The Demographics Satellite Model produces a baseline forecast of the Territory's population by single-age cohort and gender. It utilises historical fertility rates and death rates to calculate a baseline natural rate of population growth. These variables can be adjusted over the forecast period to more accurately reflect demographic trends. Migration is added to complete the demographic projection. This variable can be set independent on the model dynamics or by allowed to move based on the economic changes calculated in the model. The migration variable also contains an age-specific component.

The baseline population forecast provides the information necessary to study the potential labour force. Additional details are required for this analysis, including estimates of participation rates and graduation rates.

The Territory Impacts Model combines information from the NWT Input-Output Model and the Demographics model with a government revenue block based on historical data and current taxation regimes and a consumer activity block based on stochastic projections of consumer behaviour, retail sector data and the Final Demand profile from within the NWT Input-Output Model.

12.II.7 THE REGIONAL ECONOMIC SETTING

This chapter highlights some of the more important aspects of the NWT economy. This does not duplicate or replace the Baseline Study which offers a complete investigation into the economic, social and socio-economic history and trends in the NWT and the Local Study Area. Rather, this chapter has a narrow focus, concentrating solely on economic issues like capital investments, mineral production, gross domestic product, personal income growth, government fiscal performance, demographic change and inflation. These variables form the basis for understanding the existing conditions within the regional economy and are the ones directly impacted by the proposed Project.

The NWT has undergone a major transformation since the construction of the Ekati diamond mine began and the beginning of diamond production in 1998 affecting all aspects of economic life in the Territory. The impetus for these changes has been largely driven by resource development, though the creation of Nunavut in 1999 has been a contributing factor. But it was the discovery of diamonds in the North Slave Region of the NWT followed shortly thereafter by construction of BHP Billiton's Ekati diamond mine that set the Territory on a new path. In 2003, the opening of Rio Tinto's Diavik diamond mine overshadowed the negative effects of the division of the NWT and Nunavut and the closures of Giant and Con Mines.

The wealth generated by the diamond industry has changed the Territory. Participation in the workforce has grown considerably and has attracted new labour into the marketplace. The larger workforce has resulted in fewer people drawing on social assistance. Governments have benefited further as a result of increased revenues generated at the corporate and personal taxation levels, through resource royalties, and through indirect taxes on products. Moreover, the decade of economic expansion has not been met by an equally large increase in population. The number of NWT residents has changed little over the past decade growing at a rate well below the national average leaving the growth in demand for public services and infrastructure as it relates to population growth as it was prior to this latest development phase.¹ Existing businesses have expanded, new ones have been created, and viable Aboriginal development corporations have emerged furthering the size and extent of economic benefits flowing from the diamond industry. Through all this, inflation has also remained below the Canadian average.

¹ For the period 1999 to 2004, the population growth was 2,663. There has been virtually no growth since then; the population has increased by 138 people over the five-year period from 2004 to 2009.

12.II.7.1 CAPITAL INVESTMENT

Capital investments are an important indicator of a region's future economic growth (see Table 12.II.7.1-1). In 2000, the three-year construction of the Diavik Diamond Mine began. It brought approximately \$1 billion of new, private sector investment to the Territory. In 2005, the Snap Lake Diamond Mine began its construction phase. This project also spanned three years with a final cost above \$1 billion. From the period beginning in 2005 and ending in 2009, Ekati and Diavik continued to expand operations beyond the initial site development including further investments in pit operations and development of new underground projects. The cost of these additional capital projects is approaching \$2 billion.

Table 12.II.7.1-1 Private and Public Investment in the Northwest Territories, 1999 to 2010

(\$, millions)

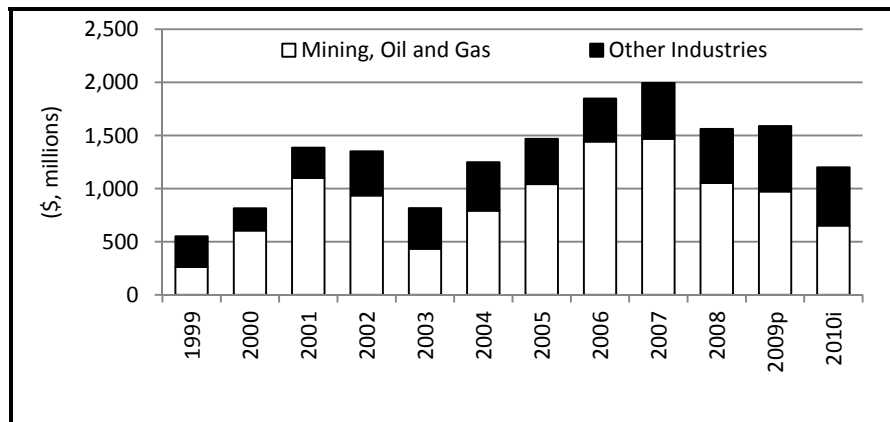
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ^p	2010 ⁱ	Total
Mining, Oil and Gas	262	606	1,099	936	434	793	1,042	1,443	1,469	1,052	973	652	5,189
Other Industries	290	209	287	415	383	455	427	405	526	509	616	548	2,514
Total	552	815	1,386	1,350	817	1,248	1,469	1,848	1,995	1,562	1,589	1,200	7,703
Mining % of total	47%	74%	79%	69%	53%	64%	71%	78%	74%	67%	61%	54%	67%

Source: Statistics Canada, Private and Public Investments in Canada, Intentions (Catalogue 61-205-WXE). Notes: 'p' means preliminary data, 'i' means intentions. Prior to 1999, the private and public investment time series includes spending in Nunavut, which is difficult to separate accurately.

Private-sector investment such as that from the diamond industry represents new money to the Territory, and even to Canada. This is unlike public-sector investment which is a redistribution of Canadian taxpayers' wealth. Still, it could be argued that in the NWT, most public sector spending represents new money to the Territory since much of the financing comes from taxpayers from southern Canada.

The latest figures from the private and public investment intentions report from Statistics Canada reveal a decline in spending for 2010 in the NWT, which is currently projected to equal \$1.2 billion, down 25% from 2009 and 40% from its peak in 2007 (see Figure 12.II.7.1-1). An important factor in this decline is the 33% drop in investment intentions from the mining, oil and gas sector of which diamond mines are an important component.

Figure 12.II.7.1-1 Private and Public Investment in the Northwest Territories, 1999 to 2010



Source: Statistics Canada, Private and Public Investments in Canada, Intentions (Catalogue 61-205-WXE). Notes: 'p' means preliminary data, 'i' means intentions

Looking forward at the prospects for future investments in the NWT, there is some potential within other mining sectors such as the proposed mine at Prairie Creek and the NICO Project. However, neither is on the scale of the diamond mines already in production. More discussion on the future economy in the absence of the Project is provided in the Baseline Study.

12.II.7.2 MINERAL PRODUCTION

Table 12.II.7.2-1 contains data on the value of mineral production in the NWT from 1996 to 2009. The rise of diamond production is clearly depicted in this table. The value of this production peaked in 2004 when the combined activities of Ekati and Diavik produced \$2.1 billion in diamonds. The value of production returned to this level in 2008 after the Snap Lake Diamond Mine opened. The most recent drop in 2009 came as a result of temporary shut-downs at Diavik and Snap Lake. Both of these operations were ramping up their production to pre-2009 levels at the start of 2010.

Prior to 1999, gold production from Con and Giant Mines and zinc production from Pine Point dominated the minerals sector. Note that the figures in Table 12.II.7.2-1 do not include oil and gas production, which is an important contributor to the NWT's GDP but have been declining over the past decade and do not require large amounts of labour or new investment.

Table 12.II.7.2-1 Value of Mineral Production in the NWT, 1996 to 2009

(\$, millions)

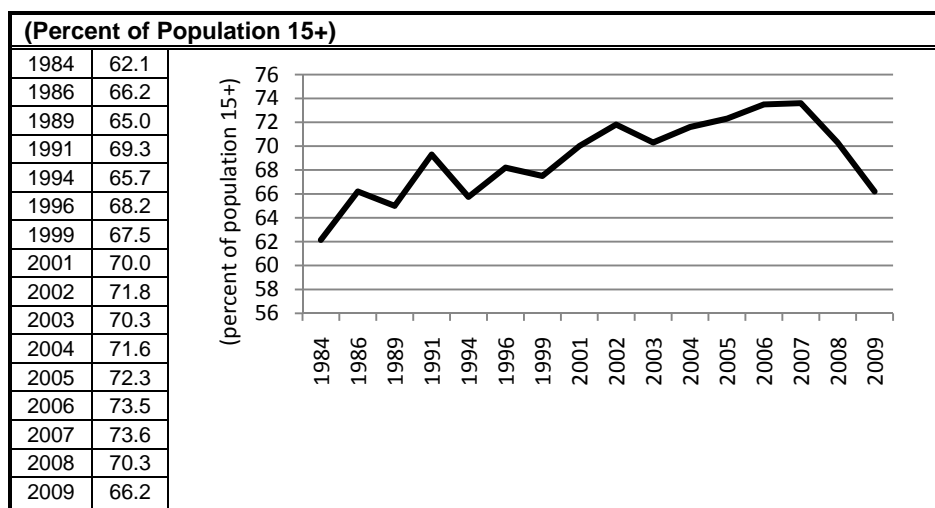
	Other Minerals	Diamonds	Total	Diamonds %
1996	245	0	245	0%
1997	213	0	213	0%
1998	64	41	105	39%
1999	47	606	653	93%
2000	57	625	682	92%
2001	61	718	779	92%
2002	73	801	874	92%
2003	79	1588	1667	95%
2004	16	2097	2112	99%
2005	28	1762	1790	98%
2006	71	1567	1638	96%
2007	86	1745	1831	95%
2008	39	2084	2123	98%
2009	62	1448	1510	96%

Source: Natural Resources Canada, Mineral and Mining Statistics Online, Mineral Production of Canada, by Province and Territory; NWT Bureau of Statistics, NWT Mineral Shipments http://www.stats.gov.nt.ca/Statinfo/Industry/non_renew/shipment.otp

12.II.7.3 LABOUR

The NWT witnessed a steady rise in employment rates from 1999 to 2007 as the diamond industry grew (see Table 12.II.7.3-1). The onset of the recession which began in 2008 and continued through 2009 brought about a sharp drop in employment. This drop will be a temporary one given the hiring announcements by Rio Tinto and De Beers Canada Inc. at the end of 2009. Collectively, the two operators plan to add in excess of 250 local workers to their payrolls in 2010.

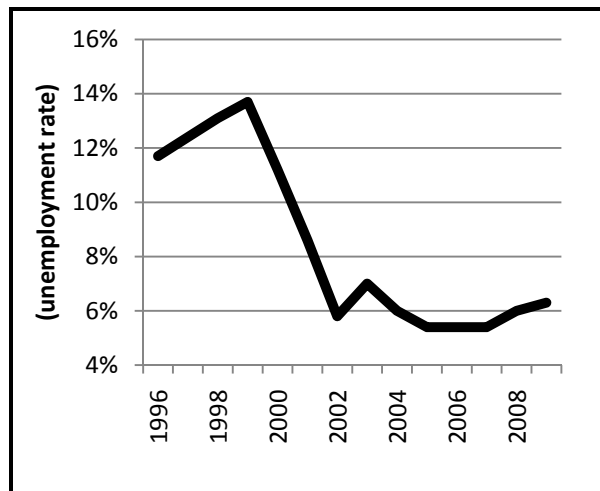
Table 12.II.7.3-1 Employment Rate, 1984 to 2009



Source: NWT Bureau of Statistics, Stats Update 2009, Statistics Canada Census and Monthly Labour Force Survey

As one would expect, other measures of labour force activity show a similar pattern over the past decade. Figure 12.II.7.3-1 displays the unemployment rate over the past ten years. The rate dropped quickly starting in 2000/2001, and settled at 5.4% for three consecutive years.² Starting in 2008, the rate of unemployment has crept up to average 6.3% in 2009. This is still below the national average for that year which was 8.3%.³

Figure 12.II.7.3-1 Unemployment Rate in the NWT, 2000 to 2009



Source: Statistics Canada Monthly Labour Force Survey, NWT Bureau of Statistics Labour Force Survey

12.II.7.4 PERSONAL INCOME

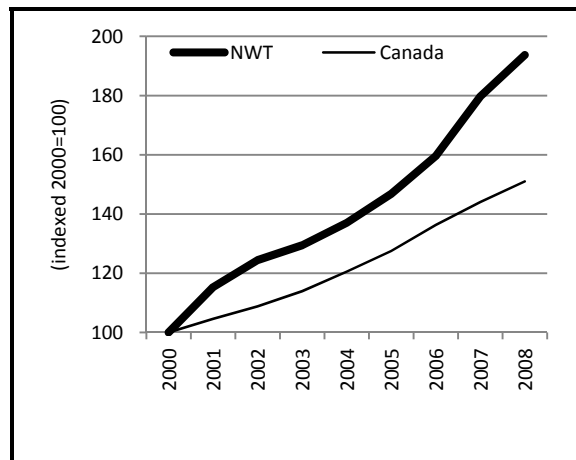
The increase in economic activity over the past decade has brought with it a greater demand for labour in the NWT. Moreover, many new jobs being created are high paying compared to the average in the Territory. The result is a rise in labour income in the Territory. Over the nine-year period beginning in 2000, total labour income in the NWT has grown from \$1.14 billion to almost \$2.17 billion in 2008. This equates to an annual increase of 8.6%, compounded annually, or 93% overall. Figure 12.II.7.4-1 illustrates this growth in comparison to that of Canada over the same time period.

The increased financial wealth brought about by the diamond industry can be seen in the growing average income levels throughout the regional study area. It is worth noting that in relative terms, the smaller communities have seen their income levels grow at a faster pace than that of Yellowknife and Hay River (see Table 12.II.7.4-1).

² For years 1997 and 1998, the unemployment rate was interpolated using Statistics Canada's 1996 Census and NWT Bureau of Statistics labour force data.

³ Statistics Canada, Labour Force Characteristics. Available at http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.pgm?Lang=E&SP_Action=Result&SP_ID=1803&SP_TYP=50&SP_Sort=-0&SP_Mode=2 accessed April 15, 2009.

Figure 12.II.7.4-1 Labour Income, NWT and Canada, 2000 to 2008



Source: Statistics Canada Labour Division; NWT Bureau of Statistics *StatsQuarterly*, December 2009.

Table 12.II.7.4-1 Average Labour Income from Selected Regional Study Area Communities, 1998 to 2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006	Average Annual Change*
NWT	33,476	35,450	36,187	38,497	41,428	41,904	43,969	45,843	47,856	4.6%
Behchokö	19,436	22,024	23,039	26,539	28,338	28,742	30,666	32,783	34,898	7.6%
Fort Resolution	17,977	18,867	19,500	23,764	23,868	24,172	26,188	27,673	28,896	6.1%
Gamèti	14,975	19,700	20,677	22,420	24,443	24,508	23,200	24,121	28,829	8.5%
Hay River	32,935	34,421	36,079	38,246	40,391	41,933	43,686	45,494	49,772	5.3%
Lutselk'e	15,950	19,369	20,407	21,442	24,965	25,572	25,782	24,187	25,459	6.0%
Whati	16,883	18,314	16,400	19,629	22,280	23,992	23,859	26,000	25,343	5.2%
Yellowknife	40,073	41,870	42,689	45,147	49,172	49,370	51,506	54,037	55,579	4.2%

Source: Statistics Canada, SAADD as reported in NWT Bureau of Statistics *Summary of NWT Income Statistics, 2008*.

Notes: * compounded annually

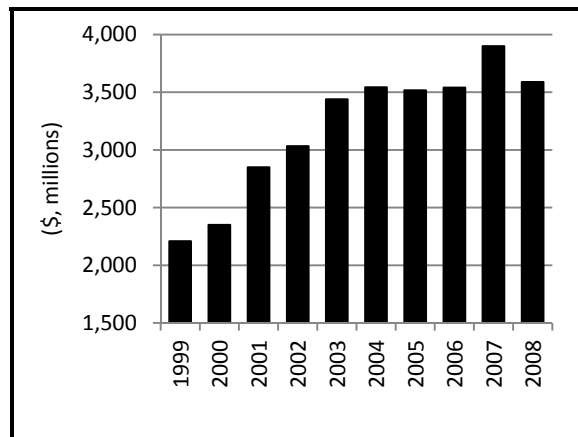
12.II.7.5 GROSS DOMESTIC PRODUCT

Gross domestic product (GDP) is a measure of the value which is added to the production process within a region. GDP can be calculated by summing labour income, mixed income, the cost of depreciation, profits and indirect taxes less subsidies levied on production. This forms what is referred to as GDP at Basic Prices. Adding indirect taxes on products less any subsidies on products to this total returns GDP at Market Prices, which is the most often cited measure of value-added production. In the NWT, real GDP at Market Prices has grown from \$2.2 billion in 1999 to \$3.6 billion in 2008 (see Figure 12.II.7.5-1). This represents a 62% increase in the nine years or 5.5% a year when compounded annually, which is substantially greater than the national average annual growth of 2.6%.⁴

⁴ Statistics Canada, National Economic Accounts, Table 385-002.

However, one can't help but notice that the economic growth of the NWT has been virtually flat since 2004, the year Diavik came into production, with the exception of 2007 which coincides with major capital developments taking place at all three diamond mines.

Figure 12.II.7.5-1 GDP at Market Prices, Chained (2002) Prices, 1999 to 2008



Source: Statistics Canada National Economic Accounts, CANSIM Table 384-0002.

Natural resource development is a large component of NWT's overall economy (see Table 12.II.7.5-1). In addition to its direct impact on the Territory's production through mineral production and mine services, it is also having a significant impact on transportation, wholesaling, and construction. It adds thousands of jobs to the economy, has raised income levels directly and indirectly and is the root cause of the surge in residential construction, retail activity, and government spending.

Table 12.II.7.5-1 GDP at Basic Prices, Chained (2002) Prices, 1999 to 2008

(\$, millions)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mining, Oil and Gas	507.1	523.9	795.6	956	1382.8	1344.7	1215.8	1242.7	1512.9	1252.1
Construction	167.5	237.5	396.9	319.8	230.3	313.3	369.1	352.3	343.7	340.1
Transportation and Warehousing	133.3	134.7	151	153.6	171.3	203.1	243.5	230.9	246.9	252.8
Wholesale Trade	48.5	51.1	50.2	53.5	57.6	60.2	73.1	75.4	101.6	85.9
Government*	581.3	584.1	604.5	642.4	663.4	676.5	683.7	690.3	714.3	714.9
Other Industries	642.0	659.2	729.5	790.8	837.1	840.6	825.1	834.0	854.9	839.3

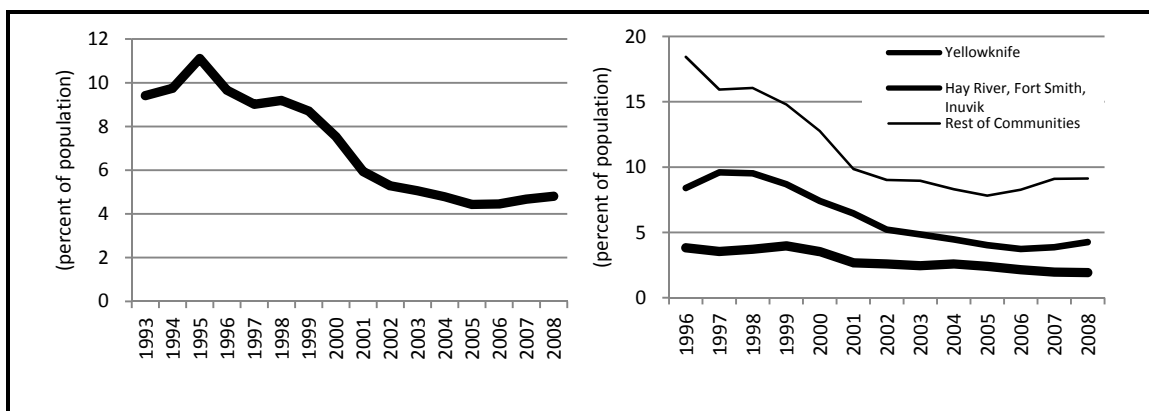
Source: Statistics Canada National Economic Accounts, CANSIM Table 379-0025. Note: * data for Education Services in 1999 and 2001 was interpolated.

12.II.7.6 SOCIAL ASSISTANCE

The economic growth of the past decade has been of a scale large enough to attract new labour into the workforce, some of whom were previously thought to be unemployable due to low education, low skill levels, general immobility, and no prior work experience.⁵ Anyone left unemployed but who wanted a job can be described as either frictionally or structurally unemployed. The former group are those in between jobs or are new to the workforce. The latter group tend to face challenges in participating in the new economy because of issues of mobility, education, mismatching skills, cultural issues and a lack of interest in the wage economy.⁶

With fewer and fewer people left unemployed, it is not surprising to see that the percentage of residents receiving social assistance has been declining (see Figure 12.II.7.6-1). To further demonstrate the broad-based nature of this change, the figure contains data on income support recipients separated into community groups. It is evident from this chart that the greatest change is coming in the smaller and more isolated communities.

Figure 12.II.7.6-1 Per cent of Population Receiving Income Support, 1999 to 2008



Source: GNWT, Department of Education, Culture and Employment, as presented in NWT Bureau of Statistics *StatsUpdate(2009)*. Note: data for 2007 is not strictly comparable to other years because of changes to the Income Support Program.

⁵ Impact Economics, *NWT Diamonds (2008)*. Report for the NWT Chamber of Mines and Mining Association of Canada. November 2008.

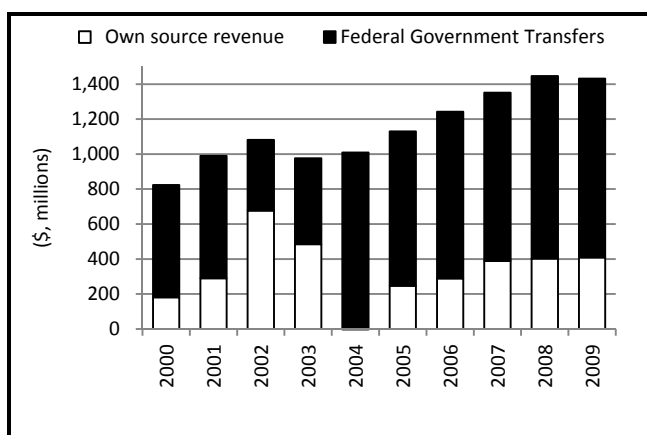
⁶ Ibid.

12.II.7.7 GOVERNMENT REVENUES

The wide spread prosperity in the NWT has had a positive impact on government revenues. The Government of Northwest Territories total revenues have grown 74% from 2000 to 2009 to equal \$1.432 billion, which equals an average annual increase of 6.3%, compounded annually (see Figure 12.II.7.7-1). In relative terms, the greatest source of increase has been the GNWT's own-source revenues, averaging 9.5% growth. Over that same time period, federal government revenues have grown by 54.9%.

When viewed in real per capita terms; that is, when taking into account population growth and rising costs, government revenues have expanded from \$21,007 per person in 2000 to \$28,429 per person in 2009 (see Figure 12.II.7.7-2).⁷ This is equal to a real growth of 35.3% over the nine year period or 3.4% annually.

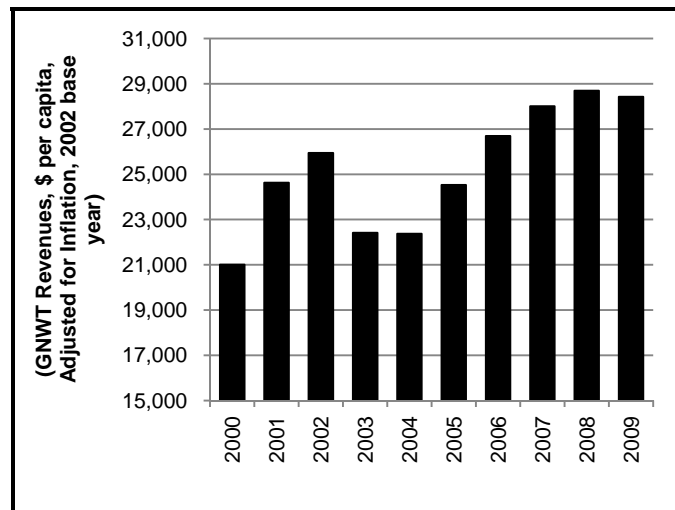
Figure 12.II.7.7-1 GNWT Total Revenues, 1999 to 2008



Source: Statistics Canada, CANSIM Table 385-0002. Note in 2004, GNWT Own-source revenues are recorded as a negative \$3 million due to an adjustment made on corporate income tax.

⁷ The base year for calculations was 2002.

Figure 12.II.7.7-2 Real Revenue per Capita, GNWT, 2000 to 2009



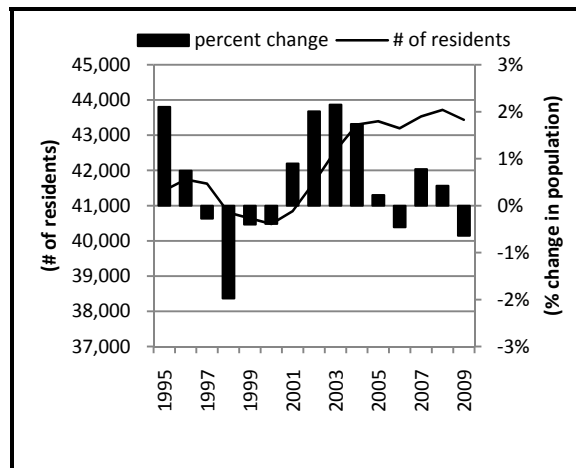
Source: Source: Statistics Canada, CANSIM Table 385-0002. Statistics Canada Demography Division. NWT Bureau of Statistics 2009 Socio-Economic Scan

12.II.7.8 DEMOGRAPHIC CHANGE

The population of the Northwest Territories was estimated at 43,439 for 2009. This is 2,800 more people than was the case in 1999.

Figure 12.II.7.8-1 contains the annual population statistics starting in 1995. One can see that over the past 15 years there have been three distinct periods of demographic change. In the years leading up to 2000, the population was on the decline, bottoming out that year at 40,480. This was followed by a period of growth until 2004 when the population reached 43,301. Since that time, the overall population has changed little.

Figure 12.II.7.8-1 Population Growth, 1995 to 2009

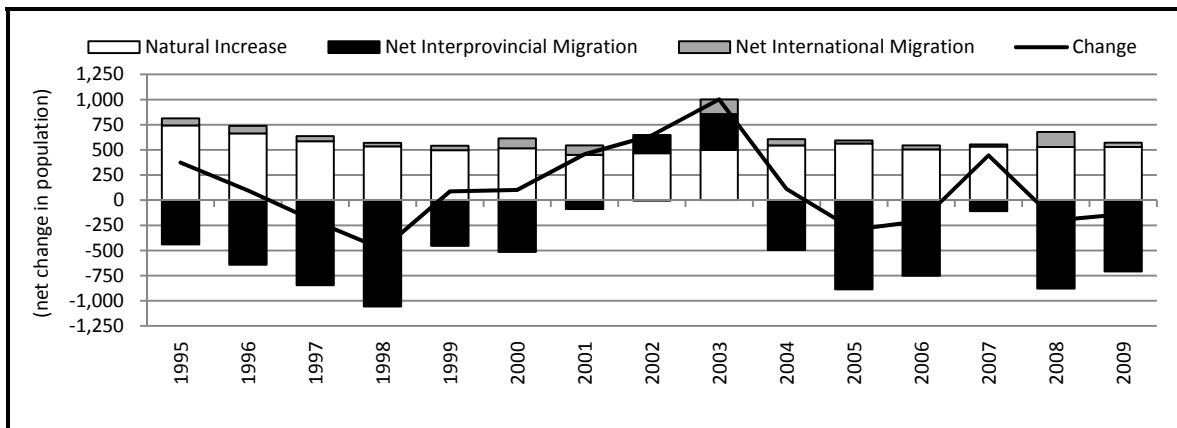


Source: Statistics Canada Demography Division as presented by NWT Bureau of Statistics 2009 Socio-Economic Scan, www.stats.gov.nt.ca

Figure 12.II.7.8-2 contains data for the sources of this changing population. The Territory has a high fertility rate, a large percentage of young people, and few seniors.⁸ This translates into a relatively high rate of natural growth, which is defined as the number of births less the number of deaths. For the last ten years, the natural rate of change has been close to 500 people annually. What is causing the discrepancy in population growth year-over-year has been migration. The NWT consistently exports residents to the rest of the country through interprovincial migration. There has been only two years in the last fifteen in which this was not true. In four of the last five years, more than 500 people have left on net, more than offsetting the natural growth of the population. Countering this consistent outflow, international migration is consistently positive for the NWT. The number of new immigrants to the NWT is relatively small on an annual basis, averaging 68 over the past ten years.

⁸ Statistics Canada Demography Division, CANSIM Table 051-0001, Catalogues 84F0210XWE and 84F0211XWE and 2006 Census.

Figure 12.II.7.8-2 Sources of Demographic Change, 1999 to 2009



Source: Statistics Canada, Demography Division CANSIM Table 051-0001, Catalogues 84F0210XWE and 84F0211XWE.

12.II.7.9 INFLATION

A period of rapid economic expansion can have an influence on inflation. There was an expectation that the demands for labour and capital by the diamond industry would lead to higher costs. This would be particularly difficult for anyone who was not benefiting from the economic growth.

There are several measures of inflation. The most commonly cited is the change in the Consumer Price Index (CPI) which represents the changing prices of a basket of goods and services. In the NWT, CPI is calculated for Yellowknife only. Therefore, price changes that occur elsewhere will not be captured. It is nevertheless a good proxy for consumer price movements throughout the Territory. CPI does omit the prices for government and industry that could follow a different growth path. Depending on what is being analysed, it might be relevant to include these additional, non-consumer price effects.

A second measure of inflation is the Implicit Price Index (IPI) for the Territory's GDP. It is calculated by finding the difference between GDP and real GDP. Unlike the CPI, the GDP's IPI captures price movements of every sector of the economy. This makes it more complete but does introduce price movements of exports which may not have any impact on NWT residents. For example, a substantial rise in the price of diamonds would be captured in this index which would falsely reflect a price impact for the Territory beyond its affect on mining profits and corresponding taxes.

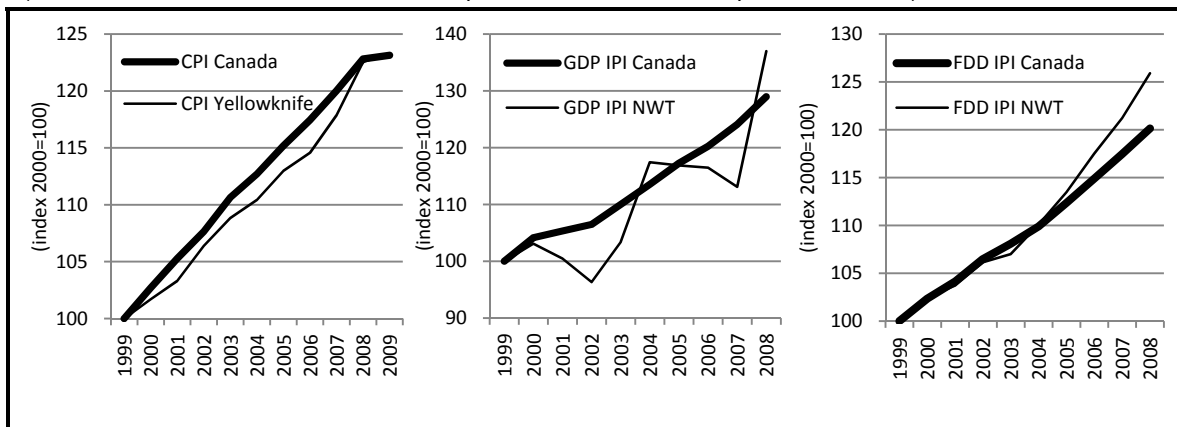
To address this issue, a third method could be used. The IPI for the NWT's final domestic demand is calculated in the same way as that for GDP. Final domestic

demand (FDD) includes the activities of consumers, government and industry and excludes exports. In this way, it is sheltered from price effects on the region's major exports which are currently limited to diamonds, oil and gas.

Figure 12.II.7.9-1 contain data on the three measures of inflation for the NWT and Canada. In the case of CPI, one can observe that for the seven-year period from 1999 to 2006, consumer inflation in the NWT was below that of Canada, but has come back in line with the national average in the past three years. The wide swings shown in the GDP IPI makes it a difficult to interpret. The FDD IPI was running in line with the national average until 2005, after which it has been growing at a slightly higher rate than that for Canada.

Figure 12.II.7.9-1 Measures of Inflation, NWT and Canada, 2000 to 2008

(All-Items Consumer Price Index, GDP Implicit Price Index, FDD Implicit Price Index)



Source: Statistics Canada, Consumer Price Index, Catalogue 62-001-XWE and 62-010-XWE; National Economic Accounts, CANSIM Table 384-0036

12.II.8 ECONOMIC IMPACTS OF THE CONSTRUCTION PHASE

The proposed Project will be constructed over a period of two years. The timeframe being considered would have activities commence in 2013. De Beers Canada Inc. reports that the labour force will equal 490 full-time employees in year one and 600 full-time employees in year two. This suggests that a greater portion of the economic impacts will occur in year two. However, because of the difficulty in separating other construction activities, including the timing of machinery and equipment purchases and the importation of goods and services, the annual impacts reported in this Economic Impact Report are averages over the two-year construction phase.

Although the construction of the project would have significant benefits to the NWT⁹, most of the economic impacts resulting from the construction phase would accrue to the southern provinces. This occurs because the NWT has a very small economy with an underdeveloped industrial base and limited labour force and relies heavily on imports from the southern provinces.

12.II.8.1 DIRECT CAPITAL EXPENDITURES

Table 12.II.8.1-1 presents direct capital expenditures. In total \$535 million (an average of \$267.5 million per year) will be spent on construction and the machinery and equipment required to build and operate the mine. It is estimated that direct imports will amount to \$90 million. These are purchases of mine machinery that are not produced anywhere in Canada. This leaves \$445 million of direct expenditures flowing to Canadian sources.

⁹ Although all of construction services and a significant portion of the machinery & equipment will be “purchased” in the NWT, it does not mean that these goods and services will be “produced” in the NWT. For example, a piece of small machinery may be purchased from an NWT supplier. Although the machinery is sold by a NWT wholesaler, it is not likely that it would be manufactured in the NWT. In all likelihood, because of the NWT small manufacturing base, it would be produced in a southern province. In this case, the only economic activity that would take place in the NWT would be the wholesale mark-up (or margin), and part of the transportation costs, of the machinery. The input-output model, which is used for the economic analysis, has a system of trade flows that permit the tracing of this type of activity. The model will “assign” the value of each type of economic activity to the province or territory where it is produced.

Table 12.II.8.1-1 Capital Expenditures by Source

	Total Expenditures	Annual Average	Per cent of Total
	(\$, millions)		(Per cent)
Total Direct Expenditures	535	267.5	100%
Less Direct Foreign Imports	90	45	20%
Equals Canadian Production	445	222.5	80%

Source: De Beers Canada Incorporated.

This amount can be further disaggregated into expenditures on goods and services, including machinery of which some components are imported, transportation from the source province or territory to the mine site, and labour (see Table 12.II.8.1-2).

Table 12.II.8.1-2 Domestic-Sourced Capital Expenditures by Component

	Total Expenditures	Annual Average	Per cent of Total
	(\$, millions)		(Per cent)
Total Domestic Expenditures	445	222.50	100
Machinery	65	32.5	14.6
Transportation	27	13.5	6.1
Labour (DeBeers and Main Contractor)	96	48	21.6
Other Goods and Services (includes some labour of subcontractors)	257	128.5	57.8

Source: De Beers Canada Incorporated.

12.II.8.2 IMPACT OF THE CONSTRUCTION PHASE ON GROSS PRODUCTION

During the construction phase it is estimated that direct gross production from the Project (also referred to as 'gross output') in the NWT will be \$362.2 million (see Table 12.II.8.2-1). The Project should generate an additional \$71.7 million of business activity in the NWT for a total gross production of \$433.9 million. This represents 55.5% of the total gross production generated by this Project. For Canada as a whole, direct gross production amounts to \$428.2 million which creates another \$353 million in business activity. Total gross production in Canada will rise by \$781.2 million.

Table 12.II.8.2-1 Impact of the Construction Phase on Gross Production

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
Gross Output	362,200	428,213	181,100	214,107
Indirect Gross Output	71,652	352,956	35,826	176,478
Total Gross Output	433,852	781,170	216,926	390,585
Gross Output Multiplier	1.20	1.82		
Percentage occurring in the NWT	56%			

12.II.8.3 IMPACT OF THE CONSTRUCTION PHASE ON GROSS DOMESTIC PRODUCT

The construction phase would lead to a rise in direct GDP in the NWT of \$112.8 million (see Table 12.II.8.3-1). The economic spin-off from this construction activity should provide \$36.6 million of indirect GDP. In total during the construction phase the proposed Project will generate \$149.4 million in GDP in the regional study area. The NWT would receive 46% of the GDP impact created by the construction of the proposed Project.

On an annual basis it is estimated that average annual direct GDP in the study area will rise by \$56.4 million. The economic spin-off from this construction activity should provide another \$18.3 million in indirect GDP annually. In total during the construction phase the proposed Project will lead to an average annual rise in GDP of \$74.7 million in the study area.

Table 12.II.8.3-1 Impact of the Construction Phase on Gross Domestic Product

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
Direct GDP	112,810	152,269	56,405	76,135
Indirect GDP	36,626	170,143	18,313	85,072
Total GDP	149,437	322,412	74,718	161,206
GDP Multiplier	1.32	2.12		
Percentage occurring in the NWT	46%			

In total during the construction phase, it is estimated that direct GDP in Canada will increase by \$152.3 million. The economic spin-off from this construction activity should generate \$170.1 million in indirect GDP. In total during the construction phase the proposed Project will lead to \$322.4 million in GDP in Canada.

12.II.8.4 IMPACT OF THE CONSTRUCTION PHASE ON LABOUR INCOME

It is estimated that during the construction phase direct labour income in the study area will increase by \$71.5 million (see Table 12.II.8.4-1). The economic spin-off from this construction activity should provide \$25.1 million of indirect labour income. In total during the construction phase, the proposed Project will generate \$96.6 million in labour income in the regional study area.

Table 12.II.8.4-1 Impact of the Construction Phase on Labour Income

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
Direct Labour Income	71,487	90,340	35,744	45,170
Indirect Labour Income	25,128	114,084	12,564	57,042
Total Labour Income	96,615	204,424	48,307	102,212
Labour Income Multiplier	1.35	2.26		
Percentage occurring in the NWT	47%			

On an annual basis it is estimated that average annual direct labour income in the NWT will rise by \$35.7 million. The economic spin-off from this construction activity should provide another \$12.6 million in indirect labour income annually. In total during the construction phase the proposed Project will lead to an average annual rise in labour income of \$48.3 million in the regional study area.

In total it is estimated that direct labour income in Canada will increase by \$90.3 million. The economic spin-off from this construction activity should generate \$114.1 million in indirect labour income. In total during the three year construction phase the proposed Project will lead to a rise of \$204.4 million in labour income in Canada.

The labour income that remains in the NWT depends on the extent of local participation during the construction phase. It is assumed that local participation will be equal to 26.5%. This percentage is based on the local participation record from the construction phase of the Snap Lake Diamond Mine and was applied to direct and indirect employment impacts. Therefore, the labour income impact for NWT residents for the construction phase is \$18.9 million (see Table 12.II.8.4-2). The indirect labour income impact for NWT residents is \$6.7 million.

Table 12.II.8.4-2 Impact of the Construction Phase on NWT Resident Labour Income

Construction		
NWT Employment Record for Snap Lake Construction (2005 to 2007)	26.5%	
Direct Labour Income for Construction in the NWT	71,487	
Total Labour Income Created in the NWT	96,615	
	Total	Annual Average
Predicted NWT Labour Income during Construction	(\$,'000s)	
Direct Labour Income from Mine Construction Jobs	18,944	9,472
Total Labour Income from Indirect Business Sector Jobs	6,659	3,329
Total NWT Labour Income	25,603	12,801

12.II.8.5 IMPACT OF THE CONSTRUCTION PHASE ON EMPLOYMENT

It is estimated that direct employment in NWT will increase by 1,008 person-years (full-time equivalent) (see Table 12.II.8.5-1). The economic spin-off from this construction activity should generate 319 indirect jobs. In total the construction phase the proposed Project will lead to 1,327 person-years of employment in the NWT. This model result differs slightly from the job estimate developed by De Beers which equals 1,090 full-time equivalent jobs. These two estimates are within acceptable margins of error based on the planned construction expenditures.

It is estimated that direct employment in Canada will increase by 1,307 person-years. The economic spin-off from this construction activity should generate 1,804 indirect jobs. In total the construction phase will lead to 3,111 person-years of employment in Canada.

Table 12.II.8.5-1 Impact of the Construction Phase on Employment

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(full-time equivalent jobs)			
Exogenous Direct Job Prediction	1,090		545	
Direct Jobs	1,008	1,307	504	654
Indirect Jobs	319	1,804	160	902
Total Jobs	1,327	3,111	664	1,556
Ratio of Total to Direct Jobs	1.32	2.38		
Percentage occurring in the NWT	43%			

Note: the labour requirement prediction by DBCI is greater than that predicted by the model. This difference accounts for the inability of models to adjust for unique construction design. Both are estimates and are based on historical information regarding mine construction in the NWT.

The construction phase would provide an estimated 267 direct jobs for NWT residents (see Table 12.II.8.5-2). The economic spin-off from this construction activity should provide 85 person-years of indirect employment. In total during the construction phase, the proposed Project will provide over 352 person-years of employment for NWT residents.

On an annual basis it is estimated that average annual rise in direct employment will be 134 person-years. The economic spin-off from this construction activity should provide another 42 indirect person-years of employment annually. In total during the construction phase the proposed Project will lead to an average annual rise of 176 person-years of employment in the NWT.

Table 12.II.8.5-2 Impact of the Construction Phase on NWT Resident Employment

Construction		
Employment Record for Snap Lake Construction (2005 to 2007)		26.5%
Construction Employment (# FTE jobs) in the NWT		1,008
Total FTE Jobs Created in the NWT		1,327
	Total	Annual Average
Predicted NWT Employment during Construction		(# FTE Jobs)
Mine Construction Jobs	267	134
Indirect Business Sector Jobs	85	42
Total NWT Employment	352	176

12.II.8.6 IMPACT OF THE CONSTRUCTION PHASE ON GOVERNMENT REVENUES

In addition to the business and household sectors, which will receive expenditure and employment impacts, governments will benefit from the proposed Project through higher revenues. Table 12.II.8.6-1 contains the details related to indirect taxes on products and production for the construction phase of the project. Note that the figures are sorted based on the region in which the taxation occurs. In the NWT, there are federal and territorial taxes. In Canada, there are federal, provincial and territorial taxes.

Taxes on products, on goods and services themselves, include the Goods and Services Tax, provincial sales taxes, federal and provincial taxes on sales volumes of gasoline and other motive fuel taxes, tobacco and alcohol, etc. These taxes only arise as a result of the actual production or sale of goods and services.

Taxes on production include property taxes, taxes on payrolls and capital, and the costs of business licences, permits and fees. These taxes are levied regardless of the current level of production of goods and services.

Construction phase of the proposed Project is expected to result in increased indirect tax revenues on products for the Government of Canada equal to \$2.1 million, \$495,000 of those revenues will be generated in the NWT. Goods and services taxes and gas taxes make up the majority of the federal revenues, equalling \$966,000 and \$957,000 respectively across Canada. In the NWT, the federal government will collect \$76,000 in GST and \$347,000 in gas taxes.

Provincial and territorial governments across Canada will collect \$3.8 million in indirect tax revenues on products during the construction phase. Provincial sales taxes will account for \$1.9 million and gas taxes \$1.5 million. From the

construction activities occurring in the NWT, \$604,000 in regional taxes will be collected, of which \$589,000 will be from gas tax.

Indirect taxes on production less any subsidies paid out will total \$5.6 million in Canada over the two-year construction phase; \$1.2 million of these taxes will be collected from activities occurring in the NWT.

Table 12.II.8.6-1 Impact of the Construction Phase on Indirect Tax Revenues paid in the NWT and Canada

Indirect Taxes: Construction				
	Full Impact		Average Annual Impact	
	NWT ¹	Canada ²	NWT ¹	Canada ²
	(\$,'000s)			
Federal Indirect Tax on Products	495	2,112	247	1,056
Gas Tax	347	957	173	479
Air Tax	69	103	34	51
GST	76	966	38	483
Other	3	87	2	43
Provincial/Territorial Indirect Taxes on Products ³	604	3,762	302	1,881
Gas Tax	589	1,498	294	749
PST	-	1,938		969
Other	15	325	8	163
Indirect Tax on Production less Subsidies	1,184	5,604	592	2,802

Note: (1) taxes assessed based on activities occurring within the NWT; (2) taxes assessed based on activities in all provinces and territories; (3) the figures do not account for claw back associated with Territorial Formula Financing Agreement.

As shown on Table 12.II.8.6-2, it is estimated there would be \$4.4 million in income taxes paid by NWT residents working directly or indirectly with the Gahcho Kué constructions phase. The federal government would receive \$3 million while the territorial government would receive \$1.4 million. Additional revenues will be generated for the federal government's employment insurance program (\$0.5 million), the NWT and Nunavut Workers' Compensation Board (\$0.4 million), and Canada Pension Plan (\$1.2 million).

The businesses involved directly and indirectly with the NWT construction activities associated with the Project earn profits and pay corporate taxes. It was estimated that federal corporate taxes would equal \$7.9 million and territorial corporate taxes would equal \$4.8 million over the two-year construction phase. This does not account for the reduction in transfers (claw-back) through the Territorial Formula Financing Agreement.

Table 12.II.8.6-2 Impact of the Construction Phase on Direct Taxes paid in the NWT

Direct Taxes: Construction		
	Total	Annual Average
	(\$, '000s)	

Income Taxes	4,425	2,212
Federal Personal Income Tax	3,020	1,510
Territorial Personal Income Tax	1,404	702
Contribution to Social Insurance Plans	2,166	1,083
Employment Insurance	504	252
Workers' Compensation	445	222
Canada Pension Plan	1,217	609
Corporate Tax	12,755	6,378
Federal Corporate Tax	7,939	3,970
Provincial/Territorial Corporate Tax	4,816	2,408
Total	19,346	9,673

12.II.8.7 TERRITORIAL FORMULA FINANCING DURING CONSTRUCTION PHASE

At the territorial level, the increased tax base will result in a claw-back of transfers according the Territorial Formula Financing Agreement. The formula determines the annual transfer by subtracting eligible revenues from a general expenditure base. The eligible revenues are determined from the revenue potential that exists within a standardised tax base applied to the Territory and from an additional revenue block formulated to approximate the GNWT's ability to raise funds by additional tax means. Within the standardised tax base, there are seven tracked revenues:

- Personal income tax
- Corporate income tax
- Gasoline tax
- Diesel tax
- Tobacco tax
- Liquor tax
- Payroll tax

All eligible revenues are applied to the formula as a three-year moving average with a two-year lag. Furthermore, an economic development incentive (EDI) of 30% is applied to the eligible revenues.

Calculating the precise amount of claw-back is difficult because the eligible revenues are determined using the Territory's revenue capacity, not its actual revenues. Assuming these two revenue streams were equal, the total revenue

implication for the Government of the Northwest Territories would be \$2.1 million with the two-year lag applied. This total comes from the 30% EDI applied to the change in tracked revenues of \$6.8 million, which includes corporate and personal income tax and indirect taxes (again, assuming actual revenues and revenue capacity are identical).

12.II.8.8 SUMMARY OF IMPACT ASSESSMENT FOR CONSTRUCTION PHASE

Table 12.II.8.8-1 summarises the impacts according to the impact assessment criteria outlined in Section 1.2. The range of analysis is restricted to the NWT.¹⁰ The geographic range for the construction phase is the regional study area. The majority of impacts will occur in the local study area however GDP is not calculated at this level. The magnitude of impact on government revenues is moderate. This assessment is affected by the claw-back within the Territorial Formula Financing Agreement that lowers the magnitude of impact. The construction phase will be two years and therefore its impacts will be short term.

Table 12.II.8.8-1 Summary of Impact Assessment for Construction Phase on the Regional Study Area

	Range	Direction	Magnitude	Duration
Business Demand	Territory	Positive	High	Short Term
GDP	Territory	Positive	Moderate	Short Term
Employment	Territory	Positive	Moderate	Short Term
Labour Income	Territory	Positive	Moderate	Short Term
Taxes	Territory	Positive	Moderate to Low	Short Term

12.II.8.9 INDUCED IMPACTS FROM THE CONSTRUCTION PHASE

Induced Impacts in the NWT from Local Participation

Several assumptions are necessary to determine the induced impacts from the Project. An estimate of local participation is necessary to determine the labour income that will remain in the Territory. An estimate of consumer's propensity to import is required. Income taxes and personal savings must also be considered. Components of the NWTEIM are used that incorporate historical information on these variables in determining an estimate. But because the assumptions impart a measurable bias on the results, one should regard these calculations as

¹⁰ The magnitude of impacts at the National level for all of the variables considered, including GDP, employment, labour income and taxes, would be considered low to negligible.

approximations, and be cautious if including them in the overall expectations flowing from the project.

Total personal income has been estimated at \$25.6 million; with \$5.2 million of that being paid in direct tax including contributions to CPP and EI (see Table 12.II.8.9-1). This leaves \$20.4 million in disposable income. Estimations of savings and imports total \$6.9 million, suggesting consumers will spend \$13.4 million on goods and services in the NWT as a result of the income earned directly or indirectly from the activities associated with the proposed Project.

Applying this consumer activity to the NWT economy creates induced impacts which include a \$4.2 million boost to GDP, 35 new jobs and \$1.5 million in labour income. These impacts can be added to the total direct and indirect impacts reported earlier to get a complete sense of the overall economic impact of the proposed Project.

Table 12.II.8.9-1 Induced Impacts in the NWT from Local Participation in the Construction Phase

	Total	Annual Average
	(\$, '000s)	
Personal Income	25,603	
Deduct: Direct Taxes	5,243	
Personal Disposable Income	20,360	
Consumer Expenditures	13,441	6,721
Induced GDP	4,208	2,104
Induced Employment	35	18
Induced Labour Income	1,547	774

Relative to the current GDP, employment and gross production, the induced impacts are positive with a low degree of magnitude and will persist throughout the life of the Project (see Table 12.II.8.9-2). These impacts will be felt wherever the income is spent, with the majority of that occurring in the Local Study Area communities.

Table 12.II.8.9-2 Induced Impacts in the NWT from Local Participation in the Construction Phase

	Direction	Range	Magnitude	Duration
Induced GDP	Positive	Territorial	Low	Long Term
Induced Employment	Positive	Territorial	Low	Long Term
Induced Labour Income	Positive	Territorial	Low	Long Term

Induced Impacts for the Canadian Economy

Measuring the induced impacts for the Canadian economy as a whole required a simulation of the National Input-Output Model. As with the calculations for the NWT, this estimation required estimates of personal taxes, savings and consumers' propensity to import. Combined, these three variables reduce the labour income available to consumers for consumption in Canada by 45%. The effects of these expenditures are shown in Table 12.II.8.9-3. It is estimated that GDP will increase by \$72.9 million, employment will grow by 826 jobs, and labour income will increase by \$45.4 million.

Table 12.II.8.9-3 Induced Impacts in Canada from the Construction Phase

	Total	Annual Average
	(\$, '000s)	
Consumer Expenditures on Goods and Services (subtracting imports)	118,269	59,135
Induced GDP	72,905	36,452
Induced Employment	826	413
Induced Labour Income	45,385	22,693

12.II.9 ECONOMIC IMPACT OF THE OPERATIONS PHASE

It is expected that the proposed Project will be in operation for 11 years. Based on the current schedule, that would mean production would start in 2015 and end in 2025. Although the operation of the project would have significant benefits to the NWT, a portion of the economic impacts resulting from the operations phase would accrue to the southern provinces. This occurs because the NWT has a very small economy with an underdeveloped industrial base and limited labour force and relies heavily on imports from the southern provinces.

12.II.9.1 DIRECT OPERATING EXPENDITURES

Table 12.II.9.1-1 presents total and average operating expenditures. In total \$438.9 million (\$39.9 million per year) will be spent on labour income and another \$910.9 billion (\$82.8 million per year) will be spent on other goods and services required to operate the mine. In total \$1.3 billion (\$122.7 million per year) will be spent.

Table 12.II.9.1-1 Operating Expenditures

	Total Expenditures	Annual Average Expenditures	
	(\$, '000s)		(per cent)
Direct Labour Income	438,875	39,898	33%
Other Direct Operations and Maintenance Costs	910,854	82,805	67%
Total Direct Operating Expenditures	1,349,729	122,703	100%
Less Imports	-195,440	-17,767	14%
Equals Direct Expenditures in Canada	1,154,289	104,935	86%

While all labour will be sourced in Canada other direct expenditures will be subject to foreign imports of \$195.4 million (\$17.8 million per year). This will reduce other direct expenditures that will take place in Canada to \$1.2 billion or \$104.9 million per year.

12.II.9.2 IMPACT OF THE OPERATIONS PHASE ON BUSINESS DEMAND

During the operation phase, \$910.9 million will be spent on goods and services necessary to operate the mine and all its facilities. This figure does not include the direct outlay for labour but does include imports. It is from this business

demand, which is the total goods and services purchased to operate the mine, that indirect impacts are generated.¹¹

NWT-based businesses will capture \$300.6 million of this initial business demand, which will generate \$77.1 million in indirect activities throughout the Territory over the life of the mine's operating phase (see Table 12.II.9.2-1). This implies a gross output multiplier of 1.26. The total gross output from the business demand will equal \$377.7 million. This also implies that 36% of the total business demand created by the operations of the Project will occur in the NWT.

For Canada, it will see initial business demand rise by \$620.2 million, which will create a further \$419.4 million in indirect business activities. This implies a gross output multiplier of 1.68 for Canada. In total, the gross output from the Project's operating expenditures (excluding labour) will equal approximately \$1 billion.

A minimal amount of time will be required to bring the Project up to full capacity in its first year of operations. However, an even distribution has been assumed when calculating the annual impacts. The average annual gross expenditure on goods and services will be \$82.8 million. This will increase business activities in the NWT by \$27.3 million and across all of Canada by \$56.4 million annually. The indirect effects of this increased production will be \$7 million annually in the NWT and \$38.1 million annually for all of Canada.

Table 12.II.9.2-1 Impact of the Gross Expenditures on Business Demand, 2015-2025

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
Gross expenditures on Goods and Services	910,854		82,805	
Gross Output from Initial Business Demand	300,608	620,235	27,328	56,385
Indirect Gross Output from Business Demand	77,068	419,420	7,006	38,129
Total Gross Output from Business Demand	377,676	1,039,655	34,334	94,514
Gross Output Multiplier	1.26	1.68		
Percentage of Total Business Activity occurring in the NWT	36%			

¹¹ The mine's direct contribution to GDP is its value-added, which equals the sum of labour income paid to employees and its 'other operating surplus'. There are no 'indirect' impacts related to labour income or other operating surplus. Other operating surplus is the mine's return on capital. It is used to repay the capital invested in the project, pay all taxes and royalties with the remainder being profits to the owner which is the company's shareholders. Other operating surplus is therefore the sum of indirect taxes paid less subsidies received, the cost of capital depreciation and profits. Direct corporate taxes are not a part of these calculations.

12.II.9.3 IMPACT OF THE OPERATIONS PHASE ON GROSS DOMESTIC PRODUCT

Table 12.II.9.3-1 presents the impact of the operating phase on GDP on the NWT and in Canada.

It is estimated that there will be a rise in annual direct GDP in the NWT of \$285.1 million. The economic spin-off from operation expenditures should increase GDP by a further \$13.4 million, with the additional indirect activities contributing an additional \$3.5 million annually. This implies a ratio of total-to-direct GDP from the initial business demand of 1.26. In total during the operations phase, the proposed Project will generate an average annual \$302 million in GDP in the NWT.

In Canada is estimated that on average \$285.1 million in direct GDP will be generated annually. The economic spin-off from the operations expenditures should generate \$21.6 of GDP from the business activity which has additional indirect impacts which raise GDP a further \$20.1 million on an annual basis. In total during the operations phase, the proposed Project will lead to an annual average of \$326.7 million in GDP in Canada.

The NWT is expected to capture 92% of the GDP impacts generated by the operation phase of the Project.

Table 12.II.9.3-1 Impact of the Operations Phase on GDP, 2015-2025

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
GDP--Mining	3,135,946	3,135,946	285,086	285,086
GDP—Initial Business Demand	147,566	237,238	13,415	21,567
Indirect GDP--Business Demand	38,101	220,734	3,464	20,067
Total GDP--Business Demand	185,667	457,972	16,879	41,634
Ratio of Total to Direct GDP--Business Demand	1.26	1.93		
Total GDP	3,321,613	3,593,918	301,965	326,720
Percentage occurring in the NWT	92%			

12.II.9.4 IMPACT OF THE OPERATION PHASE ON LABOUR INCOME

It is estimated that during the operation phase annual direct labour income in the regional study area will rise by \$39.9 million, on average (see Table 12.II.9.4-1).

The labour income from the initial business demand will equal \$9.5 million, while the spin-off activities from this business will generate a further \$2 million in labour income on an annual basis. In total during the operation phase, the proposed Project will generate an average of \$51.5 million in labour income in the regional study area each year.

Table 12.II.9.4-1 Impact of the Operation Phase on Labour Income

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(\$, '000s)			
Labour Income--Mine Production	438,875	438,875	39,898	39,898
Labour Income--Initial Business Demand	104,928	166,646	9,539	15,150
Indirect Labour Income--Business Demand	22,480	116,351	2,044	10,577
Total Labour Income--Business Demand	127,408	282,997	11,583	25,727
Ratio of Total to Direct Labour Income--Business Demand	1.21	1.70		
Total Labour Income	566,283	721,872	51,480	65,625
Percentage Labour Income occurring in the NWT	78%			

The business sector throughout Canada will raise labour income by a total of \$65.6 million on average each year. This includes \$15.2 million from the initial demand for goods and services by the operating mine and an additional \$10.6 million in labour income from additional indirect business activities.

The labour income that remains in the NWT depends on the extent of local participation during the construction phase. It is assumed that local participation will be equal to 37.6% (see Table 12.II.9.4-2). This percentage is based on the local participation record from the operation phase of the Snap Lake Diamond Mine and was applied to direct and indirect employment impacts. This is a cautious assumption which results in equally cautious results. The labour income impact for NWT residents for the operation phase is \$15 million on average each year. The labour income impact for NWT residents from the affected business sector will equal a little less than \$4.4 million on average each year.

Table 12.II.9.4-2 Impact of the Operation Phase on NWT Resident Labour Income

Operations		
Employment Record for Snap Lake Operations (2008 to 2009)	37.6%	
Labour Income for Operations in the NWT	438,875	
Total Labour Income Created in the NWT	566,283	
	Total	Annual Average
Predicted NWT Labour Income during Operations	(\$, '000s)	
Labour Income from Mine Operation Jobs	165,017	15,002
Labour Income from Business Sector Jobs	47,905	4,355
Total NWT Labour Income	212,922	19,357

12.II.9.5 IMPACT OF THE OPERATIONS PHASE ON EMPLOYMENT

Table 12.II.9.5-1 presents mine employment impacts. In Canada it is estimated that on average, 365 person-years of direct employment will be generated annually. The economic spin-off from the operations expenditures should generate an initial 259 person-years of employment, with additional indirect employment adding another 180 person-years of employment. In total during the operations phase, the proposed Project will lead to an annual average of 804 person-years of employment in Canada.

On average in the NWT during the operations phase the Project will employ the full-time equivalent of 365 people annually. The NWT business community will employ 159 people on a FTE basis, while the additional indirect business activity will create another 29 FTE positions. In total, the proposed Project would provide an average of 554 person-years of employment annually in the NWT.

The NWT would receive 69% of the employment impacts created by the operation phase of the Project.

Table 12.II.9.5-1 Impact of the Operation Phase on Employment

	Full Impact		Average Annual Impact	
	NWT	Canada	NWT	Canada
	(number of full-time equivalent jobs)			
Employment--Mine Production	4,016	4,016	365	365
FTE Jobs--Initial Business Demand	1,754	2,847	159	259
Indirect FTE Jobs--Business Demand	318	1,978	29	180
Total FTE Jobs--Business Demand	2,073	4,825	188	439
Ratio of Total to Direct FTE Jobs--Business Demand	1.18	1.69		
Total Employment	6,089	8,841	554	804
Percentage Employment occurring in the NWT	69%			

The operation phase would provide an estimated 137 direct jobs for NWT residents on an annual basis for the duration of the eleven-year operation phase. The NWT business sector involvement will provide 71 full-time equivalent jobs annually throughout the operation phase (see Table 12.II.9.5-2). In total during the operation phase, the proposed Project will provide 208 person-years of employment for NWT residents each year on average.

Table 12.II.9.5-2 Impact of the Operation Phase on NWT Resident Employment

Operations		
Employment Record for Snap Lake Operations (2008 to 2009)	37.6%	
Operations Employment (# FTE jobs)	4,016	
Total FTE Jobs Created in the NWT	6,089	
	Total	Annual Average
Predicted NWT Employment during Operations	(# FTE Jobs)	
Mine Operations Jobs	1,510	137
Business Sector Jobs	779	71
Total NWT Employment	2,289	208

12.II.9.6 IMPACT OF THE OPERATIONS PHASE ON GOVERNMENT REVENUES

In addition to the business and household sectors, which will receive expenditure and employment impacts, governments will benefit from the proposed Project through higher revenues. Table 12.II.9.6-1 contains the details related to indirect taxes on products and production for the operation phase of the project (see Section 1.8.6 for an explanation of these two indirect taxes). Note that the figures are sorted based on the region in which the taxation occurs. In the NWT, there are federal and territorial taxes. In Canada, there are federal, provincial and territorial taxes.

The revenue impact on the GNWT is complicated by the fact that the GNWT's annual federal grant entitlement is impacted by incremental revenues. When the GNWT experiences an increase in revenues it can have the impact of reducing the amount the GNWT receives from the federal government through the Formula Financing Grant (FFG).

The federal government, through provision of the FFG, provides to the GNWT a level of revenue that acts as a "floor" which is intended to enable the territorial government to provide a basic basket of goods to NWT residents that meets the minimum standard of government services that has been established for all Canadians. The FFG is intended to provide the difference between what the GNWT should be able to raise through its own tax structure¹² and the level of expenditure required to provide the required basket of services. The effects of this financing agreement are reported separately to distinguish its impact more clearly.

¹² The Formula Financing Grant has a number of provisions that can limit its growth regardless of the level of actual GNWT expenditures. The formula is structured on the basis that the GNWT will meet a certain level of "tax effort" – an average set for all provinces and territories. If the tax effort is less than this average, which has been the case in the NWT, the territory is "penalized" or has revenues "clawed back".

Operation phase of the proposed Project is expected to result in increased indirect tax revenues on products for the Government of Canada equal to \$51 million, the majority of those revenues, \$49.7 million, will be generated in the NWT. Goods and services taxes and gas taxes make most of the federal indirect revenues, equalling \$32.7 million and \$17.6 million respectively across Canada over the 11-year operation phase.

Provincial and territorial governments across Canada will collect \$40.4 million in indirect tax revenues on products during the operation phase. Provincial sales taxes will account for \$1.2 million of those revenues collected by the provinces. Most of the indirect taxes will be applied in the NWT and therefore go to the GNWT (before claw-back). The gas tax is by far the largest component of this tax collection, equalling \$36.8 million during the operation phase.

Indirect taxes on production less any subsidies paid out will total \$12.7 million in Canada over the 11-year operation phase, with \$4.8 million of these taxes collected from activities within the NWT.

Table 12.II.9.6-1 Impact of the Operations Phase on Indirect Tax Revenues paid in the NWT and Canada, 2015-2025

	Full Impact		Average Annual Impact	
	(\$, '000s)			
	NWT ¹	Canada ²	NWT ¹	Canada ²
Federal Indirect Tax on Products	49,693	50,996	4,518	4,636
Gas Tax	16,744	17,556	1,522	1,596
Air Tax	392	442	36	40
GST	32,332	32,715	2,939	2,974
Other	225	283	20	26
Provincial/Territorial Indirect Taxes on Products ³	37,848	40,358	3,441	3,669
Gas Tax	36,790	37,938	3,345	3,449
PST	0	1,162	0	106
Other	1,059	2,421	96	220
Indirect Tax on Production less Subsidies	4,774	12,751	434	1,159

Note: (1) taxes assessed based on activities occurring within the NWT; (2) taxes assessed based on activities in all provinces and territories; (3) the figures do not account for claw back associated with Territorial Formula Financing Agreement.

As shown on Table 12.II.9.6-2, it is estimated there would be \$36.8 million in income taxes paid by NWT residents working directly or indirectly with the Project's operations phase. The federal government would receive \$25.1 million while the territorial government would receive \$11.7 million. Additional revenues will be generated for the federal government's employment insurance program (\$3.7 million), the NWT and Nunavut Workers' Compensation Board (\$4 million), and Canada Pension Plan (\$8.9 million).

The direct federal corporate taxes associated with the Project will equal \$310.3 million over the life of the operation phase. Note that while an annual average is given, corporate taxes are applied to profits after capital costs are fully accounted, therefore, the income stream from corporate taxes will not be even across the 11 years of operations. Territorial corporate tax collections from the mine operations will equal \$187.8 million. Mining taxes, which are the royalties paid on the resources extracted, will equal \$240.5 million. The reported territorial revenues do not account for claw-back through the Territorial Formula Financing Agreement.

Table 12.II.9.6-2 Impact of the Operation Phase on Direct Taxes paid in the NWT

Direct Taxes: Operations		
	Total	Annual Average
	(\$, '000s)	
Income Taxes	36,796	3,345
Federal Personal Income Tax	25,116	2,283
Territorial Personal Income Tax	11,680	1,062
Contribution to Social Insurance Plans	16,558	1,505
Employment Insurance	3,694	336
Workers' Compensation	3,951	359
Canada Pension Plan	8,913	810
Corporate Tax	738,637	67,149
Federal Corporate Tax	310,310	28,210
Territorial Corporate Tax	187,819	17,074
Mining Tax	240,508	21,864
Total	791,991	71,999

12.II.9.7 TERRITORIAL FORMULA FINANCING DURING OPERATION PHASE

At the territorial level, the increased tax base will result in a claw-back of transfers according the Territorial Formula Financing Agreement. The formula determines the annual transfer by subtracting eligible revenues from a general expenditure base. The eligible revenues are determined from the revenue potential that exists within a standardised tax base applied to the Territory and from an additional revenue block formulated to approximate the GNWT's ability to raise funds by additional tax means.

All eligible revenues are applied to the formula as a three-year moving average with a two-year lag. Furthermore, an economic development incentive (EDI) of 30% is applied to the eligible revenues.

Calculating the precise amount of claw-back is difficult because the eligible revenues are determined using the Territory's revenue capacity, not its actual revenues. Assuming these two revenue streams were equal, the total revenue implication for the Government of the Northwest Territories would be \$73.5 million with the two-year lag applied. This total comes from the 30% EDI applied to the change in tracked revenues of \$244.2 million, which includes corporate and personal income tax and indirect taxes (again, assuming actual revenues and revenue capacity are identical).

Under the current financial arrangements, the GNWT does not receive any portion of the mining tax, which equals an estimate \$240 million for the Project. However, should there be a devolution agreement signed between the NWT and the federal government, these tax revenues would flow to the GNWT. Because resource royalties are not included in the current funding formula, it is not known if and how much of this revenue would be subject to a claw-back.

As will be described in Chapter 1.11, the proposed Project will have a small but measureable impact on the NWT population. Population size is an important variable in the TFF. For the 2010-11 fiscal-year, the GNWT is scheduled to receive \$920 million through Territorial Formula Financing, or approximately \$21,000 per person using the population as of July 2010.¹³ Growth in population, however small, would affect the size of transfer.

12.II.9.8 SUMMARY OF IMPACT ASSESSMENT FOR OPERATION PHASE

Table 12.II.9.8-1 summarises the impacts according to the impact assessment criteria outlined in Section 1.2. The range of analysis is restricted to the NWT, though there is a National level impact for all the variables considered, including business demand, GDP, labour income, employment and taxes.

The geographic range for the operations phase is considered the NWT. The majority of impacts will occur in the local study area, but it is more practical to discuss the economic variables in terms of the impact on the NWT. The magnitude of impact on government revenues is moderate. The effect on the GNWT's revenues is limited because it does not receive the resource royalties and a portion of its new tax earnings from this project are subtracted from the transfers it receives from the federal government. The operation phase will be 11 years and therefore its impacts are considered long term.

¹³ Department of Finance Canada *Federal Support to Provinces and Territories* (<http://www.fin.gc.ca/fedprov/mtp-eng.asp>), and NWT Bureau of Statistics *Population Estimate* (<http://www.stats.gov.nt.ca/population/population-estimates/index.otp>).

Table 12.II.9.8-1 Summary of Impact Assessment for Operation Phase on the SA

	Range	Direction	Magnitude	Duration
Business Demand	Territory	Positive	High	Long Term
GDP	Territory	Positive	High	Long Term
Employment	Territory	Positive	Moderate	Long Term
Labour Income	Territory	Positive	Moderate	Long Term
Taxes	Territory	Positive	Moderate	Long Term

12.II.9.9 INDUCED IMPACTS FROM THE OPERATION PHASE

Induced Impacts in the NWT from Local Participation

Several assumptions are necessary to determine the induced impacts from the Project. An estimate of local participation is necessary to determine the labour income that will remain in the Territory. An estimate of consumer's propensity to import is required. Income taxes and personal savings must also be factored in. Components of the NWTEIM are used that incorporate historical information on these variables in determining an estimate. But because the assumptions impart a measurable bias on the results, one should regard these calculations as approximations, and be cautious if including them in the overall expectations flowing from the project.

Total personal income has been estimated at \$212.9 million, with \$42.8 million of that being paid in direct tax including contributions to CPP and EI (see Table 12.II.9.9-1). This leaves \$170.1 million in disposable income. Estimations of savings and imports total \$57.8 million, suggesting consumers will spend \$112.3 million on goods and services in the NWT as a result of the income earned directly or indirectly from the activities associated with the proposed Project.

Table 12.II.9.9-1 Induced Impacts in the NWT from Local Participation in the Operation Phase

Induced Impacts: Operations		
	Total	Annual Average
	(\$, '000s)	
Personal Income	212,922	
Deduct: Direct Taxes	42,792	
Personal Disposable Income	170,130	
Total Consumer Expenditures	112,320	10,211
Induced GDP	35,159	3,196
Induced Employment	289	26
Induced Labour Income	12,929	1,175

Applying this consumer activity to the NWT economy creates induced impacts which include a \$35.2 million boost to GDP, 289 new jobs and \$12.9 million in labour income. These impacts can be added to the total direct and indirect impacts reported earlier to get a complete sense of the overall economic impact of the proposed Project.

Relative to the current GDP, employment and gross production, the induced impacts are positive with a low degree of magnitude and will persist throughout the life of the Project (see Table 12.II.9.9-2). These impacts will be felt wherever the income is spent, therefore the range is considered the entire Territory though the majority of impacts will occur in the Local Study Area communities.

Table 12.II.9.9-2 Induced Impacts in the NWT from Local Participation in the Operation Phase

	Direction	Range	Magnitude	Duration
Induced GDP	Positive	Territorial	Low	Long Term
Induced Employment	Positive	Territorial	Low	Long Term
Induced Labour Income	Positive	Territorial	Low	Long Term

Induced Impacts for the Canadian Economy

Measuring the induced impacts for the Canadian economy as a whole required a simulation of the National Input-Output Model. As with the calculations for the NWT, this estimation required estimates of personal taxes, savings and consumers' propensity to import. It was assumed that the average direct tax rate across all direct and indirect jobs across the country equalled 20%. Savings were assumed to equal 5%. The direct and intermediate imports were determined from the consumer demand vector embedded in the National Input-Output model. The result is the labour income entering into the Canadian economy through consumer activity would be approximately 55% of the overall labour income generated from the operation phase of the proposed Project. The effects of these expenditures are shown in Table 12.II.9.9-3. On an annual basis, it is estimated that GDP will increase by \$23.4 million, employment will grow by 265 jobs, and labour income will increase by \$14.6 million.

Table 12.II.9.9-3 Induced Impacts in Canada from the Operation Phase

	Total	Annual Average
	(\$, '000s)	
Consumer Expenditures on Goods and Services (subtracting imports)	417,638	37,967
Induced GDP	257,455	23,404
Induced Employment	2,916	265
Induced Labour Income	160,267	14,570

12.II.10 ECONOMIC IMPACTS OF THE CLOSURE PHASE

The operation phase of the proposed Project will end in 2025, assuming a start date of 2013. De Beers plans to perform reclamation work throughout the project's operation phase so that the most of the closure work needed beyond 2025 will be lake refilling and water monitoring activities.

Over the life of the operating mine, \$17.5 million will be spent on labour and capital in conducting this reclamation work. These expenditures are included in the operation phase estimates. In 2025, reclamation efforts will increase at the same time as operations are winding down. This means that the labour drawdown on the operations side will be offset in part by an increase in staffing for the closure activities.

By the start of 2026, the majority of closure activities such as demolition work will have been completed. From 2026 to 2034, De Beers will spend \$7.5 million as a part of its closure phase. The total expenditure includes the cost of opening the winter road in 2026 in order to bring in enough fuel for the entire phase and back haul the last of the on-site materials.

It is assumed that the camp will be open for approximately 16 weeks each year for the eight-year lake refilling and water monitoring activities. The camp will be dismantled in 2034. Staffing will likely consist of 9 people who will combine for approximately 68 weeks of work. The breakdown of this staff requirement is as follows:

- 2 people full-time for 16 weeks
- 2 people full-time for 12 weeks
- 2 people full-time for 2 weeks
- 2 people full-time for 4 weeks
- 1 person (time allocation to be determined)
- Some work might become part-time at some point. The manager's position would not be full time for the whole year.

Wages for this staff will equal \$188,000 annually. It is expected that this labour requirement will be filled by NWT residents. The winter road construction and transportation needs will most likely be filled by NWT-based businesses. The fuel and most goods needed during the closure phase will be imported from southern Canada.

The total expenditures on labour and capital are too small to conduct a useful modelling exercise to determine indirect and induced effects. It can be assumed that the additional business demand and the induced consumer activities will be filled through changes in productivity and not through additional job creation. The effects from the \$7.5 million expenditure on GDP when spread over the nine-year closure phase will be less than 0.01% of the economy.

12.II.11 IMPACTS ON DEMOGRAPHICS AND LABOUR FORCE

To determine the real effect the proposed Project will have on the demographic profile and labour force in the regional study area, the baseline conditions must first be determined. For demographics, this means projecting forward the growth of population and any significant changes that might occur in the NWT economy that would provoke a change in demographics or the labour force. On the latter point, there are three scenarios. The first is a projection of current conditions. Of significance here are the closure dates of the three existing diamond mines. The second is the impact of the Project compared to the current conditions. The third is a projection of future projects, which is a part of the cumulative impacts assessment. From the demographic projections and anticipated changes, the size and state of the labour force can be estimated.

12.II.11.1 PROJECTION FOR NWT POPULATION (BASELINE)

To determine the baseline population of the entire study period which extends to 2030, the NWT Demographic Model is used, which is a satellite model to the NWT Economic Impact Model (NWTEIM) developed by Impact Economics. This baseline assumes no changes in the operations of existing major projects; that is, it assumes a status quo exists within the economy. The purpose of this initial scenario is to establish a starting point for the natural rate of growth and migration. Fertility rates are drawn down only slightly over the 20 year period beginning in 2010. Mortality rates are not altered. The migration assumption is for a modest net out-migration in the range of 250 to 350 people annually. In this scenario, the NWT population will rise to a peak of 45,336 around the year 2025 (see Table 12.II.11.1-1).

Table 12.II.11.1-1 Baseline Population Projection, 2000 to 2030

Year	Population
2000	40,480
2005	43,399
2010	43,759
2015	44,592
2020	45,148
2025	45,336
2030	45,152

Note: Data from 2000 to 2010 are historical.

Data source: NWT Bureau of Statistics, Impact Economics

12.II.11.2 PROJECTION FOR NWT POPULATION AND LABOUR FORCE (CURRENT CONDITIONS)

In the second scenario, any changes in the current major economic projects are allowed to influence the population and labour force of the NWT. This provides a more realistic picture of the baseline demography. Again, no other major projects are introduced and the underlying economy moves forward at a pace that matches the existing economic state. This scenario also assumes there is no influence from economic developments in Nunavut. The Nunavut variable could help preserve some workers' residency in the NWT in the later years of the forecast period.

The major projects modelled include Ekati, Diavik and Snap Lake Diamond Mines. The mine life assumptions for these projects are as follows:

- Ekati Diamond Mine: 2021
- Diavik Diamond Mine: 2022
- Snap Lake Diamond Mine: 2026

In all three cases, it is assumed that there will be some drawdown of operations in the years leading up to the final production date. This will result in a similar drawdown of employment requirements.

In this scenario the NWT population peaks around 2020 just prior to the closures of Ekati and Diavik diamond mines (see Table 12.II.11.2-1). The closure of those mines effect population growth through a rising out migration. Meanwhile, for those remaining in the NWT, many become unemployed (see the Table 12.II.11.2-2). Beyond 2025, the decommissioning of the Snap Lake Diamond Mine results in further out migration. In the final few years of the forecast period with no other projects present in the region, out migration continues as the unemployment rate rises beyond a threshold which was determined to be 12.5% for these simulations; that is, between 4% to 5% above the national average. This threshold is included because it is assumed that at some point, the deterioration of the economy would spark out migration from people not directly or indirectly employed in the mining industry. The model also contains a low unemployment threshold set at 6.5% (this is 1% to 2% below the national average) whereby a low rate would trigger an increase in-migration from other Canadians who see the NWT as a location with excess labour demand.

Table 12.II.11.2-1 Current Population Projection, 2000 to 2030

Year	Population	Population 15 years of age and older
2000	40,480	29,575
2005	43,399	33,041
2010	43,759	34,228
2015	44,568	34,652
2020	44,907	34,980
2025	44,676	35,178
2030	42,984	34,443

Note: Data from 2000 to 2010 are historical.

Data source: NWT Bureau of Statistics, Territorial Single Years of Age by Gender, Impact Economics

Table 12.II.11.2-2 contains the projections for labour force, employment and unemployment rates under this 'current' scenario. Again, major changes in economic activity are restricted to that of the existing mining projects.

Labour force projections assume a relatively constant participation rate, growing from its current level around 75% up to 77%. This is within the upper range seen over the past decade. Labour force will continue to grow until 2025. Peak employment occurs around 2020. Lay-offs in the diamond industry beginning around 2015 that will continue through until closure will result in a slow increase in the unemployment rate over the next twenty years. Once the unemployment rate exceeds the assumed threshold of 12.5% starting in 2027, an additional round of out migration will begin. This lowers the size of the labour force and keeps the overall unemployment rate in check.

Table 12.II.11.2-2 Current Labour Force Projection, 2000 to 2030

	Labour Force	Employment	Unemployment Rate
2000			
2005	23,895	22,700	5.0%
2010	22,878	21,200	7.3%
2015	24,178	22,042	8.8%
2020	24,587	22,161	9.9%
2025	24,901	22,007	11.6%
2030	24,497	21,180	13.5%

Note: Data from 2005 is historical.

Data source: NWT Bureau of Statistics, Statistics Canada *Labour Force Survey*, Impact Economics

12.II.11.3 PROJECTION FOR NWT POPULATION AND LABOUR FORCE (PROJECT)

In the third scenario, the impacts of the proposed Project are introduced to the current scenario; all other things are kept the same. The employment impact of this project offsets the expected job losses at Ekati and Diavik, especially in the

latter years of the current decade. In this scenario, population in 2020 equals 45,060 and 44,941 in 2025 (see Table 12.II.11.3-1). These levels are 153 and 265 higher than the current scenario populations. In the final years of the forecast period, the closure of Snap Lake Diamond Mine and the Gahcho Kué Diamond Mine coincide causing a larger out migration relative to the current scenario. By 2030, the population is calculated to equal 42,827.

Table 12.II.11.3-1 Gahcho Kué Population Projections, 2000 to 2030

Year	Population	Population 15 years of age and older
2000	40,480	29,575
2005	43,399	33,041
2010	43,759	34,228
2015	44,644	34,710
2020	45,060	35,098
2025	44,941	35,385
2030	42,827	34,324

Note: Data from 2000 to 2010 are historical.

Data source: NWT Bureau of Statistics, Territorial Single Years of Age by Gender

When taken across the full fifteen years that includes construction, operations and closure, the cumulative change in population is 1,591. It was shown earlier in Section 1.9.7 that the GNWT will receive approximately \$21,000 per resident in Territorial Formula Financing. Assuming an entirely linear relationship, the population changes will result in an increase in transfer payments of \$33.4 million over the fifteen years, or an average of \$1.9 million annually.

The job creation in the NWT from the Project lowers the unemployment rate in 2015 from 8.8% in the current scenario to 7.6% (see Table 12.II.11.3-2). In that year, there are more than 326 additional jobs in the NWT economy. In 2020, there are 471 additional jobs in the NWT economy, which effectively lowers the unemployment rate from 9.9% to 8.3%. By 2025, total employment in the NWT will equal 22,415 in the Gahcho Kué scenario and the unemployment rate will equal 10.6%. In 2030, employment will number 21,096 and unemployment rate will equal 13.6%.

Table 12.II.11.3-2 Gahcho Kué Labour Force Projection, 2000 to 2030

	Labour Force	Employment	Unemployment Rate
2000			
2005	23,895	22,700	5.0%
2010	22,878	21,200	7.3%
2015	24,222	22,370	7.6%
2020	24,677	22,627	8.3%
2025	25,059	22,415	10.6%
2030	24,406	21,095	13.6%

Note: Data in 2005 is historical.

Data source: NWT Bureau of Statistics, Statistics Canada *Labour Force Survey*, Impact Economics

12.II.11.3.1 Summary of Impact Assessment on Population and Labour Force from the Project Scenario

Table 12.II.11.3.1-1 summarises the predicted impacts of the proposed Project on population and labour force according to the impact assessment criteria outlined in Section 1.2. The comparison is to the current scenario; that is, the scenario that includes the impacts of Ekati, Diavik and Snap Lake diamond mines. The baseline scenario presented is a hypothetical one for the purpose of establishing the natural rate of increase, assumed migration patterns according to a baseline growth scenario.

The range of analysis is restricted to the NWT, though there is a National level impact for employment, it is not statistically relevant at a national level. The geographic range for the operations phase is considered regional. Population and labour force impacts are positive but with a low magnitude. Employment and unemployment rate are predicted to improve under this scenario and therefore are predicted to be positive. The magnitude of impact is considered moderate. The GNWT revenues stand to benefit from a low rise in population that would result in increased transfers (all other things being equal). The project will exist for approximately 15 years, not including the longer-term environmental monitoring, therefore all the impacts are considered long-term.

Table 12.II.11.3.1-1 Summary of Impact Assessment for Population and Labour Force from the Project

	Range	Direction	Magnitude	Duration
Population	Territory	Positive	Low	Long Term
Labour Force	Territory	Positive	Low	Long Term
Employment	Territory	Positive	Moderate	Long Term
Unemployment Rate	Territory	Positive	Moderate	Long Term
GNWT Revenues	Territory	Positive	Low	Long-Term

12.II.11.4 PROJECTION FOR NWT POPULATION AND LABOUR FORCE (CUMULATIVE)

In the fourth scenario, the impacts of additional major resource projects are added to the Gahcho Kué scenario; all other things are kept the same. The added projects are the Fortune Minerals' NICO Project and Canadian Zinc's Prairie Creek Project. These two projects are the most advanced in the Territory. The NICO Project was given a start date for its construction in 2015. The Prairie Creek Project was given a start date of 2012 for its construction. In the case of Prairie Creek, the majority of impacts will occur in the Dehcho region, which is outside the Project's local study area. It will however affect the territorial GDP

and employment, and from a cumulative perspective, could affect the local study area.

Other projects considered were Tyhee Corporation's Yellowknife Gold Project and the Avalon Rare Earths Project. These two were not included due to uncertainties about their reserves, economic viability and timeline. The Talston Hydro-expansion was also considered. This is essentially a construction project, with a small long-term operational workforce. There is some uncertainty with respect to the construction cost, economic viability and financing for this project. However, should it proceed under the timelines being proposed by its proponents, the majority of its impacts would occur prior to the start date for the Project's operation.

In this cumulative scenario it is predicted that the population will peak in 2020 at 45,334 and remain close to that level through the next five years until 2025 when the population will equal 45,305 (see Table 12.II.11.4-1). The effects from closures at Ekati and Diavik and later from the Gahcho Kué and Snap Lake Diamond Mines are still present in this scenario, as is the closure of Prairie Creek in 2027. Beyond that date, the only operating mine in the local study area will be the NICO Project. The population prediction for 2030 in this scenario is 44,004.

Table 12.II.11.4-1 Cumulative Population Projections, 2000 to 2030

Year	Population	Population 15 years of age and older
2000	40,480	29,575
2005	43,399	33,041
2010	43,759	34,228
2015	44,705	34,757
2020	45,334	35,310
2025	45,305	35,671
2030	44,004	35,249

Note: Data from 2000 to 2010 are historical.

Data source: NWT Bureau of Statistics, Territorial Single Years of Age by Gender

Table 12.II.11.4-2 contains the labour force predictions under the cumulative effects scenario. In this scenario, there are more jobs created by 2015 (22,639 in total) lowering the unemployment rate to 6.6%. This unemployment rate is not below the threshold that would result in increased in-migration. This unemployment rate is maintained over the following five years, rising slightly to 6.8% by 2020. At that point, the NWT economy will produce 23,155 jobs. In the final years of the forecast period, the predicted impacts from the closures of all major projects with the exception of the NICO Project will reduce the overall number of jobs in the economy to 21,923 in 2030. At that point, the

unemployment rate will increase to 12.7% and bring about an increase in out-migration.

Table 12.II.11.4-2 Cumulative Labour Force Projection, 2000 to 2030

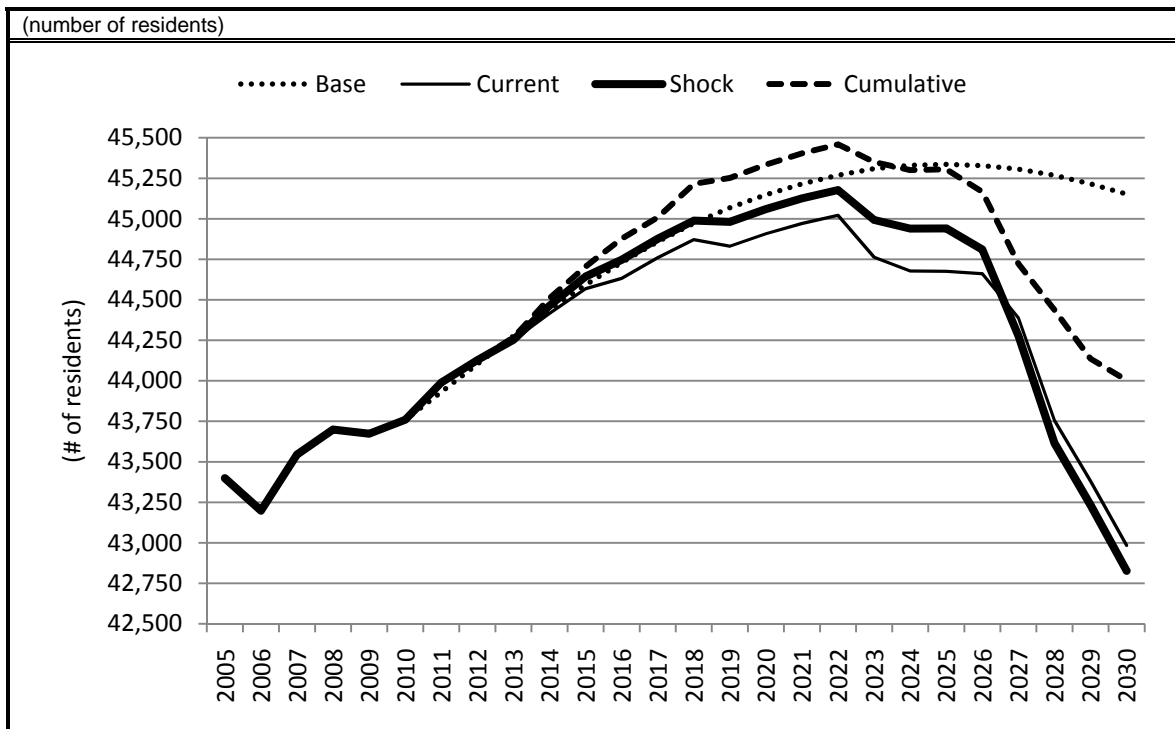
	Labour Force	Employment	Unemployment Rate
2000			
2005	23,895	22,700	5.0%
2010	22,878	21,200	7.3%
2015	24,258	22,656	6.6%
2020	24,838	23,155	6.8%
2025	25,278	22,960	9.2%
2030	25,118	21,936	12.7%

Note: Data in 2005 is historical.

Data source: NWT Bureau of Statistics, Statistics Canada *Labour Force Survey*, Impact Economics

Figure 12.II.11.4-1 includes the population results under all four scenarios. It is important to bear in mind the assumptions under each scenario. These are not pure forecasts in the sense they do not consider outside influences or contain projections on an industry-by-industry basis. These scenarios are meant to highlight the effects of major resource developments, which themselves could change from the assumptions included here. The continuation or early closure of any of the existing diamond mines would alter the population predictions. In none of these scenarios are there any influences from economic growth in Nunavut. In a complete forecast scenario, one might want to consider whether mining developments in the Kitikmeot or Kivalliq regions would have an effect on the NWT population. Furthermore, there are no other economic components added to these projections, such as changes in government or other territorial industries. For example, should federal responsibilities be devolved to the GNWT, this would alter the revenue stream of the government which could influence how and where public money is spent and how regulations for development are administered, thus having an impact of the growth of the economy.

Figure 12.II.11.4-1 All Population Projections, 2000 to 2030



Note: Data from 2005 to 2010 are historical.

Data source: NWT Bureau of Statistics, Statistics Canada *Labour Force Survey*, Impact Economics

12.II.11.4.1 Summary of Impact Assessment on Population and Labour Force from the Cumulative Impact Scenario

Table 12.II.11.4.1-1 summarises the predicted cumulative impacts that include the proposed Project on population and labour force according to the impact assessment criteria outlined in Section 1.2. The comparison is to the Project scenario; that is, the scenario that includes the impacts of Ekati, Diavik, Snap Lake, and Gahcho Kué diamond mines.

The range of analysis is restricted to the NWT. Although there is a national level impact on the Canadian business, GDP, labour income and employment, it is not statistically relevant at this level. The geographic range for the operations phase is considered Territorial because it includes the Prairie Creek Mine which is outside the local study area. This project would not be predicted to have an impact on the NWT on its own, but could have a cumulative impact on population and employment. Population and labour force impacts are positive with a moderate magnitude. Employment and unemployment rate are predicted to improve under this scenario and therefore are predicted to be positive. The magnitude of impact is considered moderate. The additional projects included

under this scenario give the economy greater stability and mitigate the negative effects of closures of the diamond mines. While the NICO Project will be in operations beyond the forecast period for this assessment, its life is still finite. Therefore, the duration of its impact is considered long term.

Table 12.II.11.4.1-1 Summary of Cumulative Impact Assessment for Population and Labour Force

	Range	Direction	Magnitude	Duration
Population	Territory	Positive	Moderate	Long Term
Labour Force	Territory	Positive	Moderate	Long Term
Employment	Territory	Positive	Moderate	Long Term
Unemployment Rate	Territory	Positive	Moderate	Long Term

12.II.12 PREDICTED IMPACT ON INFLATION

There has been concern expressed that enhanced economic development will have the impact of raising the general rate of inflation in the NWT. Impacts on inflation can be difficult to predict but in the case of the NWT there is empirical evidence of the impact of diamond industry over the last decade which can be used to indicate the likely impact of the proposed Project.

In Section 1.7.9, three methods to estimate the impact of inflation were presented. They were the Consumer Price Index (CPI) and two measures from the Provincial Income and Expenditure Accounts which are the GDP and Final Domestic Demand implicit indexes. That analysis showed inflation has not been an outcome from the economic growth to date. This is not unexpected because the economy of the NWT is very small and "open" in that there is relatively little domestic production and the demand for most goods and services is filled by imports. Therefore most of any potential change in the inflation rate in the NWT is determined by price changes in imported goods and services.

In Chapter 1.11, the proposed Project was shown to have a positive influence on population but at a low magnitude. This would suggest that inflation will not arise as a result of increase demand from a larger population.

It is predicted that the proposed Project will not have a significant impact on the rate of increase in inflation in the local study area or NWT. Table 12.II.12-1 summarizes the predicted impacts on inflation. The effect is predicted to be neutral with no or a low impact.

Table 12.II.12-1 Summary of Impact Assessment for Inflation

	Range	Direction	Magnitude	Duration
Inflation	Territory	Neutral	Negligible to Low	Long Term

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APPENDIX 12.III
ARCHAEOLOGICAL ASSESSMENT

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12.III.1 INTRODUCTION

12.III.1.1 CONTEXT

This appendix of Section 12 of the environmental impact statement (EIS) for the Gahcho Kué Project (Project) consists of the archaeology assessment. The *Terms of Reference for the Gahcho Kué Environmental Impact Statement* (Terms of Reference), issued on October 5, 2007 by the Gahcho Kué Panel (Gahcho Kué Panel 2007), required that impacts such as the physical disturbance to heritage and archaeological sites, be assessed as part of the socio-economic subject of note.

Archaeological remains (sites and their contents) are protected by legislation. The regulations that apply to archaeological sites and artifacts in the Northwest Territories (NWT) include the Northwest Territories Archaeological Sites Regulations (NTASR) and the Mackenzie Valley Land Use Regulations (MVLUR). As defined in the NTASR, archaeological artifacts are “any tangible evidence of human activity that is more than 50 years old, in respect of which an unbroken chain of possession cannot be demonstrated.” An archaeological site is defined as a location where an archaeological artifact is found.

Under the *Mackenzie Valley Resource Management Act*, heritage resources are defined as “archaeological or historic sites, burial sites, artifacts, and other objects of historical, cultural or religious significance, and historic or cultural records.” The MVLUR specifies the distance that development must be from an archaeological or historical site or burial ground (minimum 30 metres [m]) and requires that procedures be identified and followed in the event that an archaeological site is accidentally encountered or disturbed. Archaeology field investigations in the NWT can only be conducted under a NWT Archaeology Permit.

Archaeological sites and heritage resources provide historical and cultural information that is integral to the understanding of past human activities and past and present use of the landscape; and is therefore diminished by any form of physical disturbance.

12.III.2 PURPOSE AND SCOPE

The purpose of this appendix is to meet Section 5.3.4 of the Terms of Reference and address the concern that archaeological and heritage sites might be physically impacted.

It is possible that human activities may have occurred in the vicinity of the Project, but are not included in the archaeological record. Such locations are another type of heritage site that may be identifiable through traditional knowledge research (Section 5 of this EIS). Although heritage sites include a full range of activity, including locations of cultural or religious importance, this appendix focuses on archaeological sites. The known sites of concern to this Project are archaeological.

This assessment is based on data provided in the Archaeological Baseline (Annex L), which is based on the results of NWT archaeological permit reports written between 1996 and 2010.

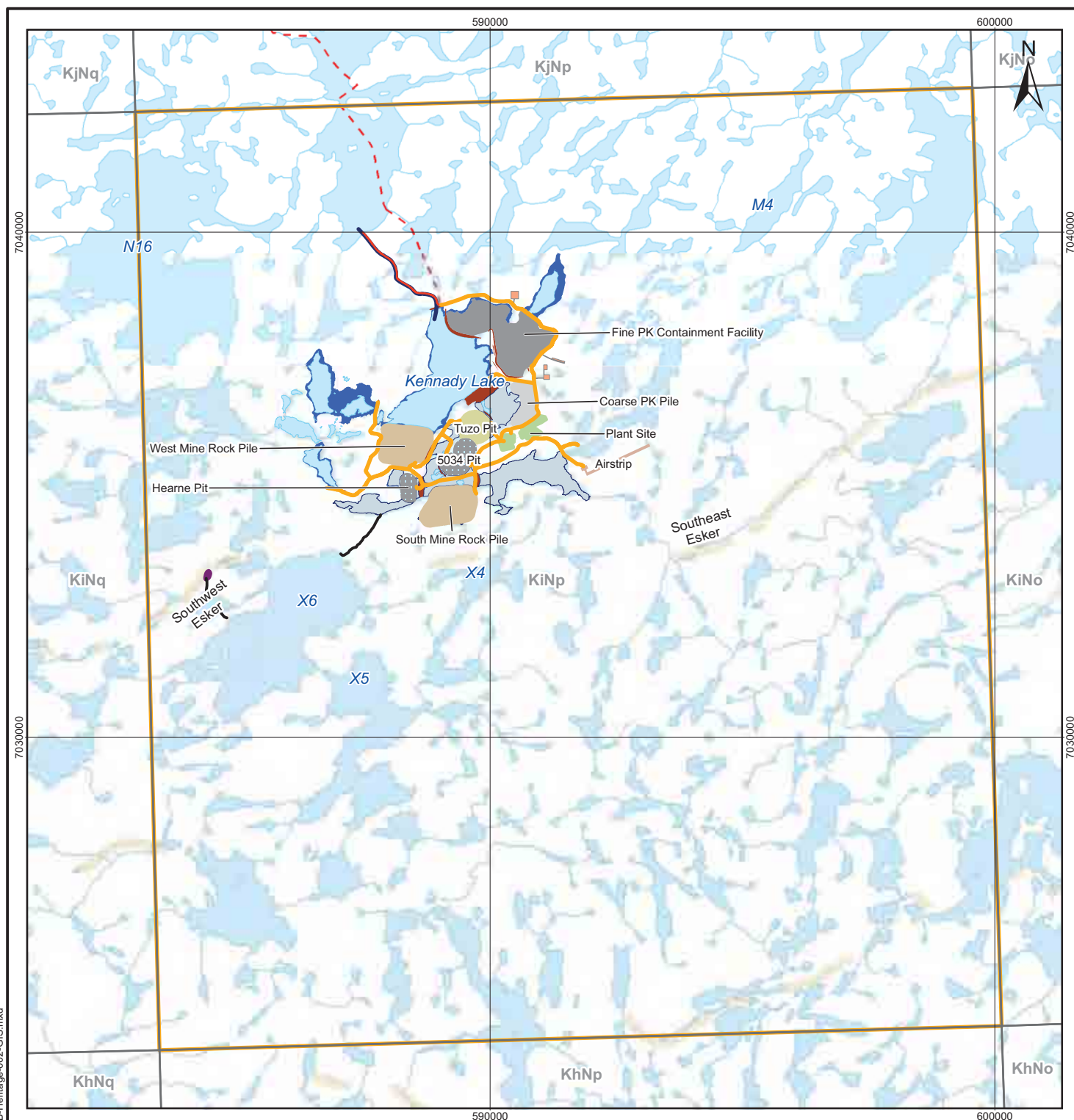
12.III.3 STUDY AREAS

The archaeology assessment identified three study areas:

- Local Study Area (LSA);
- Winter Access Road Study Area; and
- Cumulative Effects Study Area.

The majority of the recorded archaeological sites located near the Project are within one Borden block, identified as KiNp. The Borden system is a Canada-wide grid utilized to identify archaeological site locations (Borden 1952). Since the proposed mine developments are located within the KiNp Borden block, this has been identified as the archaeology LSA. The LSA includes the Project footprint, potential esker sources and part of the Winter Access Road (Figure 12.III-1). There are 80 recorded archaeological sites in this LSA.

As a result of the Project, 130 sites have been recorded in Borden blocks crossed by the Winter Access Road (Figure 12.III-2). For archaeological purposes, the Winter Access Road is a separate study area. The Winter Access Road Study Area is defined as a corridor centred on the route that is approximately 120 kilometres (km) long; the width varies depending on terrain and archaeological potential. Most of the recorded sites are more than 100 m from the access road.



LEGEND

- | | | |
|------------------------|--------------------------|------------------------------|
| - - Winter Access Road | Southwest Gravel Borrow | De-watered Lake Bed |
| Watercourse | Project Footprint | Dyke or Berm |
| Waterbody | Service Road | Fine PK Containment Facility |
| Esker | Site Road | Flooded Area |
| Winter Esker Road | Water Pipeline | Mine Rock Pile |
| Borden Block | Airstrip | Open Pit |
| Local Study Area | Back-filled Pit | Plant Site |
| | Building | Water |
| | Coarse PK Pile | |

NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

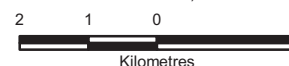
GAHCHO KUÉ PROJECT

Archaeology Local Study Area

PROJECTION:
UTM Zone 12

DATUM:
NAD83

Scale: 1:110,000



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B-Heritage-002-GIS

DATE:
December 1, 2010

JOB NO:
09-1365-1004

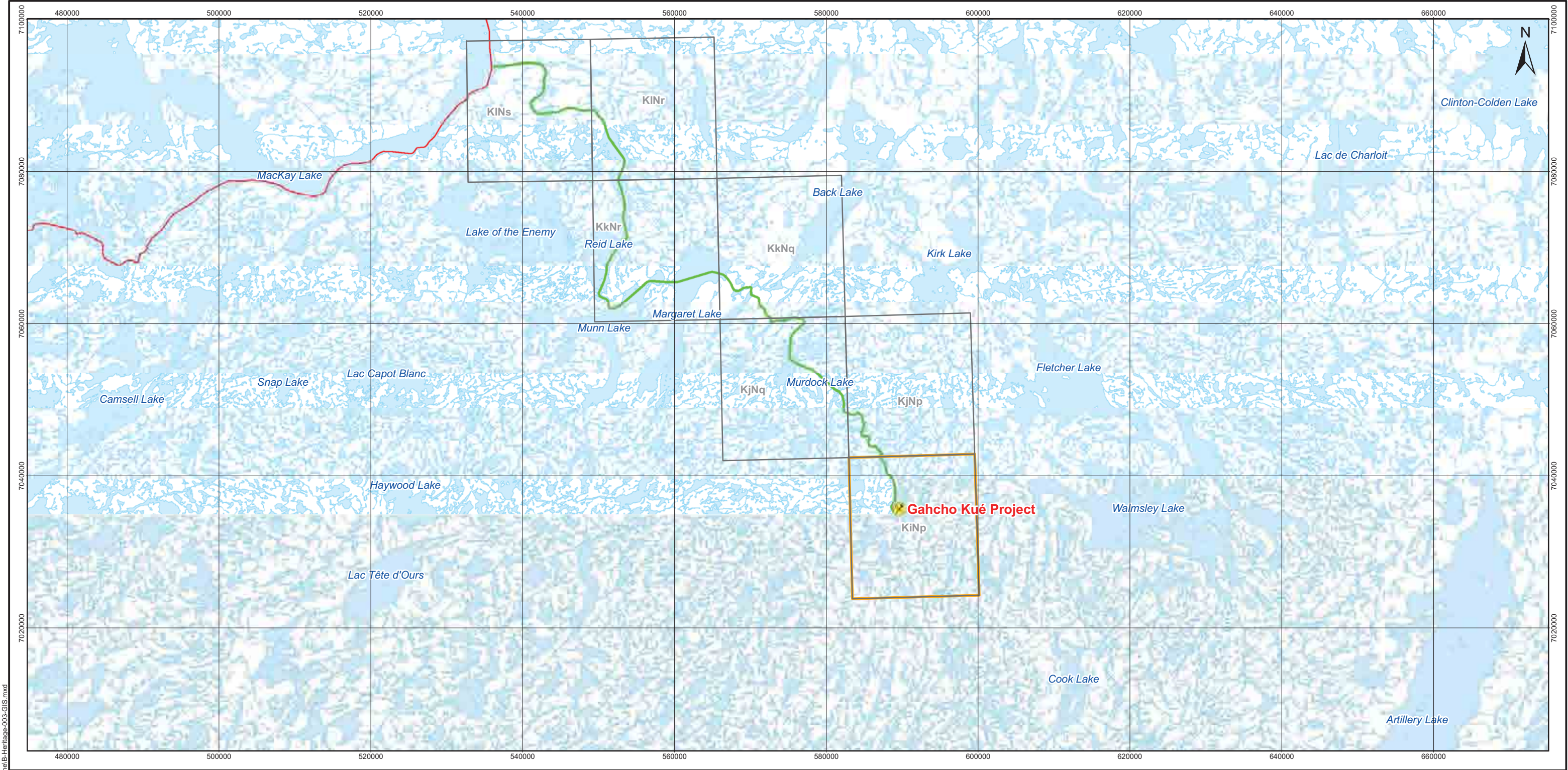
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



CHECK:
JB

Figure 12.III-1



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LEGEND

-  Gahcho Kué Project
-  Tibbitt-to-Contwoyto Winter Road
-  Watercourse
-  Waterbody
-  Winter Access Road Study Area
-  Borden Block
-  Local Study Area

NOTES
Base data source: National Topographic Base Data (NTDB) 1:250,000

GAHCHO KUÉ PROJECT

Winter Access Road Study Area

PROJECTION: UTM Zone 12	DATUM: NAD83
Scale: 1:500,000 5 2.5 0 5 10 Kilometres	



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Figure 12.III-2

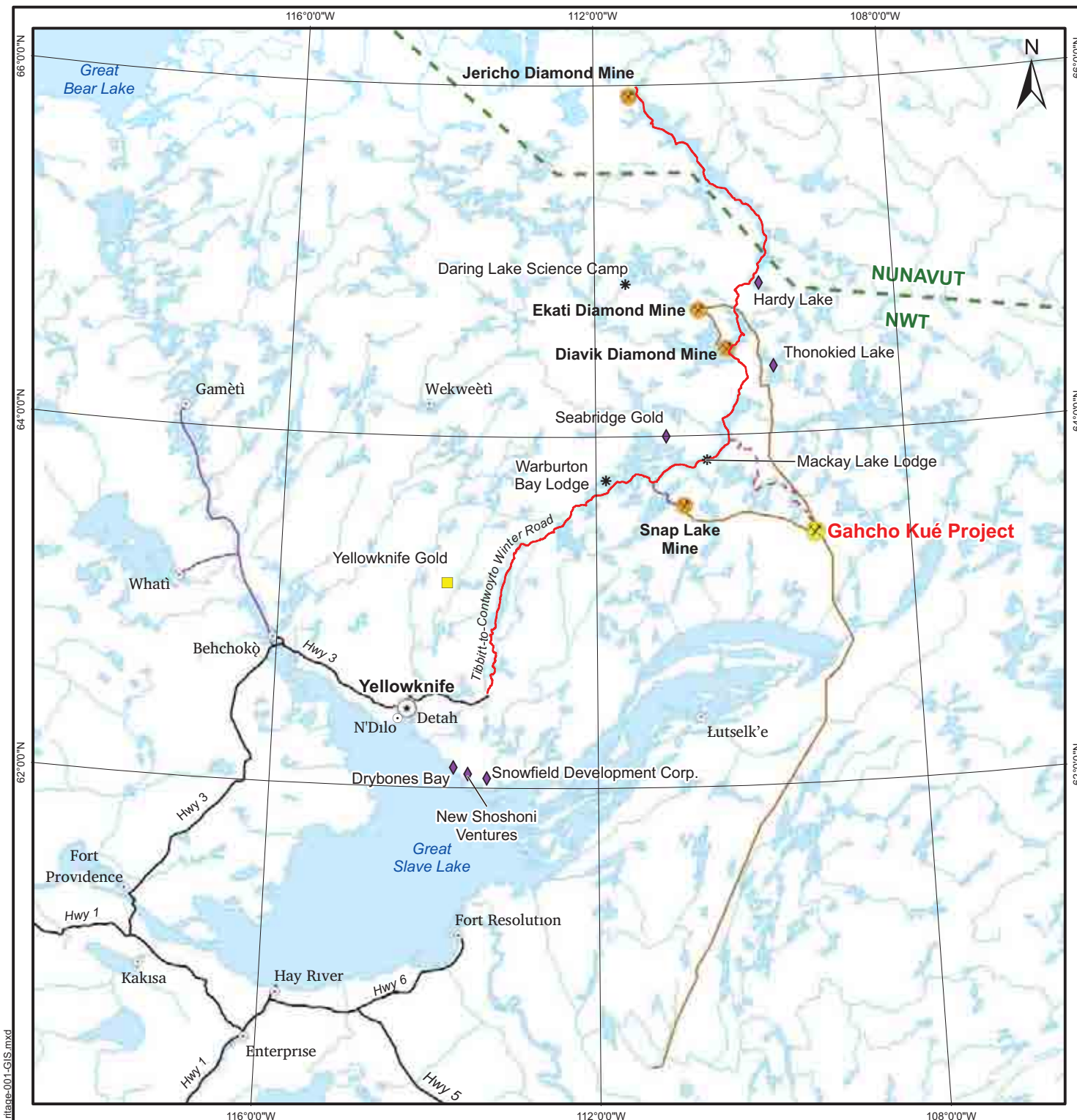
A more extensive study area was selected to assess cumulative effects. The Cumulative Effects Study Area is limited to the NWT, and although centred on the LSA, is north of Great Slave Lake and extends for a radius of up to 300 km (Figure 12.III-3). Archaeological investigations have not occurred in all areas surrounding the LSA and the majority of the intensive work has been conducted since 1994 in response to mine development. Therefore, the Cumulative Effects Study Area (Figure 12.III-3) shows the locations of the intensive studies that comprise the cumulative effects assessment; it is not an area in the same sense as the LSA.

12.III.4 CONTENT

The following briefly describes the content under each heading of this appendix:

- **Existing Environment** summarizes the relevant archaeology baseline information including the methods of baseline collection and the number and types of recorded sites within the Project study areas (Section 12.III.5)
- **Archaeological Analysis Method** outlines the approach and methods used for the archaeological assessment (Section 12.III.6).
- **Effects Analysis** presents the results of the archaeological analysis (Section 12.III.7).
- **Residual Effects** provides a general assessment of changes to archaeological resources and concludes with an outline of any potential monitoring or follow-up work (Section 12.III.8).
- **Cumulative Effects** presents the assessment of effects in the Cumulative Effects Study Area (Section 12.III.9).
- **References** lists all documents and other material used in the preparation of this section (Section 12.III.10).
- **Glossary, Abbreviations, Acronyms, and Units** explains the meaning of scientific, technical, or other uncommon terms used in this chapter. In addition, acronyms, abbreviations, and units of measure are defined (Section 12.III.11).

Supporting baseline information for the archaeological assessment is provided in Annex L (Heritage Resources Baseline).



LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Territorial / Provincial Boundary
- Highway
- Existing Winter Road
- Winter Access Road
- Tibbitt-to-Contwoyto Winter Road
- Watercourse
- Waterbody
- Exploration Project
- Mining Project
- Other
- Talston Hydroelectric Expansion

NOTES

Base data source: The Atlas of Canada

GAHCHO KUÉ PROJECT

Cumulative Effects Study Area

PROJECTION:
Canadian Lambert Conf. Conic

DATUM:
NAD83

Scale: 1:3,500,000
50 25 0 50
Kilometres



FILE No:
C-Heritage-001-GIS

DATE:
December 16, 2010

JOB NO:
09-1365-1004

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Figure 12.III-3

12.III.5 EXISTING ENVIRONMENT

12.III.5.1 METHODS

The existing archaeological conditions were documented through:

- background review to compile data on the three study areas; and
- site inventory to document archaeological sites in the LSA and Winter Access Road Study Area.

12.III.5.1.1 Background Review of Existing Archaeological Sites

There are a total of 210 archaeological sites in the LSA and associated with the Winter Access Road Study Area. The first preliminary archaeological study of the Project area was undertaken by Fedirchuk (1996). Three sites were discovered on an esker located southeast of the Project. Jacques Whitford Environment Ltd. (Jacques Whitford) conducted an archaeological overview assessment and limited inventory, which resulted in the discovery of six new archaeological sites (Thomson 1998). In subsequent years, representatives of Jacques Whitford (Stoddart 2002; Thomson 2000a,b,c, 2001, 2002, 2003) completed an archaeological inventory near and around Kennady Lake. They discovered an additional 63 sites in the LSA and 122 sites in Borden blocks crossed by the Winter Access Road. Seventeen additional sites have been discovered since 2004 (Bussey 2005a, 2006a, 2007, 2008a, 2010 in progress); all, but one within the LSA and Winter Access Road Study Area.

There are 307 recorded archaeological sites in the Regional Study Area (RSA), including the 210 in the LSA and associated with the Winter Access Road Study Area. Forty-four of the sites in the RSA were discovered as a result of investigations associated with the Project but are not currently of concern since they are well removed from identified development activity (Bussey 2008a; Thompson 2000a,b,c, 2001, 2002, 2003). Twenty of these 44 sites have been recorded as a result of associated exploration activity or the assessment of potential aggregate sources. The other 24 sites were discovered along a proposed alternate winter road connecting with the De Beers' Snap Lake Mine. The final 53 archaeological sites in the RSA were recorded in conjunction with development, exploration, and access for the Snap Lake Mine located approximately 80 km west of the Project (Bussey 1998a, 2000a, 2002b, 2003c, 2004b; Thomson 2001).

12.III.5.1.2 Site Inventory

The site inventory focuses on the discovery and inventory of archaeological sites through ground reconnaissance and where required, aerial surveys. Between 2004 and 2010, Points West Heritage Consulting Ltd. (Points West) discovered one new archaeological site along the Winter Access Road, seven sites at potential aggregate sources in Borden blocks crossed by this road and eight new sites within the LSA (Bussey 2005a, 2006a, 2007, 2008a, 2010 preparation underway). These inventories brought the total within the KiNp Borden block to 80 sites and added seven sites to the Winter Access Road inventory for a total of 130 archaeological sites. Points West also discovered one new site at a potential aggregate source outside of the LSA (Bussey 2008a).

12.III.5.2 TRADITIONAL KNOWLEDGE

First Nations members from the community of Łutselk'e have assisted in the majority of the archaeological investigations conducted for the Project. Representatives of the Yellowknives Dene First Nations (YDFN) have been involved in a portion of this Project. Concerns and interests voiced during field investigations have been addressed by the various researchers and at meetings in Łutselk'e during the initial stages of the archaeological studies.

A review of ethnographic sources and traditional knowledge studies conducted in surrounding areas has contributed to an understanding of the archaeology of the Project area. As traditional knowledge information relevant to archaeology is identified, it will be incorporated into the archaeology program.

12.III.5.3 EXISTING CONDITIONS

Archaeological sites are commonly identified on the basis of archaeological content. Sites that contain only lithic artifacts (unworked flakes and/or stone tools) are assumed to represent prehistoric resources. They are commonly identified as lithic (stone) or artifact scatters. Sites that contain organic materials or historic/modern artifacts are assumed to represent traditionally, ethnographically, or historically utilized sites. A site containing a single artifact is generally identified as an isolated find. Some sites contain evidence of a quarry (source of raw material for stone tool manufacture) and/or an area of dense lithic debris, which is suggestive of a workshop for the manufacture of stone tools. A number of sites have contained rock features such as hearths or tent rings, or a variety of tools or lithic materials, and are suggestive of a camp. Some sites have been identified on the basis of their presumed function; a number of sites in the LSA are referred to as lookouts, a location with a strategic viewpoint.

Studies have confirmed that the Project area was used in the past. It has been suggested that the Arctic Small Tool tradition (ASTt), which dates approximately 2,500 to 3,500 years before present (BP), may be represented but that the majority of the prehistoric sites are suggestive of the more recent Taltheilei tradition (2,500 to 200 years BP). Historic, recent, or traditional sites have also been identified in the region. Earlier cultural traditions have not been confirmed, but there is potential for Northern Plano (circa 8,000 to 6,500 BP) and Shield Archaic (6,500 to 3,500 BP).

12.III.5.4 LIKELY FUTURE CONDITIONS

There is potential for additional archaeological resources in portions of the LSA and RSA that have not been subjected to detailed field reconnaissance. The inventory conducted for the Project was intensive and limits the potential for undiscovered archaeological sites within the Project footprint. There is also limited potential for additional sites along the Winter Access Road study area.

12.III.6 ARCHAEOLOGICAL ANALYSIS METHODS

The archaeology impact analysis was based on the location of archaeological sites in relationship to the proposed Project (i.e., the distance between a given site and possible development activity), the type of development activity at each phase of the Project, and the anticipated intensity of use of those areas.

12.III.6.1 DIRECT AND INDIRECT IMPACTS

It is most likely that disturbance or destruction of archaeological sites will occur during the construction stage since archaeological sites in this area are typified by sparse and primarily surface deposits, which are easily impacted. The anticipated effects of Project development on archaeological sites are summarized in Table 12.III-1.

Table 12.III-1 Potential Environmental Effects of Project by Phase: Archaeological Sites

Potential Environmental Effect	Project Phase	Likelihood of Occurrence
Discovery and documentation of an archaeological site	construction	unlikely
	operation	unlikely
	closure	unlikely
	post-closure	unlikely
Disturbance or destruction of an archaeological site	construction	likely
	operation	unlikely
	closure phase	unlikely
	post-closure	unlikely

Construction activities that could directly impact archaeological sites include:

- site preparation and infrastructure (grubbing, disposal of over burden, development of gravel pads);
- dykes and diversions (water, processed kimberlite, sedimentation ponds, diversion ditches);
- waste management (mine rock piles, Coarse Processed Kimberlite (PK) Pile, Fine Processed Kimberlite Containment (PKC) Facility);
- quarrying (bedrock or sand/gravel); and
- increased human presence.

Operation, closure, and post-closure phases of the Project are not expected to affect archaeological sites unless new areas of development are identified.

Many of the potential effects resulting from increased human presence will likely be indirect and are difficult to predict. As such, potential impact to archaeological sites from other Project preparation activities such as surveys (using stones from an archaeological feature to make a claim marker or cairn) and other activities by those not familiar with archaeological remains must be considered. It is also possible that “relic collectors” and recreational activities (such as using the stones from a tent ring to make a campfire) could affect archaeological sites.

Weather and animal use of an area can also result in the disturbance or destruction of archaeological sites. Sites have been excavated by bears looking for ground squirrels and artifacts have been scattered or broken by the repetitive action of caribou hooves. Time, weather, and animals can also affect artifacts that are not as durable as stone (e.g., bone, antler, and wood tools).

12.III.6.2 IMPACT POTENTIAL CLASSIFICATION

Impact potential was assessed accordingly to three scales: low, moderate, and high impact potential. These scales were based upon the distance of a site from a proposed development activity in conjunction with the type of development. Sites as much as 1 km away can be affected due to the intensity of the development activity. For example, a proposed open pit, mine rock pile, and PK storage areas can impact archaeology sites as close as 1 km away due to the intense nature of these activities and the size of the area affected. This professional opinion is based on previous experience at mine sites. For this Project, emphasis was placed on sites within 30 m of the Winter Access Road since this is the minimum buffer width that must be maintained between development activities and an archaeological site as specified in the *Mackenzie Valley Resource Management Act*.

Low impact potential was assigned to sites far enough from development activity that avoidance and/or protection is feasible; whether or not monitoring will be required must be reviewed annually. Low impact potential was predicted for the following distances from an archaeological site:

- greater than 1 km from intensive development activity;
- greater than 500 m from ancillary facilities, such as dykes, roads, pipelines, and areas of inundation;
- greater than 30 m from the Winter Access Road because disturbances have already occurred and the route is known; and
- greater than 100 m from more isolated, location-specific activities such as proposed aggregate sources.

Moderate potential was assigned for sites at which avoidance may be possible under some circumstances but may not be feasible in association with intensive development activity unless protection options are employed. Moderate impact potential was predicted for the following distances from an archaeological site:

- 500 m to 1 km from intensive development activity;
- 250 m to 500 m from ancillary facilities, such as dykes, roads, pipelines and inundated areas;
- within 30 m of the Winter Access Road, but on an elevated landform not suitable for a winter road route; and
- 30 m to 100 m of isolated and location-specific development areas, such as proposed aggregate sources.

High impact potential sites are not likely avoidable nor are protection options likely feasible in the long-term. High impact potential was predicted for the following distances from an archaeological site:

- within 500 m of intensive development activity;
- within 250 m of ancillary facilities, such as dykes, roads, pipelines and inundated areas;
- within 30 m of the Winter Access Road and on low terrain suitable for a winter road route; and
- within 30 m of isolated, location-specific developments such as a proposed aggregate sources.

12.III.6.3 SITE ASSESSMENT

Sites classified as having moderate to high potential for impact were assessed for archaeological significance. Site assessment was achieved through a combination of surface examination and subsurface testing. The assessment is limited to its potential archaeological or scientific significance; the evaluation of cultural or ethnic significance is more appropriately conducted by Aboriginal groups. The archaeological or scientific significance of a site is based on its potential to contribute to both the NWT and the Canadian Museum of Civilization archaeological databases, and/or archaeological methods and theory, or other scientific disciplines. The determination of archaeological significance involves an assessment of:

- condition and size of site;
- quantity and variety of archaeological material visible on the surface;
- potential for the site to contain subsurface (buried) archaeological material; and
- potential to contribute to archaeological knowledge of the region.

Sites with little exposed archaeological material and limited potential for buried material were judged to have low archaeological significance; such sites tend to be small. Sites with more extensive or intensive archaeological material and potential for buried deposits were judged to have moderate archaeological significance. Sites with a dense quantity or a variety of archaeological material and/or visible tools were judged to have moderate to high archaeological significance, depending on their location, size (usually moderate to large), and potential for buried material. Unique sites would also be assigned moderate to

high archaeological significance, even if characterized by a sparse surface component.

Professional judgment and experience were employed in each of these assessments, especially in terms of predictions for subsurface deposits and potential to contribute to the regional history.

All artifacts encountered during subsurface testing were collected since their context was disturbed. Some surface artifacts were also collected because they could potentially assist in site assessment. All collected artifacts have been submitted to the Prince of Wales Northern Heritage Centre (PWNHC).

12.III.7 EFFECTS ANALYSIS

12.III.7.1 ARCHAEOLOGICAL SITE ASSESSMENT IN THE LOCAL STUDY AREA

Two stages of assessment were undertaken for archaeological sites. The first step involved determining the potential for impact to archaeological sites. The second step involved assessing the archaeological significance of all sites suggestive of moderate or greater impact potential. Site testing is intrusive and is undertaken when there is the potential that a site will be impacted by development but the number of units excavated is limited to the minimum necessary for assessment, which varies from site to site.

Assessment of archaeological significance at sites near the Project footprint was initiated by Points West in 2004. During the five seasons of investigation conducted in the LSA, a total of 49 sites were assessed. Ten sites were at potential aggregate sources and the remainder were within 1 km of proposed development activity. Sites at greater distances are assumed to represent low impact potential and were not examined in detail. Changes to the Project footprint have resulted in changes to the specific sites affected and not all sites that were assessed are still suggestive of moderate to high impact potential.

Fourteen sites that were assessed, but for which there is no longer potential for impact because of revised plans are: KiNp-1, KiNp-2, KiNp-10, KiNp-17, KiNp-31, KiNp-54, KiNp-56, KiNp-58, KiNp-59, KiNp-60, KiNp-64, KiNp-73, KiNp-77 and KiNp-79.

Eleven sites are assessed as having moderate impact potential: KiNp-4, KiNp-5, KiNp-6, KiNp-9, KiNp-28, KiNp-29, KiNp-30, KiNp-41, KiNp-75, KiNp-76 and KiNp-78.

Twenty-four sites are assessed as having high impact potential: KiNp-7, KiNp-8, KiNp-11, KiNp-12, KiNp-13, KiNp-14, KiNp-15, KiNp-16, KiNp-24, KiNp-25, KiNp-26, KiNp-27, KiNp-32, KiNp-33, KiNp-34, KiNp-35, KiNp-36, KiNp-37, KiNp-38, KiNp-39, KiNp-40, KiNp-48, KiNp-49 and KiNp-74.

Each of the 49 sites judged to have moderate to high impact potential were assessed for archaeological significance. The assessment of significance at 13 sites resulted in the conclusion that no archaeological material was present and that the locations were not archaeological sites. These sites are judged to have no archaeological significance: KiNp-9, KiNp-10, KiNp-12, KiNp-13, KiNp-14, KiNp-17, KiNp-24, KiNp-25, KiNp-26, KiNp-36, KiNp-40, KiNp-49 and KiNp-59. No further archaeological investigation is required at these 13 sites, ten of which will be affected by the Project as proposed. KiNp-10, KiNp-17 and KiNp-59 are more than 1 km from the Project footprint and are of no further concern.

Low archaeological significance was assigned to 24 sites: KiNp-1, KiNp-2, KiNp-5, KiNp-7, KiNp-8, KiNp-11, KiNp-28, KiNp-30, KiNp-33, KiNp-34, KiNp-37, KiNp-38, KiNp-39, KiNp-41, KiNp-48, KiNp-54, KiNp-56, KiNp-58, KiNp-60, KiNp-64, KiNp-74, KiNp-76, KiNp-77 and KiNp-79. These sites are isolated finds or very sparse to sparse lithic scatters with limited potential for buried archaeological material. As a result of the revised Project footprint, KiNp-1, KiNp-2, KiNp-54, KiNp-56, KiNp-58, KiNp-60, KiNp-64, KiNp-77 and KiNp-79 are no longer sufficiently near proposed development activity to be of concern.

At five of the remaining 15 sites, sufficient data were collected and no further archaeological investigation is recommended. Each of these five sites has been adequately mitigated through the recording, testing, and surface collection undertaken:

- two isolated finds (KiNp-5 and KiNp-30);
- three locations that were surface collected since no buried deposits were discovered during testing (KiNp-11 and KiNp-39); and
- on the southwest esker and within the proposed esker source, KiNp-48 was tested and no buried archaeological material was encountered. The surface contained a very sparse quantity (four) of artifacts. Because gravel extraction was proposed the winter of 2005 to 2006 and because there were no buried artifacts, the surface specimens were collected; this is judged to be sufficient mitigation at KiNp-48.

The remaining ten sites with low archaeological significance will require subsurface excavation and/or surface collection if avoidance and protection during the life of the Project is not feasible.

Moderate archaeological significance was assigned to eight sites: KiNp-4, KiNp-6, KiNp-15, KiNp-16, KiNp-27, KiNp-35, KiNp-73 and KiNp-78. These sites are lithic scatters. They are generally characterized by a moderate to dense visible archaeological yield with potential for buried archaeological material, and/or contain identifiable tools. Subsurface excavation and surface collection is required if these sites cannot be avoided. Because of its geographic location (east side of a lake) and distance (almost 1 km), KiNp-6 may be avoidable. Because of the distance (over 500 m) and nature of the nearest proposed development (dyke and road construction), in conjunction with its geographic location (opposite side of lake and inland), KiNp-73 is avoidable.

Four sites (all lithic scatters), KiNp-29, KiNp-31, KiNp-32, and KiNp-75, were assigned high significance. The large quantity of archaeological material and presence of buried deposits prompted these higher ratings. Surface collection and subsurface excavation are required if these sites cannot be avoided; all but KiNp-31 are within 1 km of the Project. Because of its elevated location and the distance and nature of the nearest proposed development (over 400 m from dyke and road construction), KiNp-29, on the opposite side of Kennedy Lake may be avoidable.

12.III.7.2 ARCHAEOLOGICAL SITE ASSESSMENT IN THE WINTER ACCESS ROAD STUDY AREA

A total of 130 archaeological sites have been recorded in Borden blocks crossed by the Winter Access Road. Most of these sites are well removed from the winter road or are on elevated terrain near portions of the route that are situated on frozen lakes. Although there is a slight possibility that impacts from the Project could occur at one or more of these lakeside sites, this is not likely.

Since impact is more likely to occur at archaeological sites located near the land-based portages of the Winter Access Road, more detailed field work was conducted for sites near these portages. At one portage, a new route has resulted in avoidance of recorded sites and no further work is required. At another portage, there are three sites that are of concern: KkNq-28 is adjacent to the route, KkNq-10 is near the route, and KkNq-6 is located on low terrain along the Winter Access Road.

At a third portage there are many sites near the Winter Access Road, but most are on well-elevated, bedrock-based terrain and are not threatened, while others are greater than 30 m. However, two sites are sufficiently near the route that impact might occur: KkNr-34 is immediately adjacent to the Winter Access Road and located on low terrain, while KkNr-47 is on slightly higher terrain and is avoided by the current route. KkNr-34 was assessed through subsurface testing since it was located immediately adjacent to the road on the same landform. The specimens encountered on the surface and during subsurface testing are suggestive of natural fracture. This, in conjunction with the disturbances associated with the adjacent road, indicates that KkNr-34 is not an archaeological site.

During the winter of 2004 to 2005, two large fuel tanks were installed on an esker near another portage. The tanks were placed on the esker between two previously recorded archaeological sites, KINs-1 and KINs-2; the placement did not affect either site. In the winter of 2006 a temporary road camp was stored east of the fuel tanks. The units were removed during the winter of 2006 to 2007 and the following summer both KINs-1 and KINs-2 sites were re-examined and assessed.

KINs-1 is characterized by extensive exposure and was examined intensively with only one surface artifact noted and collected. Site records indicate that artifacts were collected from this site when it was first discovered in the late 1960s. This site was not affected by placement of the camp and no further work was required. KINs-2 was assessed through intensive surface examination and subsurface testing. No archaeological material was noted during these investigations and the site is assessed as having low archaeological significance. Because no artifacts were encountered, no further archaeological investigation was required.

12.III.8 RESIDUAL EFFECTS

12.III.8.1 MITIGATION

There are a range of management options that can be applied at archaeological sites, depending on the type of site and type of development activity in proximity to the site. From an archaeological perspective, the preferred management option for a site that might be impacted is avoidance; however, avoidance is not always feasible. Once archaeological sites have been identified and accurate GPS coordinates are recorded, it is generally possible to avoid them with linear development such as a winter road, provided associated storage, work, camp, and borrow areas are carefully planned.

The majority of the 130 sites discovered in Borden blocks crossed by the Winter Access Road are located on elevated terrain along the shores of lakes used by the route. These sites are not judged to be threatened since it is unlikely that the road would leave the lower lake levels to traverse elevated terrain. Monitoring and/or review by an archaeologist familiar with site locations will be conducted to ensure continued avoidance.

Other archaeology management options include protecting sites by erecting barriers or by covering them with sterile materials; however, such protection measures are not applicable in all circumstances. When site avoidance and/or protection measures are not feasible, mitigation commonly consists of excavation and/or surface collection, which when combined, are referred to as systematic data recovery.

The type of systematic data recovery employed at a site is based on site characteristics and archaeological significance. For example, sites containing a scatter of surface artifacts but very limited potential for subsurface deposits would commonly be mitigated through detailed recording, in conjunction with systematic surface collection. At other sites, more extensive subsurface examination (excavation) is required. The amount of excavation required at a site depends on its size, content, and archaeological significance.

Mitigation involving subsurface excavation is destructive and will be conducted only when finalized development plans are approved. Proposed or revised development plans will be reviewed by an archaeologist well in advance of any activity to ensure known sites are avoided and to identify areas that require archaeological inventory. This, in conjunction with an education program for mine personnel and development of an archaeological management plan will assist in limiting indirect and direct impacts. Although less likely to occur and difficult to predict, indirect impacts are a possible effect of mine development and operation. If archaeological sites cannot be avoided by ancillary facilities, additional archaeological investigations will be conducted in advance of any surface disturbance.

12.III.8.2 GENERAL EFFECTS AND MITIGATION

Table 12.III-2 presents a summary of the expected effects on archaeological sites based on specific Project phases and identifies mitigation measures that will limit the extent of impact. Although it is expected that the majority of sites will be impacted in the construction phase, the recommended mitigation measures remain the same throughout the life of the Project. The assessment of mitigation success is based on the assumption that recommended mitigation measures will be undertaken; some sites have not yet been mitigated. Because archaeological resources are regulated, it is assumed that sufficient mitigation will be completed at each site.

Table 12.III-2 Potential Impacts and Mitigation Measures for Archaeology Sites

	Possible Effect	Project Phases	Mitigation/Enhancement Measure
Archaeological sites	discovery and documentation of archaeological site	construction operation closure post-closure	minimizing Project footprint and range of human activity; education of mine personnel; follow procedures in archaeological management plan
	disturbance and/or destruction of archaeological site	construction operation closure post-closure	avoiding site; protection of site; systematic data recovery; monitoring; follow procedures in archaeological management plan

12.III.8.3 SPECIFIC EFFECTS AND MITIGATION

The effects analysis (Section 12.III.7) indicated the number of low, moderate, and high archaeological significant sites.

There are 80 recorded sites located in the LSA. Forty-five of these sites are sufficiently distant from development activity that avoidance is possible and no site assessment is required. Eleven of the remaining 35 archaeological sites are over 500 m away, but within 1 km of intensive development activity and/or are between 250 m and 500 m of ancillary facilities. These sites are judged to represent moderate impact potential: KiNp-4, KiNp-5, KiNp-6, KiNp-9, KiNp-28, KiNp-29, KiNp-30, KiNp-41, KiNp-75, KiNp-76 and KiNp-78. Additional work will be required at most of these sites if development is to proceed; exceptions are KiNp-5, KiNp-9 and KiNp-30. The latter three sites were adequately examined during the site assessment process.

Twenty-four of the 35 sites are judged to represent high impact potential; they are within 500 m of intensive development or less than 250 m from ancillary facilities: KiNp-7, KiNp-8, KiNp-11, KiNp-12, KiNp-13, KiNp-14, KiNp-15, KiNp-16, KiNp-24, KiNp-25, KiNp-26, KiNp-27, KiNp-32, KiNp-33, KiNp-34, KiNp-35, KiNp-36, KiNp-37, KiNp-38, KiNp-39, KiNp-40, KiNp-48, KiNp-49 and KiNp-74. Further archaeological work is required at 12 of these 24 sites. More intensive mitigation measures have not been completed since such investigation is destructive and should not be undertaken until the impact footprint is finalized because site avoidance is the preferred option.

Table 12.III-3 provides a summary of these sites and additional work or mitigation required. Note that ten sites judged not to be archaeological sites as a result of intensive examination and/or subsurface testing, are not identified in this table: KiNp-9, KiNp-12, KiNp-13, KiNp-14, KiNp-24, KiNp-25, KiNp-26, KiNp-36, KiNp-40 and KiNp-49. No further archaeological investigation is required at these sites.

Table 12.III-3 Specific Mitigation Required for Archaeological Significant Sites in the Local Study Area

Level of Archaeological Significance	Archaeological Site	Additional Work or Mitigation/Enhancement Measure
Low	KiNp-5, KiNp-11, KiNp-30, KiNp-39, and KiNp-48	these five sites were adequately mitigated during site assessment and no further work is required if the Project proceeds
	KiNp-7, KiNp-8, KiNp-34, KiNp-37, KiNp-41, and KiNp-74	sufficient subsurface testing has been conducted, but surface collection is required if the Project proceeds
	KiNp-28, KiNp-33, KiNp-38, and KiNp-76	systematic data recovery consisting of surface collection and limited subsurface excavation is required if the Project proceeds
Moderate	KiNp-4, KiNp-6 ^(a) , KiNp-15, KiNp-16, KiNp-27, KiNp-35, and KiNp-78	systematic data recovery consisting of surface collection and subsurface excavation is required if the Project proceeds
High	KiNp-29 ^(a) , KiNp-32, and KiNp-75 ^(a)	subsurface excavation and surface collection, as well as more detailed mapping and recording, is required if the Project proceeds

^(a) May be avoidable.

As a result of the elimination of the southeast esker source from consideration as a possible borrow (due to its proximity to a proposed national park) it is no longer necessary to consider mitigation measures for eight sites assessed in 2005: KiNp-1, KiNp-2, KiNp-54, KiNp-56, KiNp-58, KiNp-59, KiNp-60, and KiNp-64. No further archaeological investigation is required. Some additional sites have been

eliminated as a result of revisions to the Project footprint: KiNp-10, KiNp-17, KiNp-31, KiNp-73, KiNp-77 and KiNp-79.

Twenty-three recorded sites are located on land portages near the Winter Access Road and were revisited because they are sufficiently near the route. KkNr-34 is on low terrain immediately adjacent to this road. Testing and detailed surface examination was conducted and is judged to be sufficient mitigation at this site. Four other sites, KkNq-6, KkNq-10, KkNq-28 and KkNr-47, are within 30 m of the Winter Access Road and require monitoring and/or protection. The remaining 16 revisited sites are located on elevated terrain that would not provide a suitable winter route and have low potential for impact. No further archaeological investigation is required at these 16 sites provided the road route does not change and no ancillary facilities (camps, storage areas, and esker sources) are identified in the vicinity.

Two additional sites, KINs-1 and KINs-2, were examined as a result of the installation of a temporary camp and no further archaeological investigation is required; both sites are judged to have been mitigated.

12.III.8.4 RESIDUAL IMPACT ASSESSMENT

Definitions appropriate to the residual impact assessment for archaeological resources are provided in Table 12.III-4. For some of the following criteria the definitions are compatible with that of other disciplines, but others were revised to ensure they were representative of archaeological sites. Results of the assessment of residual effects on archaeological sites from Project-related activities following mitigation are discussed below and summarized in Table 12.III-5.

12.III.8.4.1 Direction

An impact to an archaeological site is generally negative, and is usually direct and most often results in disturbance or destruction. Indirect impacts could occur as a result of increase human presence and could occur in both the LSA and Winter Access Road Study Area, but are difficult to predict. Due to the intensity of the archaeological inventory in the Project footprint and along the Winter Access Road, there is a low likelihood that additional unknown archaeological sites will be discovered. Should sites be found during the Project development, and these sites are disturbed or destroyed, the impact will be negative.

Table 12.III-4 Definitions of Impact Criteria for the Archaeological Residual Impact Assessment

Resource	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Likelihood
Archaeology	positive: discovery of unanticipated sites negative: disturbance or loss of sites neutral: no discovery or loss of sites	negligible: no sites impacted low: few sites with low significance moderate: numerous sites with low significance high: sites with moderate to high significance impacted	local: impact restricted to LSA and Winter Access Road Study Area beyond local: impact extends beyond local extent and includes cumulative effects of other developments	short-term: less than 2 years medium-term; between 2 and 30 years long-term: more than 30 years	isolated: impact occurs once periodic: impact occurs several times continuous: impact occurs continuously	reversible: predicted impact is reversible after impact ceases irreversible: predicted impact cannot be reversed	unlikely: impact will probably not occur possible: impact may occur likely: impact will probably occur highly likely: impact will occur

Table 12.III-5 Effects Assessment by Project Development Phase for Archaeological Sites

Residual Effect	Phase of Project	Effect Attribute						
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversible	Likelihood
Discovery and documentation of unanticipated archaeological sites	construction	positive	negligible	local	long-term	isolated	no	unlikely
	operation	positive	negligible	local	long-term	isolated	no	unlikely
	closure	positive	negligible	local	long-term	isolated	no	unlikely
	post-closure	positive	negligible	local	long-term	isolated	no	unlikely
Disturbance or destruction of archaeological sites	construction	negative	high	local	long-term	isolated	no	highly likely
	operation	negative	negligible	local	long-term	isolated	no	possible
	closure	negative	negligible	local	long-term	isolated	no	unlikely
	post-closure	negative	negligible	local	long-term	isolated	no	unlikely

Positive effects can occur, such as the discovery and documentation of an unknown and unanticipated archaeological site, provided that the site is not disturbed or destroyed in the process of its discovery. Occasional development activities can also enhance the security of an archaeological site. An example would be the reinforcement of a creek or river bank to prevent increased erosion activity from impacting an archaeological site. The intensity of the archaeological inventory conducted within the LSA makes it unlikely that unknown sites will be encountered unless there is a change in the locations of development activities or areas.

12.III.8.4.2 Magnitude

The magnitude varies depending on the significance, number and type of site(s) impacted, but is usually high, especially when dealing with sites that are small and/or consist primarily of surface artifacts that are easily disturbed even by minor levels of activity.

12.III.8.4.3 Geographic Extent

The geographic extent of impact is the LSA and the Winter Access Road Study Area. Because of the limited spatial extent of most archaeological sites, it may be possible to avoid sites once their locations are known. On the other hand, because they are small, if they are within a defined development area, especially one that involves intensive development, it is highly likely that direct impact will occur. Indirect impacts could also occur as a result of increased human presence.

12.III.8.4.4 Duration and Reversibility

The impact to all affected archaeological sites is irreversible and permanent. Since the term “duration” is a measure of the length of time until an effect is reversed (see also Section 6.4.2), duration does not apply to effects to archaeological sites. Archaeological sites are non-renewable resources that cannot be replaced once they have been destroyed or disturbed, and therefore effects are irreversible. Archaeological sites that are impacted are usually destroyed or so heavily disturbed that the context of the site and its artifacts are destroyed. If mitigated prior to such impact, archaeological remains are salvaged and data are retrieved. It is most likely that sites within 500 m of intensive development and those within 250 m of ancillary activities will be impacted. However, indirect impacts could occur during any phase of the development.

12.III.8.4.5 Frequency

Effects can occur at any time during a project and can occur more than once. The majority of sites at the Project will be affected once during the construction phase of the Project. Few, if any sites, will be affected by the operation and closure phases since surface disturbances will have already occurred.

12.III.8.4.6 Likelihood

As currently proposed, there is moderate to high potential for activities associated with the Project to impact 35 archaeological sites. This represents 44% (percent) of the 80 recorded archaeological sites in the LSA. One site on the southwest esker has already been impacted (after mitigation) by gravel extraction. It is likely that three sites (KiNp-6, KiNp-29 and KiNp-75), one with moderate archaeological significance and two with high significance, can be avoided and protected through monitoring, which would decrease the percentage of sites impacted to 40%.

In Borden blocks crossed by the Winter Access Road, 130 sites have been recorded and two sites (representing 1.5%) have been impacted. Four additional sites are suggestive of moderate to high impact potential, but avoidance and protection through monitoring and/or the use of route markers is feasible. If protection of these sites is not possible, the percentage of sites impacted could be higher (possibly as high as 5%).

The combined number of sites at which moderate to high impact potential has been identified is 41, which represents approximately 19.5% of the total (210) sites recorded in direct association with the Project. The additional 44 sites recorded as a result of Project-related activities, but not detailed in this report, due to their distances from the LSA, bring the total number of sites recorded as part of the Project to 254 (Section 12.III.5.1.1). In addition, the site testing and mitigation conducted to date, as well as that which is proposed prior to construction, contributes to the knowledge of archaeological resources in this area. Prior to the Project, only one archaeological site was recorded and it was at the west end of the Winter Access Road Study Area. The discovery of these 253 sites is considered to be a positive effect.

The effects discussed for archaeological sites are primarily direct impacts and the more an area is utilized, the more likely it is that indirect impacts might occur as well. Since indirect impacts are very difficult to predict, educational programs and monitoring are likely methods to ensure that sites that have not been mitigated are protected. There is, however, limited potential for either direct or

indirect effects in the LSA without the Project since there is little incentive for large numbers of people to be in the immediate area other than for mineral exploration and mining.

12.III.8.4.7 Level of Confidence

Level of confidence for the effects on archaeological sites is high because of the intensive site-specific archaeological investigation completed for each of the sites within and near the Project footprint, and because detailed mitigation has been and will be conducted prior to disturbance.

The systematic inventory resulted in the discovery of sites and leaves a high confidence that few sites were missed. Thus, it is unlikely that new sites will be discovered and the positive residual impact is judged to be insignificant.

Systematic data recovery at sites that cannot be avoided will ensure that a representative sample of archaeological material in each site is recovered. Although a high number of sites with a range of archaeological significance will have been impacted, mitigation will be conducted prior to disturbance. As a result, the negative residual impact is moderated and is judged to be moderate rather than high.

12.III.8.5 FOLLOW-UP AND MONITORING

Should an unknown archaeological site be discovered, the feasibility of avoiding the site will be examined. In the case of a proposed open pit, relocation is not possible and options for mitigation must be identified, whereas a linear development (e.g., a section of road) or small area developments (e.g., a storage facility) can more often be relocated to avoid an archaeological site. The type of mitigation used is usually a reflection of the archaeological significance of each site in relation to the type of development or impact proposed.

An archaeological management plan will be developed (and updated as necessary) to assist in the process of managing archaeological sites and any potential impacts to known or unknown sites. This plan will include procedures to follow in the event of the discovery of unanticipated and previously unknown sites and artifacts.

If development configurations were to change such that any of the sites listed were to be potentially directly affected by construction activities, the Project archaeologist will be consulted to determine any remaining assessment or

mitigation requirements. The Project archaeologist will also periodically review development plans as part of the annual monitoring to determine any remaining assessment or mitigation requirements.

Periodic monitoring will be conducted by the Project archaeologist to ensure that the mitigation measures are successful and that accidental impacts have not occurred. The Project archaeologist will review the final selected alignment prior to construction, as well as conducting surveillance of in-place facilities. This applies to archaeological sites greater than 1 km from the Project if related activities could potentially disturb such areas. Monitoring of the Winter Access Road may be required to ensure site protection and it may be necessary to install barriers or markers to assist in protecting specific archaeological sites along the route.

Project personnel will be made aware of the location of archaeological sites situated in proximity to development zones and encouraged to avoid these locations both during and after working hours. De Beers Canada Inc. (De Beers) will educate staff and contractors about the need to protect archaeological sites. Awareness for all heritage resources will form one component of general environmental awareness for De Beers' staff and contractors under the environmental management system. Should archaeological sites be discovered by staff and contractors, the artifact(s) will not be disturbed and the Project archaeologists will be notified.

In addition to the mitigation measures completed and proposed, the following additional work will be undertaken in advance of construction of the Project:

- Relevant primary traditional knowledge information will be incorporated into the archaeological program as it becomes available and consultation with relevant First Nations will be conducted to discuss these sites and mitigation options.
- Areas of proposed development identified after August 2010 will be reviewed for archaeological potential and field reconnaissance will be conducted if necessary.

12.III.9 CUMULATIVE EFFECTS

12.III.9.1 STUDY AREA

A cumulative effects assessment (CEA) is conducted to assess environmental effects over an area that is likely to result from the Project in combination with

other projects or activities that have been or will be carried out. This assessment is limited to those residual effects (post mitigation) for archaeological sites resulting from past, present or reasonably foreseeable human activities in a larger area than was considered for the incremental residual effects of the Project. The larger area, the Cumulative Effects Study Area, was selected on the basis of relatively recent projects that included field assessment and for which detailed archaeological reports are available.

The study area selected for this Project's archaeology CEA is restricted to the NWT and includes archaeological studies undertaken within 300 km of the Project, but north of Great Slave Lake. Early archaeological surveys conducted at locations throughout the NWT, in areas with high archaeological potential, have contributed to the NWT archaeological site database; however, unless such sites have been re-examined in association with more recent development activities, they have not been included in the CEA since most were recorded over 20 years ago and their status is unknown. Project locations relevant to this study are identified in Figure 12.III-3; emphasis has been placed on development-related projects.

12.III.9.2 LOCATION OF ARCHAEOLOGICAL SITES

As a result of similar past cultural activities, the Cumulative Effects Study Area is expected to contain similar types and ages of archaeological sites although not all will be represented in all portions and earlier cultural evidence may be encountered. The projects are not directly comparable as they are of different sizes and configurations, in different stages of development, and the types and intensity of archaeological study varied.

Past experience and the research conducted for this CEA has indicated that negative impacts to archaeological sites in the region have occurred as a result of land survey; mineral, and oil and gas exploration; winter road use and operation; mine development; sand and gravel extraction; road construction; power generation facilities; development of airstrips; as well as through hunting, fishing, and other recreational activities. Any activity that involves modification of the ground surface can negatively impact an archaeological site. The more extensive and intensive the activities are, the more likely it is that archaeological effects will occur.

It is much easier to protect sites if their locations are known, but not all activities that have occurred in the Cumulative Effects Study Area have been preceded by detailed archaeological investigations, especially those conducted decades ago. It is possible that unknown sites have been damaged or destroyed by past

activities. The majority of the archaeological sites that have been recorded in this study area are characterized by surface or shallowly deposited archaeological material. As a result, they are easily disturbed or destroyed.

12.III.9.3 DEVELOPMENT PROJECTS IN THE NORTHWEST TERRITORIES

Development activities that have resulted in detailed archaeological investigations within the eastern NWT are listed in Table 12.III-6. Residual effects on archaeological sites resulting from these activities are consistent with those identified for this Project, particularly the discovery, documentation, and mitigation of unanticipated archaeological sites (positive effect) and disturbance or destruction of archaeological sites (negative effect).

Table 12.III-6 Projects Considered for the Archaeological Sites Cumulative Effects Assessment

Access Projects	Mining Projects	Exploration Projects	Other
Tibbitt-to-Contwoyto Winter Road	Yellowknife Gold	Hardy Lake	Warburton Bay Lodge
Gahcho Kué Project Winter Access Road	Diavik Diamond Mine	Seabridge Gold	Daring Lake Science Camp
Snap Lake winter access road	Ekati Diamond Mine	Snowfield Development	Mackay Lake Lodge
Airstrip construction	Snap Lake Mine	New Shoshoni Ventures	Taltson Hydroelectric Expansion
	Gahcho Kué Project	Drybones Bay	
		Thonokied Lake	

Archaeological investigation in conjunction with winter road use or construction has indicated that archaeological sites can occur frequently near such routes. The winter access roads for the Snap Lake Mine and Gahcho Kué Project are discussed in conjunction with their respective mines and not as separate studies for this CEA.

Archaeological sites have also been found in areas where diamond exploration has been conducted, but impact at the exploration phase of development appears to be limited. Since exploration activities commonly cover a wider area than a proposed mine, when archaeological investigations are conducted it can result in a greater contribution to our knowledge of archaeological resources.

12.III.9.4 ARCHAEOLOGY INVENTORIES AND DATABASES

De Beers has initiated archaeological inventory and developed an archaeological database in two areas besides the Project: the Snap Lake Mine (80 km to the west) and an exploration project near Hardy Lake (northeast of the Ekati Diamond Mine). Archaeological investigations were also conducted in advance of exploration activity at the Ekati Diamond Mine and undertaken in advance of mine development for the Diavik Diamond Mine.

The route of the Tibbitt-to-Contwoyto Winter Road was subjected to a post-construction archaeological assessment, primarily in response to diamond industry related activity. Another linear corridor that may be developed in response to the diamond industry is the proposed Taltson Hydroelectric Expansion that would provide power to the diamond mines.

The YDFN sponsored archaeological investigations on southern MacKay Lake and near Drybones Bay on northern Great Slave Lake in response to concerns about mineral exploration. This was followed by additional archaeological inventory for two diamond exploration projects on the north shore of Great Slave Lake.

The Department of Resources, Wildlife and Economic Development (RWED) sponsored a Tundra Science Camp northwest of the Ekati Diamond Mine (not shown in Figure 12.III-4) to foster research largely as a result of diamond exploration. Part of the camp activities included archaeological survey and site recording.

Limited investigations have been conducted at Thonokied Lake, another diamond exploration area south of Lac de Gras. Archaeological inventories have also been undertaken at two proposed gold mines located north of Great Slave Lake: Seabridge Gold near Courageous Lake, and the Yellowknife Gold Project near the old Discovery Mine near Winter and Nicholas lakes (Figure 12.III-4). Earlier mines, such as the Tundra Mine, that fall within the Cumulative Effects Study Area were not subjected to an archaeological assessment prior to construction and operation and are not part of this assessment.

The final project included in the cumulative effects review was an impact assessment conducted prior to the construction of the existing Snare Lakes (Wekweèti) airport.

A summary of the archaeological data from the above CEA projects is provided below in Table 12.III-7. Not all projects are in the final stages of development

and it is highly likely that the numbers of sites recorded, the potential for sites to be impacted, and the levels of archaeological investigation will change as these projects either proceed or are put on hold.

Table 12.III-7 Archaeological Sites and Impact Potential by Project or Site Location

Project or Project Location	Type of Activity That Resulted in Site Discovery	Number of Sites	Sites with Potential for Impact ^(a)	Percent (%)
Gahcho Kué Project	diamond industry	254	41	16
Diavik Diamond Mine	diamond industry	199	68	34
Ekati Diamond Mine	diamond industry	200	17	8.5
Snap Lake Mine	diamond industry	53	2	4
<i>Subtotal</i>		<i>706</i>	<i>128</i>	<i>18</i>
Tibbitt-to-Contwoyto Winter Road	diamond industry related	55	23	42
Taltson Hydroelectric Expansion	diamond industry related	13	0	0
MacKay Lake (YDFN)	diamond exploration related	40	5	12.5
Hardy Lake (De Beers)	diamond exploration	40	2	5
Drybones Bay (YDFN)	diamond exploration related	69	5	7
Snowfield Development	diamond exploration	125	5	4
New Shoshoni Ventures	diamond exploration	33	4	12
Thonokied Lake	diamond exploration	8	1	12.5
<i>Subtotal</i>		<i>383</i>	<i>45</i>	<i>12</i>
Seabridge Gold	gold exploration	14	5	36
Yellowknife Gold Project	gold exploration	0	0	0
Wekweètì	airstrip construction	8	1	12.5
Daring Lake	RWED science camp	14	0	0
<i>Subtotal</i>		<i>36</i>	<i>6</i>	<i>17</i>
Total		1,125	179	16

^(a) Includes sites already impacted.

% = percent; YDFN = Yellowknives Dene First Nation; RWED = Department of Resources, Wildlife and Economic Development.

12.III.9.5 SUMMARY OF FINDINGS

12.III.9.5.1 Archaeological Studies and the Diamond Industry

The number of sites that have been threatened or impacted as a result of operating diamond mines varies although, for two projects, similar numbers of archaeological sites have been discovered. In the following discussion, sites that have been mitigated through archaeological investigations are considered to have been impacted. The site numbers and percentages are summarized in Table 12.III-7. The predicted maximum is identified recognizing that the site numbers for the Project are tentative and could vary once development plans are finalized.

For the Diavik Diamond Mine, 199 archaeological sites were discovered and recorded in advance of construction (Fedirchuk 1995, 1999, 2000; Unfreed 1997). It was predicted that a relatively high proportion of these, approximately 68 sites (34%), would be impacted during activities associated with mine construction. A representative sample of these sites was subjected to varying levels of mitigation.

At the Ekati Diamond Mine, there are 200 archaeological sites (Bussey 1994, 1996, 1998b, 1999, 2000b, 2001, 2002c, 2003a, 2004a, 2005b, 2006b, 2007). To date, mitigation has occurred at 13 sites and four sites were disturbed by activities that occurred prior to site discovery, for a total of 17 sites or 8.5% of the total recorded sites. Varying levels of mitigation have been conducted at most affected sites.

Only two sites were near enough to potential development activity at the Snap Lake Mine that mitigation was conducted (Bussey 1998a, 2000a, 2002b, 2003c, 2004b; Thomson 2001). Fifty-three sites have been recorded in conjunction with this mine; thus, the two mitigated sites represent less than 4% of the total.

At the three existing diamond mines in the NWT, a total of 452 archaeological sites have been recorded, with an estimated 87 sites (19%) impacted or predicted to be impacted through mitigation, exploration, or development activity. Prior to archaeological investigations related to the diamond industry, which were initiated in 1994, there were fewer than ten previously recorded sites in the immediate vicinity of these three study areas.

At the proposed Project, 254 sites have been recorded as a result of related archaeological investigations and there is potential for impact at 41 sites (16%), which is lower than at Diavik and higher than at Ekati or Snap Lake.

Not associated solely with the diamond industry, but inventoried on behalf of the Joint Venture that included the Diavik and Ekati diamond mines, the Tibbitt-to-Contwoyto Winter Road is a linear corridor that was examined for archaeological resources in 2001. Fifty-five new archaeological sites were discovered during this inventory, which was limited to land-based portions of the route since sites in areas where the road is on frozen lakes are avoidable (Bussey 2002a). Because the inventory was conducted nearly 20 years after the road was constructed, it is not surprising that 23 (42%) threatened or impacted archaeological sites were encountered (Bussey 2003b). Not all disturbances were a direct result of the Tibbitt-to-Contwoyto Winter Road, but would not likely have occurred if the winter road was not present.

The potential of a non-diesel source of power for the diamond industry prompted archaeological field investigations for the proposed Taltson Hydroelectric Expansion Project (Novecosky and Clarke 2009). Eight new archaeological sites, including two near the Winter Road Access Study Area, were discovered and four previously recorded sites were revisited. No impact potential was identified since it was predicted that towers could be placed in a manner that would avoid archaeological sites, but the final corridor has not been determined and further studies were recommended.

The intensity of mine exploration activities in the last decade has prompted other archaeological studies. The preliminary archaeological survey of the south end of MacKay Lake between MacKay Lake Lodge and Warburton Lodge (Figure 12.III-3) resulted in the discovery of 40 archaeological sites (Thomson 2005b). It would appear that impact has occurred or is likely to occur at five sites (12.5%), as a result of recreational rather than mining related activities.

Another area of concern to the YDFN, the Drybones Bay vicinity of northern Great Slave Lake, has seen two studies. In 2003, 64 archaeological sites were recorded in an area that contained five previously recorded sites (Thomson et al. 2004), for a total of 69 sites. It would appear that impact has occurred or is very likely to occur at five sites (7%). The identified or potential disturbances include cut lines (identified by Thomson as associated with mining or exploration), an exploration camp and a cabin. Additional work was conducted by Thomson and Ratch (2005) for New Shoshoni Ventures Ltd. with no evidence of site disturbance as a result of mineral exploration noted at the 33 new sites recorded; however, potential for impact was identified at four sites (12%).

Further work in the northern portion of Great Slave Lake was undertaken in 2004. Archaeological investigations conducted for Snowfield Development Corp. and the YDFN resulted in the recording of 114 archaeological sites in an area with 11

previously recorded sites, for a total of 125 sites (Thomson 2005a). Disturbances have occurred as a result of sand and gravel extraction, cabin construction and the development of a recreational lodge; a minimum of five disturbed sites were identified (4%).

Forty new sites were found in the Hardy Lake vicinity (Thomson 2004). One was disturbed by apparent gravel extraction activities and another by a camp occupied approximately 20 years before exploration by De Beers. This represents a low percentage of disturbed sites in this project area (5%).

Eight new sites were recorded in the Thonokied Lake area on behalf of Peregrine Diamonds Inc. and in response to diamond exploration. Impact unrelated to the project is predicted at one of the sites (12.5%); the other seven are not expected to be affected by exploration activities (Thomson 2006).

In summary, as a result primarily of diamond exploration and development, approximately 1,089 archaeological sites have been documented or updated (Table 12.III-7). It is possible that 173 (16%) of these sites will be or have been disturbed or destroyed, although a small proportion of those have been affected by activities (e.g., recreation) not related to the diamond industry.

12.III.9.5.2 Non-Diamond Archaeological Studies

Detailed and recent archaeological studies associated with projects that are not related to the diamond industry are limited within the Cumulative Effects Study Area. A preliminary archaeological study was conducted near Courageous Lake (Bussey 2003d) for the Seabridge Gold Project (Figure 12.III-3; Table 12.III-7). Four historic/recent and ten prehistoric sites were recorded. Five of the prehistoric sites have been impacted by previous mining activity, recreational use of this area, and/or the Seabridge exploration activity around Matthews Lake. Although portions of these sites are intact, this represents a relatively high percentage of sites affected (36%).

At the Tyhee NWT Corp. Yellowknife Gold Project, no new archaeological sites were discovered although two seasons of investigation were conducted by Points West (Prager 2005, 2006). Three previously recorded archaeological sites were not revisited since they were well removed from proposed development activity; as a result, their status is not known and they are not included in this CEA.

A proposed airstrip at Snare Lakes, now known as Wekweètì, resulted in the revisit of two previously recorded sites and the discovery of a new site in 1992 (Andrews 1993). The latter site was within the impact footprint and was mitigated

through excavation (Weyman and Andrews 1994). Other sites in this area were not revisited as they were not threatened and their status is not known.

At the RWED science camp on Daring Lake northwest of the Ekati Diamond Mine, 14 archaeological sites were recorded; none of these sites were impacted since the objective was to conserve any archaeological resources encountered (Andrews 1998).

Recent archaeological projects not related to the diamond industry and within the selected cumulative effects study area have resulted in the discovery or consideration of a total of 36 sites, some of which were previously recorded (Table 12.III-7). Six of these 36 sites (17%) have been impacted to some degree; one of the six sites was mitigated prior to its disturbance.

12.III.9.5.3 Overall Cumulative Effects for Archaeological Sites

Archaeological site numbers are increasing as a result of the inventory conducted in recent years and, provided appropriate mitigation or management measures continue to be completed in advance of development, the impact to sites may be prevented by avoidance or compensated for by detailed archaeological investigations in advance of ground disturbing activities. The discovery and assessment of archaeological sites is viewed as a positive effect. The mitigation of sites through surface collection and excavation contributes to the archaeological database and is both a negative effect (site is disturbed or destroyed) and a positive effect (data are collected).

As indicated in Table 12.III-7, approximately 706 sites have been discovered primarily as a result of archaeological work conducted for the three developed NWT diamond mines and the proposed Project. Approximately 128 of these sites have been, or will likely be, impacted and/or mitigated, which represents 18%. Diamond related activities have resulted in the discovery or revisit of about 383 sites and it is predicted that impact will or has occurred at 45 sites (12%). Averaged out, this means that 1,089 sites have been found and 173 (16%) are threatened or have been impacted.

Within the Cumulative Effects Study Area selected for the archaeology component of this EIS, non-diamond related archaeological studies have involved only 36 sites and 6 (17%) of those have been impacted to some degree. The percentage of sites threatened or impacted is thus comparable for diamond industry related and non-diamond projects. However, the quantity of data or sample size is much larger for the diamond industry. Also, it must be remembered that the archaeological study areas have varied from project to

project. While some projects have assessed only areas potentially to be impacted, others have examined larger areas to provide a broader database.

The formal recording of archaeological sites in the NWT was initiated around 1949 (Johanis, pers. comm. 2006). At the request of Points West, the PWNHC reviewed their site files and indicated that there are 6,212 recorded sites in the NWT (NWT Cultural Places Program 2010). Using the data above, 1,089 have been recorded or updated primarily as a result of the diamond exploration and development industry, representing 17.5% of the 6,212 recorded sites. Since approximately 2,557 sites (NWT Cultural Places Program 2010) are located in the eastern portion of the NWT where these diamond projects are occurring, the 1,098 sites represent an even higher percentage (almost 43%) of new sites in the region. The status of sites found much earlier in time, as a result of other activities, or in the western NWT, has not been assessed for this study, but it is likely that the only other industry that has resulted in a similarly high number of new sites is the oil and gas industry.

Cumulative effects for archaeological sites are difficult to predict for future, unknown developments since the frequency, size, and significance of archaeological sites can vary from one arbitrarily defined (by nature of development project) study area to the next. It is evident that at the Ekati Diamond Mine, few sites have been impacted, but had they not inventoried a larger area, the site discovery rate would also have been low. Whereas at the Diavik Diamond Mine, numerous sites were found in a much smaller study area and many more were impacted because of its location on an island in a major lake. Location and the characteristics of the location are integral to archaeological resources.

It is possible that the actual number of sites affected at any of the above exploration and pre-development projects might vary to those shown, depending on final Project footprints.

12.III.10 REFERENCES

12.III.10.1 LITERATURE CITED

- Andrews, T. 1993. Archaeological Assessments 1992. Report on file with the Prince of Wales Northern Heritage Centre, Yellowknife, NWT.
- Andrews, T. 1998. Report of an Archaeological Survey of the Tundra Ecosystem Research Station Area, Daring Lake, NWT. Report on file with the Prince of Wales Northern Heritage Centre, Yellowknife, NWT.
- Borden, C. 1952. A Uniform Site Designation Scheme for Canada. Anthropology in British Columbia, Vol. 4:44-58.
- Bussey, J. (Points West Heritage Consulting Ltd.). 1994. Final Report on Archaeological Investigations for the BHP NWT Diamonds Project. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 1996. 1995 Archaeological Investigations for BHP Diamonds Inc. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 1997. 1996 Archaeological Investigations for BHP Diamonds Inc. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 1998a. Archaeological Assessment of Two Gravel Sources near Snap Lake, NWT. Report submitted to Winspear Resources Ltd., Vancouver, BC.
- Bussey, J. (Points West). 1998b. Archaeological Investigations for BHP Diamonds Inc., EKATI Diamond Mine, NWT, 1997. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 1999. Archaeological Investigations for BHP Diamonds Inc., EKATI Diamond Mine, NWT, 1998. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2000a. 1999 Snap Lake Archaeological Program. Report submitted to Winspear Resources Ltd., Vancouver, BC.

- Bussey, J. (Points West). 2000b. 1999 Archaeological Investigations for BHP Diamonds Inc. at the Ekati Diamond Mine, NWT. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2001. 2000 Archaeological Investigations for BHP Diamonds Inc. at the Ekati Diamond Mine, NWT. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2002a. Tibbitt to Contwoyto Winter Road Archaeological Investigations, 2001. Report submitted to EBA Engineering Consultants Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2002b. 2001 Snap Lake Diamond Project Archaeological Program. Report submitted to De Beers Canada Mining Inc., Yellowknife, NWT.
- Bussey, J. (Points West). 2002c. 2001 Archaeological Investigations at the Ekati Diamond Mine, NWT. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2003a. 2002 Archaeological Investigations at the Ekati Diamond Mine. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2003b. Tibbitt to Contwoyto Winter Road Project 2002 Archaeological Investigations. Report submitted to EBA Engineering Consultants Ltd. Vancouver, BC.
- Bussey, J. (Points West). 2003c. Archaeological Monitoring for the Snap Lake Diamond Project, 2003. Report submitted to De Beers Canada Mining Inc., Yellowknife, NWT.
- Bussey, J. (Points West). 2003d. Archaeological Investigations for Seabridge Gold Inc. at the Courageous Lake Property. Report submitted to EBA Engineering Consultants Ltd., Yellowknife, NWT.
- Bussey, J. (Points West). 2004a. 2003 Archaeological Investigations at the Ekati Diamond Mine. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.

- Bussey, J. (Points West). 2004b. 2004 Archaeological Investigations for the Snap Lake Diamond Project. Report submitted to De Beers Canada Mining Inc., Yellowknife, NWT.
- Bussey, J. (Points West). 2005a. Gahcho Kué Diamond Project 2004 Archaeological Investigations. Report submitted to De Beers Canada Mining Inc., Yellowknife, NWT.
- Bussey, J. (Points West) 2005b. 2004 Archaeological Tours at the Ekati Diamond Mine™. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2006a. 2005 Archaeological Investigations for the Gahcho Kué Project. Report submitted to De Beers Canada Inc., Yellowknife, NWT.
- Bussey, J. (Points West). 2006b. 2005 Archaeological Investigations at the Ekati Diamond Mine. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2007. 2006 Gahcho Kué Project Archaeological Investigations. Report submitted to De Beers Canada Inc., Yellowknife, NWT.
- Bussey, J. (Points West). 2008a. 2007 Gahcho Kué Project Archaeological Investigations. Report submitted to De Beers Canada Inc., Yellowknife, NWT.
- Bussey, J. (Points West). 2008b. 2007 Archaeological Investigations at the Ekati Diamond Mine. Report submitted to Rescan Environmental Services Ltd., Vancouver, BC.
- Bussey, J. (Points West). 2010 In Progress. 2010 Gahcho Kué Project Archaeological Investigations. Report to be submitted to De Beers Mining Canada Inc., Yellowknife, NWT.
- Fedirchuk, G. (Fedirchuk McCullough & Associates Ltd. [Fedirchuk McCullough]). 1995. Heritage Resource Impact Assessment, Kennecott Southwest Diavik Property. Report submitted to Acres International Ltd., Calgary, AB.

- Fedirchuk, G. (Fedirchuk McCullough). 1996. Heritage Resource Studies, Mountain Province Mining Inc., Kennady Lake. Report prepared for Canamera Geological Ltd., Vancouver, BC.
- Fedirchuk, G. (Fedirchuk McCullough). 1999. Diavik Diamonds Project. Environmental Effects Report, Heritage Resources. Report submitted to Diavik Mines Inc., Yellowknife, NWT.
- Fedirchuk, G. (Fedirchuk McCullough). 2000. Heritage Resource Studies. Diavik Diamond Mines Inc. Lac de Gras Potential Borrow Source. Report submitted to Diavik Diamond Mines Inc, Yellowknife, NWT.
- Gahcho Kué Panel. 2007. Terms of Reference for the Gahcho Kué Environmental Impact Statement. Mackenzie Valley Environmental Impact Review Board. Yellowknife, N.W.T. October 5, 2007.
- NWT Cultural Places Program. 2010. NWT Archaeological Sites Database. Prince of Wales Northern Heritage Centre, Yellowknife, NWT.
- Novocosky, B. and G. Clarke (Golder Associates Ltd.). 2009. Taltson Hydroelectric Expansion Project. Report submitted to the PWNHC, Yellowknife, NWT.
- Prager, G. (Points West Heritage Consulting Ltd.). 2005. Tyhee Yellowknife Gold Project Archaeological Assessments, 2004: Final Report. Report submitted to EBA Engineering Consultants Ltd., Yellowknife, and Tyhee NWT Corp., Vancouver, BC.
- Prager, G. (Points West Heritage Consulting Ltd.). 2006. Tyhee NWT Corp. Yellowknife Gold Project 2005 Archaeological Investigations Final Report. Report submitted to Tyhee NWT Corp., Vancouver, BC.
- Stoddart, E. (Jacques Whitford) 2002. Continuing Heritage Resource Inventory, Assessment and Mitigation at Gahcho Kué and on Winter Access Routes between MacKay Lake and Gahcho Kué. Report submitted to De Beers Canada Exploration Inc., Yellowknife, NWT.
- Thomson, C. (Jacques Whitford). 1998. Final Report on an Archaeological Overview Assessment of the Proposed 1998-99 Winter Construction Areas, Kennady Lake (Gahcho Kué), District of Mackenzie, NWT. Report prepared for Monopros Limited, Yellowknife, NWT.

- Thomson, C. (Jacques Whitford). 2000a. Heritage Resource Inventory, Mineral Exploration Area around Kennady Lake (Gahcho Kué), District of Mackenzie, NWT. Report prepared for Monopros Limited, Yellowknife, NWT.
- Thomson, C. (Jacques Whitford). 2000b. Archaeological Assessment of the 1998-99 Winter Access Route between Margaret Lake and Kennady Lake (Gahcho Kué), District of Mackenzie, NWT. Report prepared for Monopros Limited, Yellowknife, NWT.
- Thomson, C. (Jacques Whitford). 2000c. Archaeological Assessment of the 1998-99 Winter Access Route between MacKay Lake and Munn Lake, District of Mackenzie, NT. Report prepared for Monopros Limited, Yellowknife, NWT.
- Thomson, C. (Jacques Whitford). 2001. Heritage Resource Inventory, Assessment and Mitigation at Gahcho Kué and Winter Access Routes between MacKay Lake and Gahcho Kué. Report submitted to De Beers Canada Exploration Inc., Yellowknife, NWT.
- Thomson, C. (Jacques Whitford). 2002. Continuing Heritage Resource Inventory, Assessment and Mitigation at Gahcho Kué and on Winter Access Routes between MacKay Lake and Gahcho Kué, District of Mackenzie, NWT. Report submitted to De Beers Canada Exploration Inc., Yellowknife, NWT.
- Thomson, C. (Jacques Whitford). 2003. Continuing Heritage Resource Inventory, Assessment and Mitigation, Gahcho Kué Area and Adjoining Doyle Lake Property, NT. Report submitted to De Beers Canada Exploration Inc., Yellowknife, NWT.
- Thomson, C. (Thomson Heritage Consultants). 2004. Preliminary Heritage Resource Inventory and Assessment at Hardy Lake, Northwest Territories. Report submitted to Jacques Whitford, Calgary, AB.
- Thomson, C. (Thomson Heritage). 2005a. Final Report. Archaeological Investigations, Great Slave Lake, Northwest Territories. Report submitted to Snowfield Development Corp., Vancouver and Yellowknives Dene First Nation, Detah, NWT.
- Thomson, C. (Thomson Heritage). 2005b. Archaeological Survey of MacKay Lake, Northwest Territories. Report submitted to the Yellowknives Dene First Nation Land and Environment Committee, Yellowknife, NWT.

- Thomson, C. and S. Ratch (Thomson Heritage). 2005. Archaeological Investigations, Drybones Bay, Great Slave Lake, Northwest Territories. Report submitted to New Shoshoni Ventures Ltd., Vancouver, BC.
- Thomson, C. and S. Ratch (Thomson Heritage). 2006. Archaeological Inventory and Assessment of Mineral Exploration Area DO27 and Winter Access Route, Thonokied Lake Area, NT. Report submitted to Peregrine Diamonds Ltd., Vancouver, BC.
- Thomson, C., J.S. Thomson and R. Freeman (Thomson Heritage). 2004. Archaeological Assessment of Mineral Exploration and Aggregate Extraction in the vicinity of Drybones Bay and Wool Bay, Great Slave Lake, Northwest Territories. Report submitted to Yellowknives Dene First Nation Land and Environment Committee, Yellowknife, NWT.
- Unfreed, W. (Fedirchuk & McCullough). 1997. Continuing Inventory: Historical Resources Impact Assessment, Diavik Diamond Project, Lac de Gras, NWT. Report submitted to Diavik Diamond Mines Inc., Yellowknife, NWT.
- Weyman, M. and T. Andrews, 1994. Analyses of Native Copper Artifacts from a Dene Copper Workshop at Snare Lake, Northwest Territories, Canada. Paper presented at the Canadian Archaeological Association Conference, Edmonton, AB.

12.III.10.2 PERSONAL COMMUNICATION

- Johanis, L. 2006. Email communication to the Prince of Wales Northern Heritage Centre. CMC Sites Office, Canadian Museum of Civilization. June 14, 2006.

12.III.11 ACRONYMS AND GLOSSARY

12.III.11.1 ACRONYMS

ASTt	Arctic Small Tool tradition
BP	before present
CEA	cumulative effects assessment
De Beers	De Beers Canada Inc.
e.g.	for example
EIS	environmental impact statement
Fedirchuk McCullough	Fedirchuk McCullough & Associates
i.e.	that is
Jacques Whitford	Jacques Whitford Environment Ltd.
LSA	Local Study Area
MVLUR	Mackenzie Valley Land Use Regulations
NTASR	Northwest Territories Archaeological Sites Regulations
NWT	Northwest Territories
Points West	Points West Heritage Consulting Ltd.
Project	Gahcho Kué Project
PWNHC	Prince of Wales Northern Heritage Centre
RSA	Regional Study Area
RWED	Department of Resources, Wildlife and Economic Development
YDFN	Yellowknives Dene First Nation

12.III.11.2 UNITS OF MEASURE

%	percent
km	kilometre
m	Metre

12.III.11.3 GLOSSARY

Arctic Small Tool Tradition	An early Inuit culture (also called Pre-Dorset) characterized by the use of distinctive small tools, usually of light coloured chert; approximately 2,500 to 3,500 years BP.
Borden Block	A Canada-wide alpha-numeric grid system designed by Charles Borden to record archaeological sites using "Borden blocks" for reference.
Camp	An archaeological site containing cultural material suggestive of a variety of activities and/or containing structural remains or features such as hearths.

Features	Non-portable artifact of human construction; examples include hearths, tent rings and caches.
Flake	Fragment of rock discarded during core reduction or in the manufacture of stone tools (see debitage and lithic).
Historic	Refers to the period of time for which there are written records; also referred to as post-contact.
Isolated find	An archaeological site type consisting of a single artifact, whether an unworked flake, stone tool or other specimen.
Lithic	Stone; also used as an alternate word for debitage or flake.
Lithic scatter	An archaeological site type consisting of unworked flakes and/or stone tools; also referred to as an artifact scatter.
Lookout	A functional archaeological site type presumed to have served as a strategic location for viewing the surrounding terrain.
Northern Plano Tradition	Refers to an early Paleo-Indian culture characterized by distinctive lanceolate-shaped spear points; approximately 6,500 to 8,000 years BP.
Prehistoric	Refers to the period of time before written records; also known as pre-contact.
Quarry	An archaeological site type where outcroppings of a lithic material suitable for stone tool manufacture have been quarried or mined.
Shield Archaic Tradition	An archaeological culture that follows and may have evolved out of the Northern Plano Tradition; approximately 3,500 to 6,500 years BP.
Taltheilei Tradition	An archaeological culture that is associated with Athapaskan occupations and followed the Arctic Small Tool Tradition; approximately 200 to 2,500 years BP.
Tent ring	A functional name for an archaeological feature; a ring of rocks presumably used to hold down the cover of a tent or tipi-like structure.
Workshop	An archaeological site type consisting of a significant quantity of debitage suggestive of intensive use of locally available stone to manufacture tools, tool blanks or performs; commonly located near a quarry.