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## 16 – COMMUNITY VITALITY

### 16.1 INTRODUCTION

The Community Vitality VC assesses the potential effects of the Project on demographic conditions and well-being of the communities located in the Project's LSA. The potential effects of the Project on community vitality will ultimately depend on the extent to which Project employment results in people moving into the area, either permanently or temporarily. Typically, the temporary population increase would occur during the construction phase, and workers would be housed in a construction camp at the mine site. During the operations phase, a site camp would continue to be provided, but some workers could decide to move to the LSA. This could lead to an increase in population and possibly change the demographic composition of the LSA. In addition, the potential change in community demographics, and new Project-related income and work schedules could affect social and behavioural conditions in the communities and therefore affect the well-being of individuals, families, and communities in the LSA. The key indicators selected to assess community vitality are: Population and Demographics, and Community Well-being. Supplemental information to complement this section is provided in Appendix 13A.

#### 16.1.1 Regional Setting

The Project is a proposed Open Pit mine located approximately 300 kilometres (km) northwest of Whitehorse, Yukon Territory on Crown land that is administered by Yukon Government. The Project site is located within the Selkirk First Nation traditional territory. The Project will require construction of a road access, including upgrades to the existing Freegold Road and construction of the Freegold Road Extension on land that partially falls within the Selkirk First Nation and Little Salmon/Carmacks First Nation traditional territories. The Freegold Road Extension and proposed Freegold Road Upgrade will extend for approximately 200 km southeast from the Project to the village of Carmacks.

#### 16.1.2 Rationale for VC Selection

The Community Vitality VC was identified based in consideration of the information and issues communicated by the public, Aboriginal groups, local communities, and government stakeholders during the engagement process conducted in support of this Proposal. This VC and specific indicators were also selected based on professional judgement and experience in conducting socioeconomic effects assessments.

Potential population changes are important to consider because it is a prominent factor in determining community character and demands on infrastructure and services. It is a common practice to evaluate population changes because population directly affects the quality of life in a region, and assists public and private agencies in planning for future capacity requirements for various services. Population changes and new Project-related income could also affect the well-being of individual, families, and communities in the area. This section of the Proposal assesses the potential effects of the Project on these conditions that could affect the vitality of the local communities.

### 16.2 ASSESSMENT BOUNDARIES

#### 16.2.1 Local Study Area (LSA)

The LSA for socio-economic VCs, which includes Community Vitality, is defined in Section 13.2.1 and shown on Figure 13.1-1.

### 16.2.2 Regional Study Area (RSA)

The RSA for socio-economic VCs, which includes Community Vitality, is defined in Section 13.2.2 and shown on Figure 13.1-1.

### 16.2.3 Temporal Boundaries

The temporal boundaries for the effects assessment is defined in Section 5.2 of the Proposal as the life of the Project. Details on activities associated with the construction, operation, closure and decommissioning, and post-closure phases of the Project is provided in Section 4.0.

## 16.3 BASELINE CONDITIONS

This section provides an overview of relevant baseline conditions for each of the key indicators chosen to assess the potential effects of the Project on Community Vitality. The key indicators used to assess Project effects on this VC include: Population and Demographics, and Community Well-being. A detailed baseline for these indicators is available in Appendix 13A: Socioeconomic Baseline of this Proposal.

### 16.3.1 Population and Demographics

#### 16.3.1.1 Selkirk First Nation / Pelly Crossing

Selkirk First Nation (SFN) has a registered membership of approximately 500 people according to the community website (SFN 2012) although Aboriginal Affairs and Northern Development Canada (AANDC) reports the figure at 614 as of September 2013 (AANDC 2013). The SFN website estimates that only 40% of membership reside in Pelly Crossing (SFN 2012) and AANDC estimates that 47% of the population live off-reserve (e.g., not in Pelly Crossing) (AANDC 2013). Of those, approximately 75 SFN members reside in Whitehorse (Fred 2008a).

Pelly Crossing's population grew by 24% from 281 to 348, between 2005 and 2010. Net migration into the community accounted for 66% of this growth (Yukon Bureau of Statistics 2011a). Selkirk First Nation comprises the majority of the population, making up approximately 80% of residents (Fred 2008a). The 2011 National Household Survey (NHS) indicates that approximately 91% (305) of Pelly Crossing residents are Aboriginal (Statistics Canada 2013c). This is the highest percentage among the LSA communities. Unlike Yukon, where the proportion of males and females was balanced, Pelly Crossing had a higher proportion of males to females at 55% to 45%, respectively (Statistics Canada 2012).

#### 16.3.1.2 Little Salmon/Carmacks and Carmacks

According to the Little Salmon/Carmacks First Nation (LSCFN) website, LSCFN has a total reported membership of approximately 630 people including status and non-status beneficiaries (LSCFN 2012). Aboriginal Affairs and Northern Development Canada estimates the membership at 640 as of September 2013, of which 52% live outside of the home community of Carmacks (AANDC 2013). The 2006 Census estimates that about half (47.8%) of membership reside within the home community of Carmacks (Fred 2008b). Another, 28.3% reside outside of the home community but within Yukon, while an additional 23.9% live outside of Yukon. According to 2006 Census, approximately 130 members (21%) reside in Whitehorse (Fred 2008b).

Based on Yukon Health Care Registration data, the total population in the Village of Carmacks as of 2012 is 513 people. The population has increased steadily since 2006, growing from 405 in 2006 to 513 in 2012 (Yukon Bureau of Statistics 2013). Net in-migration accounted for 77% of the community's population growth between 2005 and 2010 (Yukon Bureau of Statistics 2011). LSCFN members comprise the majority of the population,

making up approximately 76% of residents (Fred 2008b). This is consistent with census information that reported 76.5% of Carmacks residents in 2006 were of Aboriginal identity (Statistics Canada 2007).

Population growth is identified as a key long-term goal in the Carmacks Integrated Community Sustainability Plan (Village of Carmacks 2006). The report suggests that population growth is needed to increase the ability of local governments to finance community services and infrastructure and would aid development of a thriving business environment.

#### 16.3.1.3 Whitehorse

Whitehorse is the largest community in Yukon with a population of 27,753 in 2012; this equates to 78% of the population of Yukon (35,621) (Yukon Bureau of Statistics 2013). The City of Whitehorse grew by approximately 13.8% between 2006 and 2011, which is about twice the national growth rate of 5.9% for the same period and accounted for most (85%) of the 11.6% growth that occurred in Yukon between 2006 and 2011 (Statistics Canada 2013a). Across the territory, populations in some smaller communities have declined over the past few years (Yukon Economic Development 2010). The majority of the population growth is a result of net migration to the city, but the birth rate also exceeded the death rate, which is not the case for Canada as a whole (CMHC 2012). The 2011 NHS indicates that approximately 17% (3,770) of Whitehorse residents are Aboriginal, higher than the Canadian average of 4% but lower than Yukon's average of 23% (Statistics Canada 2013c).

#### 16.3.1.4 Yukon

Yukon has seen rapid population growth (11.6%) over the period 2006 to 2011, the highest rate of all the provinces and territories. This development is welcomed by the Yukon Government, which seeks to present Yukon as a "world-class destination in which to live, work and invest" (Yukon Economic Development 2011). During the period 2007 to 2012, the number of births (1,885) exceeded the number of deaths (1000) by 89%. At the same time, the number of (1,109) immigrants to Yukon exceeded emigrants (115) by 864% (Statistics Canada 2013b).

#### 16.3.2 Community Well-being

The AANDC has developed a Community Well-being Index (CWBI) based on four primary indicators: education, labour force activity, income, and housing conditions. CWBI scores range from 0 (lowest/worst) to 100 (highest/best) and are constructed from Census 2006 data, which are the most comprehensive data currently available.

There are considerable differences between well-being conditions in the rural communities of Pelly Crossing and Carmacks compared to the urban community of Whitehorse. The rural communities of Pelly Crossing and Carmacks had CWBI scores of 71 and 70, respectively, which is below the overall Yukon score of 78. The education category had the lowest scores for both communities, with average scores of only 43 and 44, respectively, which were the third and fourth lowest in Yukon (AANDC 2006). The small population size, particularly in Pelly, means these results need to be considered as a general indicators, rather than accurate reflections of the situation.

Whitehorse, by contrast, had a CWBI score of 85, which is the highest in Yukon and 7 points above Yukon average. The categories with the highest scores were housing and income (93 and 92, respectively) and the category with the lowest score was education (64 points).

Similarly, there is a considerable difference in crime rates among the study communities. According to the Yukon Bureau of Statistics (2013), Pelly Crossing has the highest crime rates in the LSA (110 crimes per 100 residents),

representing almost six times the crime rate in Whitehorse (20 crimes per 100 residents) and two and a half times the crime rate of Carmacks (42 crimes per 100 residents). Property crime was the most prevalent at Pelly Crossing and Whitehorse at rates of 48.2 and 8 per 100 residents, respectively. The most prevalent crime at Carmacks was “other” crime at a rate of 15.7 per 100 residents, followed by property crime at a rate of 12.2 per 100 residents. Pelly Crossing reported the highest rate of violent crime among the LSA communities at 20.1 per 100 residents, followed by Carmacks at 8.6 per 100 residents and Whitehorse at 3.2 per 100 residents.

There are no data for each community regarding drug and alcohol consumption, but there are data for the entire Yukon. Yukon residents were more likely to be frequent, heavy drinkers when compared with the national estimates. In Yukon, 19% of the population age 12 and older drank heavily more than once a month, compared to 12% for the entire Canada. There is some variation by gender, with a larger estimated proportion of Yukon males (24%) being frequent, heavy drinkers than females (15%) (Yukon Bureau of Statistics 2010).

The emergency room at Whitehorse General Hospital treats many patients for alcohol or illicit drug-related health emergencies. In 2005, visits to the Whitehorse General Hospital emergency room for which alcohol was the reason for the visit (most responsible diagnosis) made up 2.8% of all emergency room visits (698 visits by 279 individuals, 61% of whom were male). In 2009, this rose to 4.1% of all emergency room visits (1,050 visits by 307 individuals, of whom 60% were male).

In contrast to alcohol, there was a decline in drug-related emergency room visits between 2005 and 2009. In 2005, visits to the emergency room for which illicit drugs were the reason for the visit (most responsible diagnosis) made up 0.8% of all emergency room visits (196 visits by 129 individuals, 51% of whom were male). In 2009, this had dropped slightly to 0.6% of all emergency room visits (149 visits by 114 individuals, of whom 45% were male) (Yukon Bureau of Statistics 2010).

## 16.4 PROJECT-SPECIFIC EFFECTS

### 16.4.1 Project Interactions and Potential Effects

Table 16.4-1 identifies potential interactions between specific Project components and activities and the Community Vitality VC. The identified interactions warrant further analysis because they may result in substantive socio-economic effects on community vitality, either positive or negative. The specific nature of the effects is evaluated and discussed in subsequent sections. The list of Project components and activities included in this table were derived from the Project Description as described in Section 4.

Project components that may affect directly or indirectly the community vitality conditions during the mine construction, operations, and closure and decommissioning phases include:

- Contracted Employment;
- Mine Staffing; and
- Accommodations (Construction and Mine Staffing).

These Project components are expected to interact with the Community Vitality VC through three mechanisms: population changes, employment income and work schedules, and camp accommodation.

#### Contracted Employment and Mine Staffing

##### *Population Changes*

The Project will result in considerable direct employment as well as contracted employment, which could cause population changes on the local communities (e.g., encourage an influx of new residents into local communities).

The Project population effects would depend on whether Project-related jobs are filled by residents or by non-residents, and on whether non-residents relocate to the area or commute to work. Some potential out-migration is also anticipated following a decline in employment opportunities, specifically towards the end of operations and during decommissioning and closure.

*Employment Income*

Direct Project employment and contracted employment would also result in increases to personal income for workers and contractors. The increase in employment and income will decrease dependencies on government transfers (i.e., social assistance), but also could lead to poor personal choices for spending disposable income, which could affect workers' family well-being.

Accommodations

*Work Schedules and Camp Accommodation*

The Project will provide construction and operations camps for employees and contractors. Workers will live away from their families and dependents during working shifts. Project work schedules and separation from family for extended periods of time have the potential to affect family relationships and community well-being.

**Table 16.4-1 Potential Interactions between the Project and Community Vitality**

<b>Project Components and Activities</b>	<b>Project Phase<sup>1</sup></b> (C, O, DC, PC)	Potential Interaction (Y/N)	<b>Mechanism of Interaction</b> (or Rationale for No Interaction)
Accommodations (Construction and Mine Staffing)	C, O, CD,	Yes	Work schedule and fly in/fly out camps
Aggregate Sources / Borrow Sites	C,	No	No specific interaction with this socio-economic VC
Airstrip and Airstrip Access Road	C, O, CD,	No	No specific interaction with this socio-economic VC
Ancillary Buildings (Explosives Storage, Security Shed, Truck Shop etc.)	C, O,	No	No specific interaction with this socio-economic VC
Concentrate Transport and Loading	O,	No	No specific interaction with this socio-economic VC
Concrete Batch Plant Operation	C, O,	No	No specific interaction with this socio-economic VC
Contracted Employment	C, O, CD,	Yes	Direct and indirect population changes from Project employment and income
Contracted Employment	C, O, CD,	Yes	Increase disposable income
Cyclone Sand Plant	C, O,	No	No specific interaction with this socio-economic VC
Dismantling of Facilities	CD,	No	No specific interaction with this socio-economic VC
Diversion of Canadian Creek	C, O,	No	No specific interaction with this socio-economic VC
Drilling and Blasting	C, O,	No	No specific interaction with this socio-economic VC

<b>Project Components and Activities</b>	<b>Project Phase<sup>1</sup></b> (C, O, DC, PC)	<b>Potential Interaction</b> (Y/N)	<b>Mechanism of Interaction</b> (or Rationale for No Interaction)
Fish Habitat Compensation Construction	C, O,	No	No specific interaction with this socio-economic VC
Freegold Road Extension	C, O, CD,	No	No specific interaction with this socio-economic VC
Freegold Road Upgrade	C, O, CD,	No	No specific interaction with this socio-economic VC
Fuel Storage and Distribution System	C, O,	No	No specific interaction with this socio-economic VC
Gold Extraction Plant / Oxide Ore Processing	C, O,	No	No specific interaction with this socio-economic VC
Ground Preparation Activities (e.g. cut, fill, grub, etc.)	C,	No	No specific interaction with this socio-economic VC
Hazardous Materials Storage, Transport, and Disposal	C, O,	No	No specific interaction with this socio-economic VC
Heap Leach Facility	C, O,	No	No specific interaction with this socio-economic VC
Heap Leach Pad	C, O,	No	No specific interaction with this socio-economic VC
Laydown Areas	C, O,	No	No specific interaction with this socio-economic VC
LNG Transport to Site	C, O,	No	No specific interaction with this socio-economic VC
Main and Supplemental Power Plant (Gas Turbine and Diesel)	C, O,	No	No specific interaction with this socio-economic VC
Maximum Disturbance Area	C, O, CD,	No	No specific interaction with this socio-economic VC
Mine Development	C, O, CD,	No	No further interaction; already addressed in other Project components
Mine Staffing	C, O, CD,	Yes	Direct and indirect population changes from Project employment and income
Mine Staffing	C, O, CD,	Yes	Increase disposable income
On-site Equipment and Vehicle Use	C, O, CD,	No	No specific interaction with this socio-economic VC
Open Pit Mining	C, O,	No	No specific interaction with this socio-economic VC
Ore Conveyors	C, O,	No	No specific interaction with this socio-economic VC
Ore Crushing	C, O,	No	No specific interaction with this socio-economic VC
Ore Hauling	C, O,	No	No specific interaction with this socio-economic VC

Project Components and Activities	Project Phase <sup>1</sup> (C, O, DC, PC)	Potential Interaction (Y/N)	Mechanism of Interaction (or Rationale for No Interaction)
Ore Stockpiles	C, O,	No	No specific interaction with this socio-economic VC
Processing Facilities for Sulphide Ore	O,	No	No specific interaction with this socio-economic VC
Reagent Storage and Distribution	C, O,	No	No specific interaction with this socio-economic VC
Site Reclamation / Re-Vegetation	O, CD,	No	No specific interaction with this socio-economic VC
Site Security and Fencing	C, O, CD,	No	No specific interaction with this socio-economic VC
Surface Water Management (Contact Water)	C, O, CD,	No	No specific interaction with this socio-economic VC
Surface Water Management (Non-Contact Water)	C, O, CD,	No	No specific interaction with this socio-economic VC
Tailings Management Facility	C, O, CD,	No	No specific interaction with this socio-economic VC
Topsoil Stockpiles	C, O,	No	No specific interaction with this socio-economic VC
Traffic (Equipment and Materials to Site)	C, O, CD,	No	No specific interaction with this socio-economic VC
Waste Management: Garbage and Sewage Waste Facilities	C, O,	No	No specific interaction with this socio-economic VC
Wasterock and Overburden Disposal	C, O,	No	No specific interaction with this socio-economic VC
Water Supply	C, O, CD, PC	No	No specific interaction with this socio-economic VC

**Note:**

1. C (Construction), O (Operation), CD (Closure and Decommissioning) and PC (Post-Closure) represent the Project phases when the potential interaction between the Project and valued component is anticipated to occur.
2. Potential mechanism(s) of interaction between the Project components and activities and the valued component are carried forward into the assessment by characterizing the potential effect(s).

#### 16.4.1.1 Potential Project Effects on Community Vitality

This section evaluates changes to population and community wellbeing resulting from anticipated Project interactions as described above in Table 16.4-1.

Changes in size and characteristics of the local population affect a range of community and regional services that are driven by use levels. Therefore, the assessment of this indicator is linked to the assessment of other socio-economic VCs defined in this Proposal (e.g., Infrastructure and Services).

#### 16.4.1.2 Potential Effects on Population and Demographics

The Project has the potential to change population and demographics in the RSA and LSA through direct Project staffing demands or through indirect changes in employment rates and household incomes. Quantitative assessments are made of these effects for the transitional period (from 2016 to 2024) over which staffing and expenditures peak. Qualitative assessments are made for the later portions of the operations phase, as well as the closure and post-closure phases. This is due to rising uncertainty on staffing and expenditures that would make a quantitative forecast unreliable. The scale of other demographic changes (e.g., ethnicity, age/gender, etc.) is directly dependent on the magnitude of the population change, so the assessment of potential Project effects would focus on population change.

#### 16.4.1.3 Direct Migration (Project Staffing)

As discussed in Section 13 Employment and Income, the Project has substantive staffing requirements over its construction and operations phases. At its peak, the size of the mine construction labour force is estimated at 1,000 workers, of which 26% are expected to be drawn from the RSA. Not included in that share is the pre-production operations workforce, which will begin to be hired in 2017 and is expected to grow until 2024. The size of the mine operations workforce is estimated to be 652 workers by 2024, of which 536 are expected to reside in the RSA (including existing residents and migrants). The decommissioning and closure workforce will be contracted and no staffing estimate is provided, as will also be the case in the post-closure phase.

Casino Mining Corporation (CMC) anticipates three potential sources for the Project workforce: the LSA; RSA; and elsewhere, including other areas in Canada. Some long-term employees hired from outside of the RSA will choose to migrate to Yukon, for example to reduce their commuting time. The share of migrants in the overall workforce is estimated at 20% based on the scarcity of local skilled labour and surveys of existing commuting workers receptivity to incentives. Only incentives that could reasonably be offered by CMC are considered in this analysis, notably travel and housing allowances, as well as training (both external and on the job). Assuming that the average household size of workers is 2.6 (reflecting the Canadian average) the estimated net migration from Project staffing is shown in Table 16.4-2 (MiHR 2012, Herkes, Mooney and Smith 2013, Statistics Canada 2013c). It sees migration from staffing reaching 335 in 2024. These effects are expected to be sustained during operations and then gradually decline in the period leading up to closure as the size of the overall workforce declines.

**Table 16.4-2 Estimated population change in RSA from Project Staffing, 2016-2024**

Phase	Year	Total Yukon-Resident Staff	Share of Migrants in Resident Staff	Annual Net Migration From Staffing (Annual Individuals)	Total Net Migration From Staffing (Total Individuals)
<b>Construction</b>	2016	0	0	0	0
	2017	68	28	73	73
	2018	155	54	66	140
	2019	196	61	20	160
<b>Operations</b>	2020	353	85	62	222
	2021	442	126	105	327
	2022	489	129	8	335
	2023	525	134	12	335
	2024	536	129	-12	335

#### 16.4.1.4 Indirect Migration

In addition to direct staffing effects, the Project will affect regional labour market conditions (e.g., increase employment rates and household income) and incentivize additional indirect migration, by making the region more attractive to potential migrants. The Project is expected to encourage indirect migration into the region through two mechanisms: employment effects and income effects.

#### 16.4.1.5 Employment Effects

As addressed in Section 13 (Employment and Income), direct, indirect, and induced employment effects will occur in Yukon from Project expenditures. These 'spin-off' effects are related to the purchase of goods and services needed to construct and operate the Project (indirect effects) and the expenditures of direct and indirect labour income on consumer goods and services (induced effects). MNP estimates that construction of the Project would support 5,091 full-time equivalents (FTEs) of direct, indirect, and induced employment. Over the operations phase, MNP estimates the Project will support 855 FTEs annually on average (MNP 2013).

Changes in the regional employment rate resulting from this demand are expected to encourage migration into the region. Amirault et al. (2012) estimate that a 5-percentage point increase in the gap in employment rates between Canadian regions will increase net in-migration to the region, with the higher employment rate by 12% over a 5-year period. This effect includes people coming into the region and the retention of those who would otherwise have left the region (Amirault et al. 2012). Table 16.4-3 uses these results to estimate the effect of the Project on migration from 2016 to 2024. This analysis assumes that migrants will either participate in employment opportunities supported by the Project or replace existing workers drawn to Project-related work. This reduces the change in the migration rate from employment effects as labour markets adjust to incorporate new job opportunities. The analysis predicts that the rise in annual migration peaks during the construction period in 2017 at 77 people falls to 9 in 2020 and then turns mildly negative from 2022 onward. Negative effects arise from fully adjusted labour markets incorporating migrants drawn to the region, which then place downward pressure on the employment rate. Expenditures on services and procurement are expected to decline close to closure and this would be expected to have a negative effect on the migration rate as employment returns to baseline conditions.

**Table 16.4-3 Estimated Population Change in RSA from Employment Effects, 2016-2024**

Phase	Year	Employment Effects (non-staff) (FTEs)	Change in Employment Rate (non-staff) (Percentage Point)	Change in Migration Rate (%)	Annual Net Migration From Employment Effects (Annual individuals)	Total Net Migration From Employment Effects (Total individuals)
<b>Construction</b>	2016	0	0.0	0.0	0	0
	2017	1,629	5.0	12.3	77	77
	2018	1,542	4.3	10.5	67	144
	2019	1,501	3.8	9.2	59	204
<b>Operations</b>	2020	502	0.5	1.3	9	212
	2021	413	0.1	0.3	2	215
	2022	366	-0.2	-0.5	-3	211
	2023	330	-0.3	-0.8	-5	206
	2024	319	-0.4	-0.9	-6	200

16.4.1.6 Income Effects

As addressed in Section 13 (Employment and Income), employment from the Project (either through direct staffing or from direct, indirect, and induced economic effects) will be tied to increased incomes in the region. It is estimated that the Project would provide \$195 million in wages and salaries in Yukon over the construction phase and \$43 million annually over the operations phase (MNP 2013). This increase in income is expected to encourage migration into the region. Amirault et al. (2012) estimate that a 10% increase in the difference in median household income between two typical Canadian regions would cause an approximately 6% increase in net migration to the region with higher income. This effect includes both people coming into the region and the retention of those who would otherwise have left the region. It is assumed for the purpose of this analysis that income effects are distributed equitably and consequently a change in mean income would translate fully into a change in median income, which may overstate these effects (MNP 2013, Amirault et al. 2012).

Table 16.4-4 shows the population effects arising from the increase in incomes associated with the Project over the period 2016 to 2024. This analysis assumes that migrants will either earn income derived from employment opportunities supported by the Project or from replacing existing workers drawn to Project-related work. This reduces the change in the migration rate from income effects as labour markets adjust to higher incomes. Changes in migration from income effects are expected to be most pronounced in the construction phase, increasing net migration by 3.7% or 23 individuals in 2017 but falling to 1.2% or 8 individuals annually by 2024. These effects are expected to decline as closure approaches and Project expenditures fall; with closure, the effects will turn negative as incomes return to baseline conditions.

**Table 16.4-4 Estimated Population Change in RSA from Income Effects, 2016-2024**

Phase	Year	Income Effects (\$ millions)	Log Change In Income	Change In Migration Rate (%)	Annual Net Migration From Income Effects (Annual Individuals)	Total Net Migration From Income Effects (Total Individuals)
<b>Construction</b>	2016	0	-	0.0	0	0
	2017	65	0.057	3.7	23	23
	2018	65	0.052	3.3	21	45
	2019	65	0.047	3.0	20	64
<b>Operations</b>	2020	43	0.026	1.6	11	75
	2021	43	0.023	1.5	10	85
	2022	43	0.020	1.3	9	94
	2023	43	0.020	1.3	9	102
	2024	43	0.019	1.2	8	110

16.4.1.7 Summary of Effects

The combined results of effects from direct Project staffing demands and indirect changes in employment rates and household incomes on RSA population from the period 2016 to 2024 are shown in Table 16.4-5. The rate of population growth within the RSA peaks in 2017 at 0.5% and declines thereafter to 0.0% from 2022 onward. Total change in population from all Project effects is 645 by 2024. These effects are expected to decline as closure approaches and Project expenditures fall; with closure, the effects will turn negative as incomes return to baseline conditions.

**Table 16.4-5 Estimated Population Change from Project Effects in RSA, 2016-2024**

Phase	Year	Total Change In Population From Project Staffing	Total Change In Population From Employment Effects	Total Change In Population From Income Effects	Total Change In Population From All Effects	Projected Change In Population Growth Rate (Percentage Point)
	2016	0	0	0	0	0
<b>Construction</b>	2017	73	77	23	174	0.5
	2018	140	144	45	329	0.4
	2019	160	204	64	428	0.2
<b>Operations</b>	2020	222	212	75	509	0.2
	2021	327	215	85	626	0.3
	2022	335	211	94	640	0.0
	2023	347	206	102	656	0.0
	2024	335	200	110	645	0.0

The estimated population change from staffing, employment, and income effects are shown in Table 16.4-6. Migration patterns associated with these effects are assumed to follow historic migration patterns for Yukon (Yukon Bureau of Statistics 2011a) with the added assumption that these effects will be limited to communities within the Project's LSA. As a consequence, Whitehorse is expected to receive 95.9% of migrants with Pelly Crossing receiving 1.7% and Carmacks receiving 2.4%. The total effect of the Project as a share of the projected

population is expected to rise by 2024 to 2.9% in Pelly Crossing (or 11 individuals), 2.6% in Carmacks (or 16 individuals), and 2.0% in Whitehorse (or 619 individuals). The rate of change in population is highest during the construction phase, with a projected change in population of 0.6% within the LSA in 2017.

**Table 16.4-6 Estimated Population Change from Project Effects by RSA Community, 2016-2024**

Phase	Year	Net migration from Project Effects				Effect as Share of Projected Population (%)			
		Pelly Crossing	Carmacks	Whitehorse	LSA	Pelly Crossing	Carmacks	Whitehorse	LSA
<b>Share of Migrants (%)</b>		1.7	2.4	95.9	100.0	1.7	2.4	95.9	100.0
<b>Construction</b>	2016	0	0	0	0	0	0	0	0
	2017	3	4	167	174	0.8	0.8	0.6	0.6
	2018	5	8	315	329	1.5	1.4	1.1	1.1
	2019	7	10	410	428	2.0	1.8	1.4	1.4
<b>Operations</b>	2020	9	12	489	509	2.3	2.1	1.6	1.6
	2021	10	15	601	626	2.8	2.6	2.0	2.0
	2022	11	15	614	640	2.9	2.6	2.0	2.0
	2023	11	16	629	656	3.0	2.7	2.0	2.0
	2024	11	16	619	645	2.9	2.6	2.0	2.0

Source: Yukon Bureau of Statistics, 2011a; Yukon Bureau of Statistics, 2011b.

This analysis does not consider effects of the Project on movement between communities. A rise in the employment rate and in median incomes in the LSA's rural communities would be expected to reduce the rate of economic migration from those communities to Whitehorse, although there is insufficient data to quantify this effect.

At the end of operations, some out-migration of operation workers and their families is expected as employment and income returns to baseline conditions. It is difficult to determine the magnitude of the population outflow, since this decision depends on the regional work opportunities available at the time of closure and personal and family interests. Project-related improvements to worker skills and experience will provide residents of the LSA with opportunities to pursue higher-paying jobs in the mining industry or transfer their skills to other industries. Casino Mining Corporation is committed to ongoing investment in workers to enhance employability and to help workers find new employment in the mining industry after production ends.

#### 16.4.1.8 Potential Effects on Community Well-being

Anticipated Project effects on family and community well-being are linked to income changes and family separation during work rotation, and are also, to a lesser extent, linked to behavioural changes associated with Project-related migration. These effects are discussed below. As a result of data limitations and other uncertainties involved with predictions of well-being effects, this assessment is mainly qualitative and based on established economic and social impact assessment theory and best practices. This is due to high uncertainties on family and individual decisions and behavioural changes, which would make a quantitative forecast unreliable.

#### 16.4.1.8.1 Income-Related Effects

Increased income from the Project has the potential to affect family and community well-being in the LSA through three mechanisms: changes in economic hardship, changes in income equity and, more indirectly, through family spending decisions of disposable income.

##### Economic Hardship Effects

Employment opportunities available to local residents during construction and operations will directly benefit family and community well-being by reducing economic hardship (e.g., reducing unemployment for existing residents, providing higher incomes, and reducing dependency on government transfers). Project-related improvements to worker skills and experience will provide residents of the LSA with opportunities to pursue higher-paying jobs at the mine and potentially elsewhere. Given the length of construction and operations, income-related effects could extend over the 26-year life of the mine.

Increased family income is also associated with improved health and well-being of children. For example, an empirical study using a survey of Canadian children found that cognitive, social, physical, and behavioural development of children was almost always associated with household income of their family (Lethbridge and Phipps 2006). The study found that regardless of age or how income is measured, higher family income was almost always associated with better child well-being. In particular, children's cognitive and behavioural development measures appear to have the strongest associations with levels of family income. Among children in lower income families, incremental increases in household income were found to be associated with better child development outcomes. Increases in income continue to remain associated with better well-being, even once children are out of low income. In fact, the study did not find a point above which high income ceases to benefit children's development (Lethbridge and Phipps 2006).

While other factors also influence well-being, it is well-established that there is a strong association between income and family well-being. Baseline information shows that Pelly Crossing and Carmacks have relatively low CMBI scores compare to the overall Yukon or the urban community of Whitehorse. In particular, education scores in Pelly Crossing and Carmacks are the third and fourth lowest in Yukon (AANDC 2006). By providing additional income, employment, and training during construction and operations, the Project could substantially increase the CWBI scores of the LSA communities, in particular of the First Nation communities.

At closure, the loss of operational employment would result in a large net decrease in local and regional employment and income. However, from a family well-being perspective, the training offered by CMC during construction and operations will provide residents with opportunities to pursue higher-paying jobs elsewhere.

##### Equity Effects

The distribution of income may result in adverse equity effects on vulnerable sub-populations. In some groups, pre-existing social, cultural, physical, and psychological barriers can limit accessibility to employment and income. While opportunities for employment may be available, they may not be accessible to all community members. Gender, physical and mental ability, cultural dissimilarities, low levels of education and training, and lack of experience are examples of possible barriers.

As described in the Socio-economic Baseline Report (Appendix 13A), First Nation communities experience low participation rates and high unemployment rates. Further, current low levels of education and limited work experience in resource-based industries are constraints to accessing Project-related employment. Without a focus on engagement of underrepresented groups, the Project has the potential to inadvertently exacerbate existing disparities leading to greater income and social inequities.

### Spending Decisions

In addition to the direct Project effects discussed above, there could be some indirect income effects on well-being associated to individual and family spending decisions. There are two possible scenarios:

- **Positive Scenario:** If increased income is saved or invested in social goods such as better housing, education, or lifestyle amenities, overall well-being could be enhanced. For example, the increased employment opportunities and higher salaries could increase perceived returns to education for local families and, therefore, increase incentives to invest in schooling.
- **Negative Scenario:** If increased income is spent on socially disruptive activities such as alcohol consumption and/or gambling, overall well-being could decline for those directly or indirectly affected by this behaviour. A recent study noted that increased incomes associated with mining can lead to a greater potential for alcohol and drug use, increased sexually transmitted diseases, and other social and health problems (Gibson and Klinck 2005).

In evaluating the potential overall Project effects on family and community well-being, the outcome will largely depend on how workers choose to spend their increased income.

#### 16.4.1.8.2 Population-Related Effects

As discussed earlier, the Project will create population changes in the LSA through migration of long-term Project staffing or through indirect migration driven by changes in local employment rates and household income. This influx of population to the local area could affect existing family and community well-being through behavioural changes. For example, if transient populations engage in socially disruptive or illegal activities, this could create negative well-being effects such as increase in crime, alcohol abuse, or family dysfunction.

As discussed in Section 16.4, influx of people (due to direct or indirect effects) from outside the RSA will be gradual and will begin during the construction phase. The rate of population growth within the LSA peaks in 2017 at 0.6% and declines thereafter to 0.0% from 2022 onward. Total change in population from all Project effects is estimated at 645 (or 248 families) by 2024. These effects are expected to decline, and eventually turn negative, as closure approaches and employment and income returns to baseline conditions. Whitehorse is anticipated to receive the majority of migrants (95.9% or 619 individuals), which would represent 2.0% of its projected population. Pelly Crossing is anticipated to receive 1.7% of migrants (11 individuals) and Carmacks would receive 2.4% (16 individuals). Migrants would represent 2.9% of Pelly Crossing projected population, while they would represent 2.6% at Carmacks.

Attracting and retaining skilled residents has been identified as a priority of Yukon and local governments (Yukon Economic Development 2011a, Village of Carmacks 2006). If the magnitude of effects were considered to be high, the direction may be adverse since a rapid increase in population can challenge the existing social structure. However, the magnitude of effects is low and represents a small change in each community population. The majority of population growth is anticipated to occur in the already rapidly growing city of Whitehorse, which is expected to be highly resilient in managing change.

Behavioural change-related problems, if any, are anticipated to occur early in construction, and are expected to lessen over time as migrants settle into the communities.

#### 16.4.1.8.3 Work Schedule-Related Effects

Separation of workers from their families and dependants for extended periods of time because of the work rotation schedule and the requirement to stay in on-site accommodations could affect family relationships. This

isolation of workers from their families for extended periods could result in stress to the workers and their dependants, altered roles and responsibilities in the home, and potential behavioural issues when a worker returns home because of conflicting needs and priorities of the worker and his/her dependants. A recent study noted that limited family time can lead to family fragmentation, family violence, and behavioural issues in children who grow up with a part-time parent (Gibson and Klinck 2005).

Table 16.4-7 summarizes the potential Project effects on the Community Vitality VC.

**Table 16.4-7 Potential Effects on Community Vitality**

<b>Mechanism of Interaction</b>	<b>Key Indicator(s)</b>	<b>Project Phase<sup>2</sup> (C, O, DC, PC)</b>	<b>Potential Effect</b>	<b>Direction</b>
Direct and indirect population changes from Project employment and income	Population and demographics	C, O, CD,	Population changes from out-of-territory mine workers and their dependents moving residency to RSA	Beneficial
Direct and indirect population changes from Project employment and income	Population and demographics	C, O, CD,	Population changes from migration to the RSA to take advantage of higher incomes and employment rates generated by the Project	Beneficial
Increased disposable income of families from Project employment	Community well-being	C, O, CD,	Employment opportunities and increased income would reduce economic hardship of local families and lead to positive economic well-being effects	Beneficial
Increased disposable income of families from Project employment	Community well-being	C, O, CD,	Spending decisions of additional disposable income could affect family and community well-being: Positive spending decisions would enhance family and community wellbeing (i.e. positive spending on education) Negative spending decisions would reduce family and community wellbeing (i.e., crime, addictions)	Beneficial/Adverse
Increased disposable income of families from Project employment	Community well-being	C, O, CD,	Potential lack of employment and income equity for Aboriginal peoples, women, people with disabilities, and visible minorities	Adverse
Direct and indirect	Community well-being	C, O, DC	Influx of workers and their families	Adverse

Mechanism of Interaction	Key Indicator(s)	Project Phase <sup>2</sup> (C, O, DC, PC)	Potential Effect	Direction
population changes from Project employment and income			could create negative behavioural changes and reduce family and community well-being if transient population engages in socially disruptive or illegal activities (e.g., crime, alcoholism)	
Work schedule and fly in/fly out camps	Community well-being	C, O, DC	Separation of workers from family and dependants for extended periods of time could lead to deterioration of family relationships	Adverse
Decrease of disposable income of families at the end of Project operations	Community well-being	C, O, DC, PC	Loss of jobs and income at closure and potential out-migration could negatively affect family and community well-being	Adverse

**Note:**

1. Key indicators are defined as measurable parameters or attributes to qualitatively or quantitatively evaluate the potential effect.
2. C (Construction), O (Operation), CD (Closure and Decommissioning) and PC (Post-Closure) represent the Project phases when the potential interaction between the Project and valued component is anticipated to occur.

In summary, potential adverse Project effects on family and community well-being will be largely attributable to decisions made on spending disposable income, behavioural changes associated with influx of migrants and family separation during work rotation.

#### 16.4.2 Identification of Mitigation Measures and Potential Residual Effects

The Yukon Government has identified attracting people to live in Yukon as a priority, as have communities in the LSA (Section 16.3). Since the Project is expected to support this objective, the effects are considered positive for LSA communities and the RSA, although they may produce challenging secondary effects in terms of housing, and community services and infrastructure (Section 17) and to a lesser extent, in terms of community well-being. Theoretically, if the magnitude of the population effect is large enough to challenge the capacity of communities to accommodate the changes, the direction of effects may be reversed.

Mitigation measures are aimed at decreasing negative effects or enhancing beneficial ones. The main causal factor for effects on Population and Demographics are staffing, employment, and income effects generated by the Project. Casino Mining Corporation plans to fulfill its commitments of hiring locally to the maximum extent practical, which would reduce migration associated with Project staffing. However, the relative scarcity of skilled mining labour in Yukon would necessitate the use of commuting labour (Section 14). Casino Mining Corporation would thus offer incentives to encourage commuting workers to become Yukon residents. Other measures would enhance migration by maximizing the amount of employment and income generated within the RSA.

To summarize, CMC would enhance beneficial effects by:

- Implementing a hiring policy that encourages the employment of workers from Yukon and in particular the rural communities within the LSA;

- Implementing a procurement process that gives preference to suppliers from the RSA and LSA;
- Employing a community liaison staff member who focuses on community relationships and working with community staff on housing/planning issues related to mine staff;
- Monitoring project socio-economic effects and adapting management measures where required;
- Providing on-the-job training to assist local and regional workers to develop mining-specific skills;
- Providing training and education for potential employees from Yukon and in particular the rural communities within the LSA; and
- Implementing career training and development opportunities for employees once hired.

In general, Project employment and income will lead to an improvement in family and community well-being. It will create new job opportunities in the LSA and RSA and will increase personal incomes. This additional income will reduce family economic hardship and could enhance quality of life. However, there may also be some potential indirect negative well-being effects associated with employment, income, and population changes. As discussed earlier, these potential negative effects will be largely attributable to decisions made on spending disposable income, behavioural changes associated with influx of people, and family separation during work rotation. Although indirect, and sometimes outside of the Project control, some policies could be implemented to minimize these potential negative effects.

In addition to the policies to manage and enhance population effects, CMC will:

- Offer a direct deposit option to and help identify money management training programs;
- Facilitate and maintain communication between workers and their families by providing phone and Internet services on site;
- Provide flexible rotation schedules, where practical, that could accommodate the needs of local hires and industry practices;
- Work with Yukon Government agencies and Yukon College to identify barriers to employment and offer training programs to improve local hire and retention of staff;
- Implement a zero tolerance policy with respect to drug and alcohol on-site for Project employees and contractors;
- Work with the appropriate agencies to ensure staff have access to counselling services as required;
- Work with local agencies to monitoring Project socio-economic effects and to take corrective actions where appropriate.

**Table 16.4-8 Proposed Mitigation Measures and Potential Residual Effects for Community Vitality**

Potential Effect	Project Phase <sup>1</sup> (C, O, DC, PC)	Direction	Proposed Mitigation (or Enhancement) Measure <sup>1</sup>	Predicted Effectiveness	Residual Effect
Population changes from out-of-territory mine workers and their dependents moving residency to RSA	C, O, CD,	Beneficial	Priority hiring for qualified local residents. employing a community liaison staff member who focuses on community relationships and working with community staff on housing/planning issues related to mine staff	High	Yes
Population changes from migration to the RSA to take advantage of higher incomes and employment rates generated by the Project	C, O, CD,	Beneficial	Implementing a hiring policy that encourages the employment of workers from Yukon and in particular the rural communities within the LSA; implementing a procurement process that gives preference to suppliers from the RSA and LSA.	Moderate	Yes
Employment opportunities and increased income would reduce economic hardship of local families and lead to positive economic well-being effects	C, O, CD,	Beneficial	None	n/a	Yes
Potential lack of employment and income equity for women, Aboriginal peoples, people with disabilities, and visible minorities	C, O, CD,	Adverse	Implementing a hiring policy that encourages the employment of workers from rural communities within the LSA; Pursuing employment opportunities in negotiation of cooperation agreements with First Nations	High	Yes
Spending decisions of additional disposable income could affect family and community	C, O, CD,	Beneficial/Adverse	Offer to deposit workers salaries in their bank accounts. Facilitate money management training as required to those employees who do not	Moderate	Yes

Potential Effect	Project Phase <sup>1</sup> (C, O, DC, PC)	Direction	Proposed Mitigation (or Enhancement) Measure <sup>1</sup>	Predicted Effectiveness	Residual Effect
well-being: Positive spending decisions would enhance family and community wellbeing (i.e. positive spending on education). Negative spending decisions would reduce family and community wellbeing (i.e. crime, addictions)			have experience with high wage earnings and working in mines Implement a zero tolerance policy with respect to drug and alcohol at the Project site for Project employees and contractors. Work with local agencies in monitoring Project socio-economic effects and to take corrective actions where appropriate		
Influx of workers and their families could create negative behavioural changes and reduce family and community well-being if transient population engages in socially disruptive or illegal activities (i.e. crime, alcoholism)	C, O, DC	Adverse	The project will have a self-contained camp on site to house workers. A zero tolerance policy with respect to drug and alcohol use will be implemented at the Project site for Project employees and contractors. Facilitate money management training as required to those employees who do not have experience with high wage earnings and working in mines. Work with local agencies to monitoring Project socio-economic effects and to take corrective actions where appropriate	High	Yes
Separation of workers from family and dependants for extended periods of time could lead to deterioration of family relationships	C, O, DC	Adverse	Facilitate communication between workers and their families by providing phone and Internet services on-site. Explore shift schedules that meet the needs of the operation and that are attractive to local hires.	Moderate	Yes

Potential Effect	Project Phase <sup>1</sup> (C, O, DC, PC)	Direction	Proposed Mitigation (or Enhancement) Measure <sup>1</sup>	Predicted Effectiveness	Residual Effect
			Facilitate money management training as required to those employees who do not have experience with high wage earnings and working in mines. Work with local agencies to monitor Project socio-economic effects and to take corrective actions where appropriate.		
Loss of jobs and income at the end of operations and potential out-migration could negatively affect family and community well-being	C, O, DC, PC	Adverse	CMC will work with the community to develop a plan that identifies strategies and actions to help minimize potential adverse effects from closing the mine. Provide training opportunities to help employees get employment elsewhere.	Moderate	Yes

**Notes**

1. C (Construction), O (Operation), CD (Decommissioning and Closure) and PC (Post-Closure) represent the Project phases when the potential interaction between the Project and valued component is anticipated to occur.
2. For beneficial potential effects, opportunities, where possible, to enhance potential environmental and socio-economic benefits are included as proposed enhancement measures.

16.4.3 Significance of Residual Effects

The criteria used to discuss residual effects are discussed in detail in Section 5, Assessment Methods and Frameworks. Table 16.4-9 outlines the seven criteria used to assess significance for the Community Vitality VC.

**Table 16.4-9 Determining Significance of Residual Effects for Community Vitality**

Criteria	Rating	VC Specific Definitions
Direction	Adverse	Long term trend of the residual effect.
	Beneficial	
Magnitude	Low	Effect that occurs might or might not be detectable, but is within the normal range of variability
	Medium	Effect is unlikely to pose a serious risk or benefit to the VC or to represent a management challenge
	High	Effect is likely to pose a serious risk or benefit to the selected VC and, if negative, represents a management challenge
Geographical Extent	Localized	Within the identified Local Study Area
	Widespread	Outside the identified Regional Study Area
Duration	Short Term	Effect is limited to the construction period
	Long Term	Throughout operations, decommissioning and closures
	Permanent	Effects measureable Post-Closure
Frequency	Infrequent	Effects occur occasionally
	Frequent	Effects are continuous and consistently applied over the period
Reversibility	Reversible	Effect will return to baseline condition after operations, decommissioning and closure
	Irreversible	Effect is persistent after operations, decommissioning and closure
Context	Low Resilience	Effects operate outside of regional experience and represent a challenge to local socio-economic management institutions
	High Resilience	Effects are familiar to local socio-economic management institutions
Probability of occurrence	Low	Effects are unusual under similar circumstances and are not expected to occur with this Project
	Moderate	Effects has a reasonable risk of occurring under similar circumstances or there is not currently sufficient information to assess probability
	High	Effects have consistently occurred under similar circumstances and are expected to occur with this Project

Residual effects on Community Vitality are assessed by these criteria in Table 16.4-10. In general, to be considered to have potential for a significant effect, the residual effect on community vitality must meet one of the following criteria:

- Have a medium magnitude at a regional spatial extent and have a long term or permanent duration;
- Have a high magnitude at a localized spatial extent and be permanent in duration; or
- Have a high magnitude at a regional extent of any duration.

The challenge with socioeconomic assessment is that neither guidelines nor predefined thresholds exist, so the assessment often relies on the setting, intensity, public concerns and professional judgement gained from working on similar projects.

**Table 16.4-10 Significance of Residual Effects for Community Vitality**

Residual Effect	Predicted Degree of Effect After Mitigation (or Enhancement) Measures <sup>1</sup>								Significance of Residual Effect
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context	Probability of Occurrence	
Population changes from out-of-territory mine workers and their dependents moving residency to RSA	Beneficial	Low	Localized	Long Term	Frequent	Reversible	High resilience	High	Not Significant
Population changes from migration to the RSA to take advantage of higher incomes and employment rates generated by the Project	Beneficial	Low	Localized	Long Term	Frequent	Reversible	High resilience	Moderate	Not Significant
Employment opportunities and increased income would reduce economic hardship and improve well-being of local families	Beneficial	Medium	Localized	Long Term	Frequent	Reversible	High Resilience	High	Not Significant
Potential lack of employment and income equity for women, Aboriginal peoples, people with disabilities, and visible minorities	Negative	Low	Localized	Long Term	Frequent	Reversible	High Resilience	Low	Not Significant
Positive spending decisions would enhance family and community wellbeing (e.g., positive spending on education)/ Negative spending	Beneficial/ Adverse	Low	Localized	Long Term	Frequent	Reversible	High Resilience	Moderate	Not Significant

Residual Effect	Predicted Degree of Effect After Mitigation (or Enhancement) Measures <sup>1</sup>								Significance of Residual Effect
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Context	Probability of Occurrence	
decisions would reduce family and community wellbeing (e.g., crime, addictions)									
Influx of workers and their families could create negative behavioural changes and reduce family and community well-being if transient population engages in socially disruptive or illegal activities (e.g., crime, alcoholism)	Adverse	Low	Localized	Short Term	Frequent	Reversible	High Resilience	Moderate	Not Significant
Separation of workers from family and dependants for extended periods of time could lead to deterioration of family relationships	Adverse	Low	Localized	Long Term	Frequent	Reversible	High Resilience	High	Not Significant
Loss of jobs and income at the end of operations and potential out-migration could negatively affect family and community well-being	Adverse	Low	Localized	Long Term	Frequent	Reversible	High Resilience	High	Not Significant

Note: For beneficial potential effects, opportunities, where possible, to enhance potential environmental benefits are included as proposed enhancement measures.

#### 16.4.4 Discussion of Significance

The direction of population effects are considered to be beneficial because attracting and/or retaining skilled residents has been identified as a priority of Yukon and some community governments (Yukon Economic Development 2011a, Village of Carmacks 2006). If the magnitude of effects were considered to be high, the direction may be adverse since a rapid increase in population can challenge the existing social structure. However, the magnitude of effects is low when considered in the regional context. Approximately 96% of the population effects are expected to occur in the already rapidly growing City of Whitehorse. Whitehorse grew at an annualized rate of 2.6% between 2006 and 2011; in the year of the greatest effect (2017, when noticeable effects from construction begin) total migration is expected to be 0.6% of the total population of the city, or 29% of the total annual growth. The most recent population projections for Yukon published by the Yukon Bureau of Statistics forecast a 2021 population for Whitehorse between 33,179 and 30,721 (Yukon Bureau of Statistics 2011b). The estimated effect of 601 new migrants by 2021 falls well within the variance of these estimates. By 2021, the annual change in population arising from the combined effects of Project staffing, employment, and income is 0.1% or less and are not expected to be noticeable. The Yukon Government and the City of Whitehorse are very familiar with the challenge of dealing with a rapidly growing population and can expect to be highly resilient in managing change.

The geographic extent of population effects are localized to the LSA. Although changes in migration are two-way and some population declines would be expected outside the LSA, the magnitude of these effects is negligible. The duration of population effects are considered to be long term; although the rate of change in population is only noticeable in the period 2017 to 2021, the Project sustains the higher level of population over the operations phase. The sustained and continuous character of population effects are why these effects are characterized as frequent.

All population effects are reversible. Population effects are modelled on staffing, employment, and income effects of the Project, which would be reversed when those effects are removed post-closure. Within this context, the population would return to baseline conditions over the period approaching closure to the post-closure period. Population effects from direct staffing are expected to be highly probable to occur, but the probability of migration from employment and income effects are expected to be only moderately probable. This is due to uncertainty around a number of factors around the migration analysis as it relates to employment and income, in particular the assumption of equitable distribution of income effects and the potential for Project employment to cause structural changes in the workforce rather than changing the employment rate.

As summarized in Table 16.4-11, population effects are considered to be beneficial but not of a magnitude to be significant within the context of a rapidly growing LSA.

Although some potential family and community well-being effects from construction and operations have the potential for adverse consequences, the net effects are expected to be on balance slightly positive because Project-related employment incomes will reduce family economic hardship and enhance quality of life. The proposed mitigation and monitoring is anticipated to be effective as long as the Proponent, communities, and governments cooperate in management initiatives.

Potential residual effects are expected to be localized. Although social effects will spill over into other jurisdictions, as Project employs people from outside the LSA who will commute to work; however, these effects are not likely to be noticeable within the context of other provinces or territories.

The effects are considered to be long term; although behavioural effects, if any, are only expected to be noticeable during the first years of construction and operations as migrants settle into the communities and people adjust to higher incomes. The duration of employment and income and related well-being effects would be long

term and sustained. The duration coincides with the construction (4 years) and operating (22 years) phases. Direct income earned during the Project will reduce economic hardship and will also contribute to the retirement income of the workforce during operations and extend benefits beyond the operational phase of the Project. The effects are also characterized as frequent as they are sustained and continuous.

Well-being effects are reversible and expected to return to baseline conditions during the closure and post-closure phases. However, as discussed in Section 15, investment in training and capacity-development will improve the employability of local residents to pursue higher-paying jobs after closure.

Direct income effects on economic hardship are expected to be highly probable; however, indirect effects on spending decisions and behavioural changes are only moderately probable. This is because there is uncertainty around a number of factors that can affect family decisions and the behaviour of people.

Yukon residents, and in particular LSA residents, are familiar with the cyclical nature and work schemes of the mining industry and also with the challenge of dealing with a rapidly growing population and can expect to be highly resilient in managing change. In general, the effects on community well-being of the Project are anticipated to be not significant.

The magnitude of effects on family relationships are uncertain since they depend on how families adjust to work schedules. There is little information on family characteristics, values, and expectations that would allow us to quantify these effects. However, with mitigation strategies in place, the effects of work schedules are not expected to be significant. Fly-in / Fly-out schemes are a common practice in the mining industry and workers are familiar with these working arrangements. Some workers even find it attractive to have the opportunity to spend long periods of time with their families when off rotation.

The moderate level of confidence associated with most population effects reflects the linked nature of socio-economic analysis; effects on migration and improved well-being from incomes are modelled on estimates of economic effects within the region on employment and income and consequently share the uncertainty of those underlying forecasts. The high level of confidence relating to out-of-territory mine workers and their dependents moving residency to the RSA is based on workforce forecasts with a low margin of error and survey results which show that incentives offer the proponent substantial influence on where workers live. The moderate level of confidence associated with adverse but not significant effects on community vitality in terms of social issues such as crime, substance abuse and deterioration of family relationships is based on the lack of a model or academic consensus on the magnitude of these effects.

**Table 16.4-11 Summary of Residual Effects for Community Vitality**

<b>Potential Residual Effect</b>	<b>Direction</b>	<b>Significance</b>	<b>Level of Confidence (Low, Moderate, High)</b>
Population changes from out-of-territory mine workers and their dependents moving residency to RSA	Beneficial	Not Significant	High
Population changes from migration to the RSA to take advantage of higher incomes and employment rates generated by the Project	Beneficial	Not Significant	Moderate
Employment opportunities and increased income would reduce economic hardship and improve well-being of local families	Beneficial	Not Significant	Moderate
Positive spending decisions of increased income could enhance family and community wellbeing (i.e., positive spending on education)	Beneficial	Not Significant	Moderate
Negative spending decisions could reduce family and community wellbeing, (i.e., crime, addictions)	Adverse	Not Significant	Moderate
Influx of workers and their families could create negative behavioural changes and reduce family and community well-being if transient population engages in socially disruptive or illegal activities (i.e., crime, alcoholism)	Adverse	Not Significant	Moderate
Separation of workers from family and dependants for extended periods of time could lead to deterioration of family relationships	Adverse	Not Significant	Moderate
Loss of jobs and income at the end of operations and potential out-migration could negatively affect family and community well-being	Adverse	Not Significant	Moderate

## 16.5 CUMULATIVE EFFECTS ASSESSMENT (CEA)

### 16.5.1 Introduction

The effects assessment of the Project on Community Vitality takes into consideration past and existing actions and is based on forecasts for population growth incorporating those actions. Consequently, the assessment is already cumulative in nature. Further, the effects on population growth are considered to be beneficial and thus are not required to be carried forward. In addition, the residual effects on well-being are very small, there is good existing capacity in the RSA, and Project contributions to cumulative effects are unlikely to be detectable. This, and the lack of VC-specific effects data from potentially overlapping projects, means it is impractical to conduct a CEA for well-being effects.

### 16.5.2 Identification of Other Projects or Activities

The Project's effects on staffing, employment, and income are expected to have a beneficial effect on population in the region. Estimates of population growth are based on forecasted data, which already includes consideration of cumulative effects. As a consequence, no new identification of activities is necessary.

### 16.5.3 Interactions and Potential Cumulative Effects

Residual effects on population are based on forecasts and thus already include cumulative effects in their analysis. As a consequence, residual effects are already a CEA and no further assessment of cumulative effects is required.

### 16.5.4 Additional Mitigation Measures and Potential Residual Cumulative Effects

As the effects assessment of the Project has already been conducted in the context of other proposed projects and their effects on population and well-being, no additional mitigation measures are required.

### 16.5.5 Significance of Residual Cumulative Effects

The residual cumulative Project effects on community vitality are the same as the effects specific to the Project provided in Table 16.4-10.

### 16.5.6 Discussion of Significance of Residual Cumulative Effects

The discussion of significance of residual cumulative effects is the same as the discussion provided in Section 16.4.4.1.

## 16.6 SUMMARY AND CONCLUSIONS

The Community Vitality VC assesses the potential effects of the Project on demographic conditions and well-being of the communities located in the Project LSA.

The Project is expected to affect the LSA population through three interactions: project staffing, employment effects, and income effects. Project staffing increases population through workers hired from outside Yukon who subsequently re-locate to the LSA with their dependents; these are expected to add an average of 42 people per year to the region's population over the period of peak hiring from 2017 to 2024. Employment effects come from the stimulus to economic activity brought to the region by the Project, which raises the relative employment rate and thereby encourages in-migration and discourages out-migration; these are expected to add an average of 68 people per year to the region's population over the final three years of the construction phase but few thereafter as employment rates stabilize in the operations phase. Higher incomes stimulated by Project activities are expected to have similar effects on net migration and income effects are expected to increase net migration by an average of 14 people per year over the period of peak hiring from 2017 to 2024. The Project is expected to increase the population of the RSA by 645 people by 2024, accounting for a 0.5 percentage point increase in the population growth rate in 2017 and declining to 0.2 percentage points in 2019 and a negligible increase by 2022.

Whitehorse is expected to receive 95.9% of migrants, with Pelly Crossing receiving 1.7% and Carmacks receiving 2.4%. By 2024, the total effect of the Project as a share of the projected population is expected to rise to 2.9% in Pelly Crossing (or 11 individuals), 2.6% in Carmacks (or 16 individuals), and 2.0% in Whitehorse (or 619 individuals). These increases would occur in the context of a rapidly-growing Yukon population. Whitehorse grew at an annualized rate of 2.6% between 2006 and 2011; in the year of the greatest effect from the Project (2017, when noticeable effects from construction begin) total migration is expected to be 0.6% of the total population or 29% of the total annual growth. The most recent population projections for Yukon published by the Yukon Bureau of Statistics forecast a 2021 population for Whitehorse between 33,179 and 30,721, for which the estimated effect of 619 new migrants by 2021 falls well within the variance of these estimates. The Yukon Government and the City of Whitehorse are very familiar with the challenge of dealing with a rapidly growing population and can expect to be highly resilient in managing this change.

All population effects are considered to be reversible. Population effects are modelled on staffing, employment, and income effects of the Project, which would be reversed when those effects are removed post-closure. Within this context, the population would return to baseline conditions over the period approaching closure to the post-closure period.

The anticipated Project effects on family and community well-being are linked to income changes and family separation during work rotation, and are also, to a lesser extent, linked to behavioural changes associated with Project-related migration. In general, Project employment and income will lead to an improvement in family and community well-being. It will create new job opportunities in the LSA and RSA and will increase personal incomes. This additional income will reduce family economic hardship and could enhance quality of life. The duration of this effect would extend over the 26-year life of the mine.

However, some potential indirect negative wellbeing effects are anticipated. These potential negative effects will be largely attributable to decisions made on spending of disposable income, behavioural changes associated with influx of people and family separation during work rotation.

The effects on well-being are considered to be long term; although behavioural effects, if any, are only expected to be noticeable during the first years of construction and operations as migrants settle into the communities and people adjust to higher incomes.

The magnitude of effects on family relationships are uncertain since they depend on how families adjust to work schedules. There is little information on family characteristics, values and expectations that would allow us to quantify these effects. However, with mitigation strategies in place, the effects of work schedules are not expected to be significant.

The net effects on well-being are expected to be on balance slightly positive because Project-related employment incomes will reduce family economic hardship and enhance quality of life. The proposed mitigation and monitoring is anticipated to be effective as long as the Proponent, communities, and governments cooperate in management initiatives.