APPENDIX 5

SIR 30 – Cultural Assessment

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) completed a Traditional Land Use (TLU) assessment for Shell Canada Limited (Shell)'s proposed Jackpine Mine Expansion (JME) project in May of 2011 (*Submission of Additional Traditional Knowledge and Traditional Use Information to the Joint Review Panel)*. First Nations expressed concern that the TLU assessment did not consider cultural information contained in reports provided. Shell agreed to complete an assessment of cultural effects to examine the JME Project (the Project) potential effects on elements of Aboriginal culture based on the information provided by several Aboriginal groups, including the following documents prepared by the Fort McKay First Nation (FMFN), Athabasca Chipewyan First Nation (ACFN), and Mikisew Cree First Nation (MCFN) specifically for the JME Project:

- Fort McKay Specific Assessment (Supplemental Information for the Shell Canada Limited Jackpine Expansion and Pierre River Mine Project (Fort McKay IRC (2010a).
- Integrated Knowledge and Land Use Report and Assessment for Shell's Proposed Jackpine Mine Expansion and Pierre River Mine (ACFN 2011).
- Mikisew Cree First Nation Indigenous Knowledge and Use Report and Assessment for Shell Canada's Proposed Jackpine Mine Expansion, Pierre River Mine, and Redclay Compensation Lake (Candler et al. 2012).

Shell requested that Golder, along with contributions from Nichols Applied Management (Nichols), consider available information to provide an assessment of the cultural effects resulting from Shell's proposed JME project. Since initiating this work in June of 2011, the Joint Review Panel (JRP) Terms of Reference (TOR) and JRP Supplemental Information Request (SIR) of January 30, 2012, have resulted in some refinement to the assessment. This report presents a discussion of the effects associated with the JME Project on Aboriginal cultural elements that are important to Aboriginal communities near the Project, and is structured to provide a definition of culture, components of culture and environmental effects on culture.

Section 2.0 of this assessment focuses on the approach used to assess the Project effects on the culture of Aboriginal groups potentially impacted by the Project, along with a list of the reviewed Aboriginal literature. This section proceeds to define what is meant by the term "culture," describes earlier studies of non-western societies and culture, discusses cultural change and how it can be studied, and describes what is meant by a "cultural effects assessment."

Section 3.0, "Resource Development and Aboriginal Culture in the Wood Buffalo Region", discusses the historical and cultural context of development in the region from 1960 to present day. It also looks at socio-economic conditions for Aboriginal peoples in the region, and discusses current trends (e.g., population, labour force, income, language, and social and physical infrastructure).

Section 4.0 presents the results of the discipline-specific assessments in the Project Environmental Impact Assessment (EIA) and discusses the effects on elements of culture specific to Aboriginal groups. This section also details Shell's history and approach to consultations, including Shell's history of engagement, employment of Aboriginal people in the region and contribution to maintaining and validating Aboriginal culture.

Section 5.0 provides a summary of Project effects on the tangible and intangible elements of culture including those pertaining to lifestyle and quality of life, traditional land use, historical resources, socio-economics, air quality and human health, noise and aesthetics.

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2.0 APPROACH

The focus of this assessment is on Project effects on the culture of potentially impacted Aboriginal groups and First Nations whose traditional use overlaps the Project footprint, including the ACFN, FMFN, MCFN, the Fort McMurray First Nation #468, and Métis Locals 63, 125 and 1935. The assessment relies, in part, on studies commissioned by the Aboriginal communities themselves.

To complete this assessment of Project effects on culture, the following steps were completed:

- Consideration of consultation records between Shell and each Aboriginal group dating back to 2007.
- Literature pertaining to and written by Aboriginal people in the region was reviewed to identify and gather information on cultural elements of concern to Aboriginal groups. Reports and academic literature on the ACFN, FMFN and MCFN were of primary importance to the review. The Fort McKay Specific Assessment (Fort McKay IRC 2010a) and predevelopment baseline reports (Fort McKay IRC 2010b,c) were reviewed, along with ACFN's *Integrated Knowledge and Land Use Report and Assessment* (Candler 2011), *An Ethnohistory of the Mikisew Cree First Nation* (McCormack 2010) and The MCFN Indigenous Knowledge and Land Use Report and Assessment (Firelight Group, 2012). A list of Aboriginal reports that were used in Golder's TLU report is provided in Section 2.1.
- A pathways analysis was undertaken to identify linkages, or routes, by which a particular environmental change interacts with a particular cultural component.
- Relevant discipline-specific impact assessments were reviewed and their results were documented, including the socio-economic impact assessment of effects on the Aboriginal population, the wildlife effects assessment, the TLU assessment, the human health risk assessment and the wildlife health risk assessment.
- Based on the results of discipline-specific impact assessments, an assessment was made as to the related Project effects on elements of Aboriginal culture identified in the reviewed reports, including elements pertaining to lifestyle, health and quality of life.

2.1 Traditional Knowledge and Traditional Land Use Information Considered in the Environmental Impact Assessment and Updates

A summary of the information reviewed to inform the TLU Assessment in the EIA is provided in Table 1.

Table 1 Traditional Knowledge and Traditional Land Use Information Sources

Fort McKay First Nation (FMFN)	• *From Where We Stand* (Fort McKay Tribal Administration 1983). • *There is Still Survival Out There* (FMFN 1994). • *Survey of Consumptive Use of Traditional Resources by the Community of Fort McKay* (Fort McKay 1997). • *Fort McKay End Land Use Survey Database* (Fort McKay IRC 2000). • *Some Effects of Oil Sands Development on the Traditional Economy of Fort McKay* (Tanner et al. 2001). • *Fort McKay Medicinal Plant Report* (BG TEK 2003).
Athabasca Chipewyan First Nation (ACFN)	• Information provided by members of the ACFN during the Alberta Energy and Utilities Board (EUB) hearing for the Albian Sands Energy Inc. Muskeg River Mine (EUB 1998). • *Athabasca Chipewyan First Nation Traditional Land Use Study* (ACFN 2003a). • *Footprints on the Land* (ACFN 2003b).
Mikisew Cree First Nation	• Canadian Natural Resources Limited's Horizon Project (Golder 2002a).
Affected Trapline Holders	Interviews with trapline holders: • Registered Fur Management Area (RFMA) #1275 – held by Arne Hermansen. • RFMA #2939 – held by George Clark. • RFMA #1714 – held by Marvin L'Hommecourt. • RFMA #1716 – held by Henry Shott (Deceased). • RFMA #2137 – held by Emma Faichney. • RFMA #2331 – held by Victor Amiot.
Other Sources	• *Where the Rivers Meet* (FMMFN 2006). • Albian Sands Energy Inc.'s Muskeg River Mine Expansion Project (Albian Sands 2005; AXYS 2005). • Shell Canada Limited's (Shell's) Jackpine Mine – Phase 1 (Golder 2002b, 2003a,b). • Petro-Canada/UTS Energy Corporation's Fort Hills Mine (AXYS 2001a,b,c). • Suncor Energy Inc.'s Firebag in-situ project (Golder 2000). • Shell's Muskeg River Mine (FMES and AGRA 1998a; Golder 1997). • Petro-Canada's MacKay River Steam Assisted Gravity Drainage development (FMES and AGRA 1997). • Syncrude Canada Ltd.'s Aurora Mine (BOVAR 1996). • *A Report of Wisdom Synthesized From the Traditional Knowledge Component Study* (Bill et al. 1996). • Steepbank Mine Studies (FMES 1995a,b, 1996a). • Aurora Mine Studies (FMES 1996c,d; Fort McKay 1996). • Project Millennium Study (FMES and AGRA 1998b). • Firebag Project Traditional Land Use Baseline (Suncor 2000, Appendix VX). • Culturally significant ecosystems model (McKillop 2002). • Analyses of the impacts of development to traditional economies (Fox and Ross 1979). • Legislative and Consultation Context for Impact Assessments (Ross 2003).

Subsequent to preparing the TLU Assessment for the EIA (EIA, Volume 5, Section 8.3), Shell received the following Project-specific reports prepared by Aboriginal groups:

- Athabasca Chipewyan First Nation Traditional Ecological Knowledge and Traditional Land Use Study for the Jackpine Mine Expansion and Pierre River Mine (Lepine 2008).
- Fort McKay First Nation Traditional Ecological Knowledge Study for Jackpine Mine Expansion and Pierre River Mine (FMA 2008).

- Fort McKay Specific Assessment (Fort McKay IRC 2010).
- As Long as the Rivers Flow, Athabasca River Knowledge, Use and Change (Candler et al. 2010).
- Athabasca Chipewyan First Nation Integrated Knowledge and Land Use Report. (Candler et al. 2011).
- Mikisew Cree Use of Lands and Resources in the Vicinity of the Proposed Shell – Jackpine and Shell – Pierre River Operations. (Elias 2011).
- Mikisew Cree First Nation Indigenous Knowledge and Use Report and Assessment for Shell Canada's Proposed Jackpine Mine Expansion, Pierre River Mine, and Redclay Compensation Lake (Candler et al. 2012).

This assessment considered information from the documents identified above, and also considered the significance assessment of the Project's effects on TLU (Golder 2011).

2.2 Defining Culture

There are a variety of definitions of "culture," most of which derive from investigations of how societies develop and change over time, and from attempts to understand what factors drive the diversity of human cultures around the world.

Early anthropologists[1] focused on understanding the structure and function of social institutions in "small- scale societies" where cooperation and kin ties were paramount to survival. A pragmatic definition of social anthropology emerged, as did the study of social groups. This was especially evident in those groups that were organized along territorial, kinship and political lines. The interrelationships among these components constitute a "social-structure" where social structure is the arrangement of orderly social life. Thus, culture was defined as a "system" of relationships between social institutions.

Earlier works were refined to describe how cultural systems and patterns develop and change by identifying the material condition of socio-cultural life in terms of the articulation between production processes and habitat (or the natural environment). These refinements focused on how ecosystems and physical environments could influence culture. This approach has been called "cultural ecology" and is a perspective that argues that people are defined, by what they do for a living. The cultural ecological approach shows that the social system is adapted to a physical environment and what flows from that are the culture or mechanisms by which an individual acquires characteristics to fit him to that life. For example, in drought prone regions of Africa, where rainfall patterns were of great concern, belief systems developed where rainfall and water was strongly held.

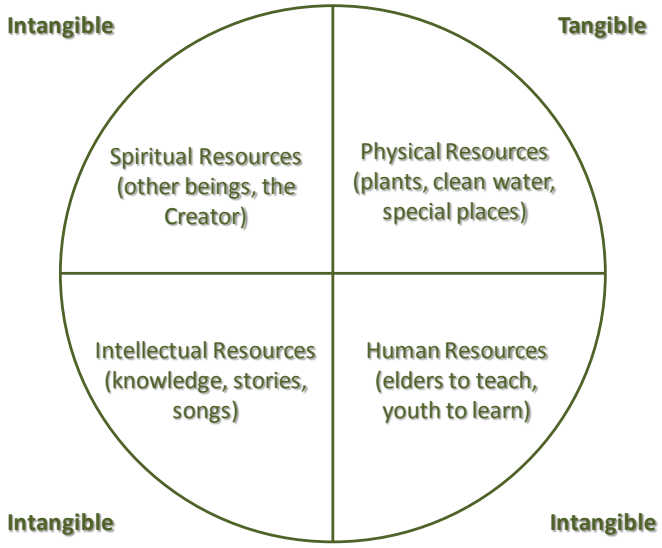
Following the "cultural ecological" definition of culture, elements of the natural and physical environment can be described as "tangible" and elements of social environment are often known as "intangible". Definitions and examples of tangible and intangible elements, and a visual model are shown below. The model is used in this cultural assessment.

[1] Radcliffe Brown (1881-1955) and Julian Steward (1902-1972) are two anthropologists that relied on reports from missionaries and travelers in Africa, North America and Pacifica to develop explanations of cultural differences around the world.

- **Tangible elements**: those things which can be seen or touched and are the physical resources upon which cultural practices, values or beliefs rely (e.g., culturally important plant and animal species, hunting areas, landscapes and spiritual sites) (Candler 2007).
- **Intangible elements**: those things which cannot be seen or touched but are nonetheless important to culture (e.g., language, values, traditional knowledge, oral history, social relationships, spiritual or religious beliefs and customs) (Candler 2007).

An example of tangible and intangible elements of Aboriginal culture is shown in Figure 1.

Figure 1 Elements of Culture



Source: Candler 2007.

Changes in the tangible elements, such as available traditional land, influence intangible cultural elements such as language, oral history and the transmission of cultural values to youth. Conversely, changes in the intangible elements of culture, such as changing spiritual beliefs or customs, can affect the value or use of tangible elements such as burial sites and spiritually-significant landscapes.

Cultural and social elements important to Aboriginal groups in the region emerge from common themes identified in the literature review. These themes in turn identify the cultural elements that were assessed.

The reports reviewed confirm that the land based economy continues to provide economic, social and cultural benefits. Country foods represent an important element in the diets and livelihood strategies of community residents. There are also important cultural dimensions to land based economic activities. For example, the harvesting, distribution, processing and consumption of traditional resources affirm identity and social relationships between community members. Important values are passed down to young people and are considered important now and for the future. Aboriginal communities also identify an interest in employment in the wage economy and training opportunities, especially for young people. In other words, while opportunities in

the wage economy are important to Aboriginal communities in the region, so is the choice and ability to continue activity on the land.

2.3 Cultural Change

Change is taking place in all human societies all the time. The data to be investigated are specific social and cultural institutions and the modifications of these specific institutions studied through time, in the context of other co-existing social, cultural and often ecological factors. There are no general "laws" of social change. A multiplicity of social processes is involved and these often operate concurrently.

In America, the term "acculturation" was first used to describe what happens when "groups of individuals having different cultures come into first-hand contact, with subsequent changes in the patterns of either or both groups" (Herskovits 1948). The concept is useful but restricted, because television, the internet, and print media affect important changes in the absence of continuous first-hand contact.

It is important to state that social and cultural change is not necessarily from better to worse. The fact that change has often had deleterious consequences has sometimes created the presumption that it always does so (Golder 2011).

In traditionally centralized societies, where chiefs and elders were the most respected and powerful people in the community, the introduction of the cash economy altered relationships in the communities in another way. In some cases, young people with large salaries were resented. They were the nouveaux riches who, by traditional standards, were asserting a status to which they were not entitled. Thus, the cash economy effected a change in values.

An example from Aboriginal culture is that land was regarded as a resource available for all, with rights in it being vested not in private individuals or corporations but in specific social groups. Modern land use is not compatible with this traditional pattern.

The natural environment, upon which small scale or subsistence societies are, in part, dependent, is a major contributor to social organization and other human institutions. Change in the natural or physical environment may lead to changes in social organization and social institutions, including values.

2.4 Cultural Effects Assessment

Historically, issues around cultural change and social stressors due to development have been addressed in socio-economic impact assessments, and through consultations with potentially affected communities and groups.

In 2008, the Mackenzie Valley Environmental Impact Review Board (MVEIRB) made a commitment to develop guidelines for conducting cultural impact assessments. Currently, the MVEIRB's cultural impact assessment guidelines are in draft, and have not yet been finalized.

In conducting this type of an assessment, it is generally agreed that qualitative and quantitative data should be considered. Qualitative data collection commonly utilize tools such as social mapping, development of historic timelines, and priority matrices, borrowed from participatory rural appraisal tool kits. Since it is important to involve the cultural group in determining what elements of culture need the most protection, culture "holders" are involved in identifying important cultural values, heritage resources and special places in order to focus the

assessment on what a given community believes to be important. Doing so involves the recommended practice of broad based consultation with community members.

Quantitative investigation, or the use of standard data sets (census data) is also important to incorporate into cultural assessment, as it may sometimes show that a pattern that people assert or believe to be dominant is in fact, not so. For example, people may believe that salaried employees do not have time for hunting. However, statistics may show that harvesting activity is not affected by full time employment. Statistical surveying and review of census data might show unexpected correlations of which the people themselves have no real awareness. Exclusive reliance on questionnaires and survey data however may lead to an overly formal and mechanistic presentation of a community or culture, at the expense of the intensive qualitative analysis which depends on first-hand knowledge and sustained personal contact. This is most obviously the case where people's ideas, beliefs and values are being studied. No amount of statistics will help us to understand a people's concept of spirit, for example, or their notion of substance, or their different categories of kinship. A good working knowledge of a group's social and cultural institutions is important.

What EIA practitioners and Aboriginal communities seem to agree upon is that addressing issues about cultural change and protection of rights requires meaningful involvement from the potentially effected group. This cultural assessment holds particular focus on whether the Project may interfere with hunting, trapping and fishing and how the Project addresses Aboriginal interests, typically those involving employment, training and benefits targeted to Aboriginal communities so that they benefit from development. These are the topics that are frequently raised in consultations. Changes, as a result of the Project, are identified with a view to determining if Aboriginal lifestyles and quality of life are affected, as Aboriginal traditional activities and interests should be respected so that lifestyle and quality of life is not compromised.

Project effects on cultural elements identified by Aboriginal communities in the Athabasca Oil Sands Region are delineated through consultations/engagement and a review of project specific and regional information available. While interviews have not taken place specifically for the purposes of completing this assessment, the information contained here is based on regional and project specific data made available during the course of in-depth and longstanding consultations with potentially impacted aboriginal groups. Much of this data and information has been collected using participatory tools. Publicly available statistics have also been reviewed. The resulting reports were provided to Shell for use in assessing the Project's effects on Aboriginal communities. The reports are extensive and date from 1995 to, as recent as, 2012. While the approach taken here recognizes the importance of first-hand knowledge, engagement and involvement of Aboriginal communities when assessing the effects of development on them, it was the authors of the reports reviewed that undertook this engagement. Because the reports are thorough and well researched, relying on them for this effects assessment is a valid approach.

This assessment has made use of cultural information provided by the FMFN, ACFN, and MCFN as it relates specifically to the Project. For example, as part of its specific assessment for the Project, the FMFN produced its Cultural Heritage Baseline (Fort McKay IRC 2010b) and Cultural Heritage Baseline Assessment (Fort McKay IRC 2010c), in which elements important to its culture were identified. Similarly, in their TLU and Traditional Ecological Knowledge (TEK) studies prepared for the Project, both the ACFN and MCFN have identified elements of their culture which they believe to be important (ACFN 2011; MCFN 2011; MCFN 2012).

2.5 Cultural Effects Linkage and Pathways

Pathways or Project-environmental interactions have been identified to show the linkage between Project activities and a potential change or effect on tangible and intangible elements of Aboriginal culture.

The following pathways (linkages) were considered:

Table 2 Cultural Effects Pathways (Linkages)

Project Activity	Potential Effect	Potential Indirect Effect
land clearing/disturbance	lower availability of land for harvesting	less ability to pass on Traditional Knowledge to successive generations
	less ability to access land or water resources for harvesting or other traditional activities (e.g., hunting, trapping and fishing)	
	lower availability of habitats to support wildlife, aquatic and plant resources	
	loss of historical resources	
changes in air and water quality due to Project activities	effects on human and ecological health	loss of trust in sources of water for consumption
changes in noise levels due to Project activities	loss of experience of wilderness or solitude	less ability to pass on Traditional Knowledge to successive generations
	effects on wildlife distribution around the Project	lower availability of wildlife for harvesting or other activities
employment requirements and procurement	participation in the wage economy	lower language retention
		less ability to pass on Traditional Knowledge to successive generations
		changes in social organization due to changes in values, or inequities in participation in the wage economy
		changing role of Elders due to changes in values
	increased non-Aboriginal population	increased demand for services
		increased competition for traditional resources
		changes in values

2.6 Environmental Impact Assessment Background

In 2007, Shell undertook an Environmental Impact Assessment (EIA) to determine the effects of the Project activities on a number of Key Indicator Resources (KIRs). Detailed information on the components assessed is located in Volumes 4, 5, and 6 of Shell's EIA (2007). The EIA used the following EIA methodology for determining the effects of the Project on the KIRs:

- Impact Analysis and Classification:
  - The impact analyses focuses on assessing the potential changes to receptors within the environment due to the construction, operation and reclamation and closure of the Project. The impact analysis includes validation of causal linkages and pathways between particular Project activities and potential environmental impacts for each EIA component.

- Impact Description Criteria:
  - Each impact is first described in terms of the following criteria: direction, magnitude, geographic extent, duration, reversibility and frequency. The framework is applied to the environmental components of the EIA, with the exception of: hydrogeology; hydrology; water quality; traditional land use; historical resources; and socio-economics. Effects on these components are expressed on the final receptors such as aquatic health, wildlife health, fish habitat and health risk, or are expressed qualitatively.
- Environmental Consequence Rating:
  - The environmental consequence rating consolidates the results of the aforementioned impact criteria into one rating. The consolidation allows the effects from different components to be compared using a common rating so that areas of greatest potential concern can be identified.
- Certainty and Prediction Confidence:
  - The degree of confidence in predictions is assessed for each residual effect predicted in the EIA. Each component uses quantitative methods such as sensitivity analyses or semi-quantitative methods to assess prediction confidence to the extent reasonable.

The EIA methodology, along with the results, is important to understand as the assessment of the Project's potential effect on tangible and intangible elements of Aboriginal culture, depend on the results of each discipline's specific assessment. These discipline specific assessments include the Traditional Land Use Assessment, Terrestrial Resources Assessment, Aquatic Resources Assessment, Air Quality Assessment, Noise Assessment, Visual Effects Assessment, Resource Use Assessment, Historical Resources Assessment, and Human and Ecological Health Assessment, and Socio-Economic Assessment. Collectively, these assessments capture results of the assessment of Project effects on the aquatic environment, on wildlife and historical resources, on human health and on aesthetics. A socio-economic impact assessment of the Project on Aboriginal groups is also included. Each assessment applies the methodology listed above.

For example, an environmental consequence ranking of "low" for habitat loss for large game and fur bearing animals would suggest that little change in the resource (i.e. large game or fur bearing animals) within the relevant study area would occur due to the Project. If Aboriginal groups can still access the resource and depletion of the resource is not expected in the region, it would be reasonable to conclude that opportunities to harvest is not expected to be affected due to the Project. If the socio-economic impact assessment concludes that the Project will not induce population and consequent competition for resources (i.e. large game and fur bearing animals) and the Project's work schedule and rotation does not severely limit hunting opportunities, it is, again, reasonable to conclude that the Project's socio-economic effects will not have a negative impact on hunting opportunities or hunting success.

If a tangible element of culture, such as habitat for large game and fur bearing animals is not affected by the Project, intangible elements of culture such as the passing on of Traditional Knowledge (TK) would not be expected to be affected. Section 4.0 provides additional information and discusses the results of the discipline specific assessments from the EIA.

3.0 RESOURCE DEVELOPMENT AND ABORIGINAL CULTURE IN THE WOOD BUFFALO REGION

3.1 Historical Overview

Aboriginal peoples have lived in northeastern Alberta for 10,000 years or more, and evidence of their presence can be found throughout the region. For example, the Cree Burn Lake site was a hub for trading and cultural activities dating back some 8,000 years. It was designated as a Provincial Historic Resource in 1999. Prior to contact with European settlers, Aboriginal peoples maintained a relatively stable way of life based on hunting, fishing, and the gathering of food and medicinal plants.

European settlers first came to the region as explorers and fur traders in the 18th century. Fur trading posts were established at Fort Chipewyan (1788), Fort McKay (1820) and Fort McMurray (1870). Located at the confluence of the Clearwater and Athabasca rivers, Fort McMurray developed into a major staging point for travellers and freight bound for the north via the Slave River, Great Slave Lake and Mackenzie River.

As of the early 1960s, the region[2] was a relatively isolated part of the province with a small, predominantly Aboriginal population. Prior to 1966 there was no all-weather road access from the region to the southern parts of the province. Ground transportation to the region was dependent on the railway, completed in the early 1920s, or on winter access via forestry roads.

In 1961, the population of the region stood at approximately 2,600. Approximately one-half of those people resided in Fort McMurray[3] with most of the remainder in the unincorporated communities of Fort Chipewyan, Fort McKay and Anzac. There were just over 600 housing units in the region, split fairly evenly between Fort McMurray and the other smaller communities. Housing was predominately single family dwellings (AOSERP 1979).

The scattered urban settlements, most significantly Fort McMurray, provided only a basic level of services to the region (AOSERP 1979). As an example, in 1960, Fort McMurray had a hospital with 25 hospital beds and just one constable without a police vehicle (AOSERP 1980).

Prior to large-scale development of the Oil Sands, the region's economy was reliant on its function as a transportation thoroughfare to other regions in the far north, and on traditional resource industries such as hunting, fishing, trapping and forestry. With Fort McMurray as its southern terminus, Athabasca River barge transport was an important link for communities in northeastern Alberta, northwestern Saskatchewan and the far north. While the expansion of highway systems in the late 1950s and early 1960s began diverting traffic away from the barge transport system, it nonetheless remained an important transportation route for many northern communities, such as Fort Chipewyan, without rail or all weather road access.

In 1961 Fort McMurray's employed labour force was 330 persons (AOSERP 1979). The percentage of the population age 15 and over that was employed was less than 49%, below the provincial average of 55%. The construction and mining sectors comprised a relatively minor share of the employment base of the community at

[2] Most of the regional data presented in this section refers generally to the town of Fort McMurray, the unincorporated communities of Fort Chipewyan, Fort McKay, Anzac, and their surrounding areas.

[3] Fort McMurray was only known only as McMurray until 1962 when the word "Fort" was added back to its name in order to reflect the community's heritage.

that time. More than one third of the labour force was engaged in the transportation and communications industry, reflecting the town's importance as a rail and waterway transportation hub.

The region had been marked by successions of booms and recessions associated with natural resources and transportation (AOSERP 1978). The Oil Sands, in particular attracted interest prior to 1960, including:

- a minor boom at the turn of the 20th century when speculators tried to drill for oil below the Oil Sands;
- the late 1920s when serious efforts were made by the newly-formed Research Council of Alberta to find a method of extracting oil from Oil Sands deposits; and
- the 1950s when the exploration period for the Great Canadian Oil Sands (GCOS) began (AOSERP 1980).

Most of the economic effects for these developments fell upon the community of Fort McMurray.

The smaller, predominantly Aboriginal communities in the region were largely dependent on renewable resource harvesting, seasonal firefighting, local administration, and social assistance. The relationship between Aboriginal peoples of the region and their traditional lands had changed since pre-European contact times. The arrival of the Europeans and the fur trade ensured that trapping now supplemented traditional hunting, fishing and gathering activities. By the 1960s, Aboriginal persons in the region were also engaging in various wage-employment opportunities in renewable resource sectors, such as fishing and forestry. For example, commercial fishing on Lake Athabasca provided a relatively significant amount of seasonal employment to Aboriginal people in the Fort Chipewyan area in the early 1960s (AOSERP 1979).

The living patterns of Aboriginal people in the region also changed in the early 1960s as they settled more permanently in established communities as a result of the declining fur trade and under the pressure of government policies. As part of the same process, they were obliged to rely increasingly on government transfer payments and the surrounding wage economy to supplement their livelihood from traditional hunting and gathering activities.

Some members of the ACFN transferred membership to Fort McKay in the 1970s as the Oil Sands economy grew and the trapping economy declined (Candler 2011). Changes in the environment (some attributed to the Bennett Dam on the upper Peace River in the late 1960s), lower fur prices, industrial impacts and Canadian colonial education policies all influenced transition to a more permanent ACFN settlement at Fort Chipewyan through the 1960s and 1970s. Seasonal reliance on historic village areas, traplines and the wider traditional territory still continued.

Until the 1960s, the way of life for the people of Fort McKay was the traditional bush economy, based on a seasonal cycle of hunting, trapping, fishing and plant gathering. By living and working together on the land, kinship networks were reinforced and core values influencing behaviour were instilled. The 1960s was a period of transition, wherein settlement in establish communities and increasing reliance on the wage economy became more prevalent.

3.2 Pre-development Conditions in the Region

Large scale development of the region's Oil Sands resource began in the mid-1960s and helped lead to a number of important changes for the region over the succeeding five decades. Development of the region from the 1960s to today can be divided into four distinct time periods:

- Early 1960s to 1986: The first major growth period associated with Oil Sands development. Fort McMurray's population grew from 1,200 to nearly 37,000.
- 1986 to late 1990s: Population was essentially stable as Oil Sands industry employment declined marginally as a result of productivity improvement measures.
- Late 1990s to 2008: The second major growth period associated with Oil Sands exploration and development. Employment growth drove rapid population growth in the region, leading to high demand for regional infrastructure and services. The population of Fort McMurray increased to over 70,000.
- 2008 to 2011: Growth in the region moderates as a result of the global economic downturn.

It is clear that livelihoods have changed enormously over the last 50 years, as described in *Cultural Heritage Assessment Baseline - Pre-development (1960) to Current (2008)* (Fort McKay IRC 2010b). For example, new technologies, including all terrain vehicles and snowmobiles, are used to harvest. These tools are, however, costly, making wage labour more necessary. Only the oldest people in the community have experience of living as adults on the land. Only 8% of Fort McKay residents speak a language other than English at home (Fort McKay IRC 2010b) and names of traditional places and traditional resources are increasingly at risk of being lost.

Many Aboriginal People in the region today are active in the wage-based economy while also continuing to pursue land-based activities (e.g. hunting, fishing and trapping). There is a continuum, along which harvesting, fishing and plant gathering, and wage based employment lie, and along which individuals operate as they engage in a range of economic activities. Earning money is not always the only objective of economic activity. Instead, these activities and their associated social and cultural values help shape individual and community identity and wellbeing. In this regard, some of Fort McKay's members prefer to combine seasonal work with hunting and traditional pursuits. "Despite the continued northward advance of industrial society, most Aboriginal northerners continue to regard traditional activities as essential to the maintenance of their social structure and institutions, their culture and cohesion of their community and family lives." (Fort McKay IRC 2010b). "An appropriate place for children to learn traditional values is in the bush. Practical skills and Cree values are considered very important for today and for the future. The right to transmit knowledge depends on access to traditional lands" (McCormack 2010).

Even with the intensification of the Oil Sands economy in the past twenty years, relationship to the land remains important to ACFN members and other Aboriginal groups[4]. "Dene livelihood ties people with place and culture on the land. These connections have implications for individual and community health and well being and for maintaining resilience of culture in the face of change. In traditional Dene cosmology, the land is alive. The

[4] For various historic reasons, ACFN families are affiliated with other Aboriginal groups in the region. There are strong family connections between the ACFN, Mikisew Cree and Fort McKay First Nations (Candler 2011).

creator imbued the land, the waters and all the creatures that dwell upon the land and within with spirits, and ACFN Elders remember the spirits that helped their ancestors to survive" (ACFN 2011).

3.3 Socio-economic Conditions in the Region

From the early 1960s to today, the region has transitioned from a relatively isolated part of the province with small communities and few amenities into a region that is home to one of Alberta's larger urban centres. While these changes to some degree reflect the general enhancement of services and facilities that occurred throughout the province, many of these changes were precipitated by the nature and pace of Oil Sands development.

3.3.1 Benefits of Growth

Residents of the region have experienced the benefits of growth, driven by expansion of the Oil Sands industry, in a variety of ways, including:

- increased employment and contracting opportunities for residents, including for those groups that are currently under-represented in the labour force (e.g., Aboriginal persons);
- increased wages and benefits that can be used by local workers to purchase various goods and services;
- increased industry support for community programs and infrastructure used by residents;
- increased revenues to local government that can be used to increase investment in public infrastructure and services or lower taxes;
- increased revenues to the provincial government that can be used for province-wide funding, programs, and initiatives that will also benefit the region; and
- a broader range of local services and amenities, including both commercial (e.g., retail, industrial) and public (e.g., education, health, emergency services).

3.3.2 Challenges of Growth

Along with, and sometimes as a direct result of these benefits, growth over the years has also led to a number of socio-economic challenges, primarily during the two major growth periods noted in Section 3.2 above. These pressures include:

- a shortage of housing, particularly affordable housing, due to high demand for accommodation;
- a rising cost of living, driven especially by housing costs;
- increased demand for regional services, including health, education, emergency, municipal, and social services;
- difficulties for both public and private sector service providers in meeting increased demand because of:
  - difficulties in attracting and retaining personnel because service providers are unable to offer higher wages to offset the high cost of living;

- funding that has not kept pace with increasing demand from both the resident and non-resident population and rising service delivery costs;
- pre-existing structural issues in certain areas such as health care that are further exacerbated by growth in the region;
- increased pressure on physical public infrastructure in the region, including municipal infrastructure and the regional road network;
- increased numbers of non-permanent residents (e.g., camp-based workers) who draw on regional services and infrastructure;
- reduced community cohesion and a sense of transience among residents; and
- increased social stressors related to growth, such as work demands that take time away from family and community life.

Many of these socio-economic issues do not exist in isolation but influence one another and further exacerbate socio-economic challenges in the region. For example, while the lack of affordable housing has created a demand on social service agencies in the area, it has also made it difficult for these same agencies to attract and retain the needed personnel to meet this increased demand.

The ability of service providers to address these challenges has expanded over the years as a result of increased resources (e.g., funding) and growth in the breadth and nature of social infrastructure services available. For example, policing, emergency, education, social and health services have all expanded the size and nature of their services. While responsible authorities in the region have often been stuck in catch-up mode in responding to socio-economic issues during periods of rapid growth, many of these service providers — the Regional Municipality of Wood Buffalo (RMWB), the Royal Canadian Mounted Police (RCMP), Alberta Health Services, and others — have also developed into sophisticated organizations that are aware of these issues and are directly and vigorously engaged in addressing them. There have been a number of recent positive developments (2008 to 2011) that have expanded the capacity of responsible authorities to address socio-economic challenges.

Without Oil Sands development, the regional population would be much smaller than it is today and communities in the region would not have experienced many of the socio-economic challenges precipitated by development. At the same time, neither would the region or its residents have realized many of the benefits of development, including jobs, income, and increased service offerings and amenities. Although growth is a pathway by which many socio-economic effects occur, the level of that growth alone is not a sufficient indicator of the nature and magnitude of these effects. Consideration must be given to the processes and systems in place to handle and address these effects. In the Wood Buffalo region, these processes and systems have expanded considerably over time, especially in recent years, as a response to rapid growth in the late 1990s to 2008.

3.4 Drivers of Change Contributing to Present Day Conditions for Aboriginal Groups in the Wood Buffalo Region

Over the last 50 years, Aboriginal peoples in the region have experienced a number of the same benefits and challenges related to regional growth. Their way of life has changed enormously, including:

- settlement into permanent communities;
- changes in family and community practices and relations (e.g., child rearing, education, visiting);
- declining Aboriginal language skills;
- declining reliance on traditional harvesting;
- fewer traditional practices being carried out;
- increasing reliance on non-traditional activities for their livelihood (e.g., wage economy opportunities, government assistance);
- increasing social challenges, including alcohol and drug abuse; and
- increasing access to improved amenities and services (e.g., health care, emergency and social services).

Many of these changes are shared with other Aboriginal peoples across Canada and have been brought about by increasing contact with non-Aboriginal peoples, values and norms as a result of external influences largely outside their control, including:

- increased use of traditional lands for non-traditional purposes, whether it be resource development such as Oil Sands development in the Wood Buffalo region, diamond mining in the Northwest Territories, or increased agricultural development and encroaching urbanization in others parts of the country;
- educational curriculums that have limited the learning of traditional knowledge values and practices; and
- increased access to other cultural influences through advancements in technology (e.g., TV, computers, satellite, internet, cell phones).

Among these external influences, Oil Sands development has undoubtedly had a strong effect on the Aboriginal population in the region. Table 3 outlines a number of these effects in greater detail.

Table 3 Oil Sands Development Effects on the Local Aboriginal Population

Oil Sands Development Practices	Effects on the Local Aboriginal Population
Taking up portions of land for a period of time	• Reducing opportunities to carry out traditional activities on Oil Sands industry affected lands and to transmit traditional culture and oral history while on the land. • Affecting how and where traditional practices are carried out by raising concerns about potential pollutants on traditional land and resources.
Drawing on regional sources of water	• Potential to have a negative view regarding the quantity and quality of water in the region, which is relied upon for carrying out traditional activities (e.g., fishing, means of accessing traditional lands).
Offering opportunities for increased engagement in the wage economy	• Limiting opportunities for carrying out traditional pursuits and transferring traditional knowledge to Aboriginal youth while on the land • Providing for greater household spending power, lower need for government transfer payments, and an improved sense of self-worth for some. • Increasing incomes, which may lead to increased disparity and social stratification within Aboriginal communities. • Increasing incomes, which may contribute to negative behaviours, including increased alcohol and drug abuse and gambling, especially among those lacking financial experience. Alcohol or drug use may also be used as a form of escapism from the stresses of work or family conflicts.
Increasing the non-Aboriginal population in the region	• Increasing competition for traditional resources from non-Aboriginal community members. • Increasing the exposure to outside cultural values.

Aboriginal peoples in the region are concerned that environmental effects related to industrial development have affected lifestyle and quality of life. The use of land and regional water sources by industry has contributed to a declining reliance on traditional harvesting and fewer traditional practices being carried out. This, in turn, has driven socio-economic change within Aboriginal communities by increasing the reliance of local Aboriginal peoples on non-traditional activities for their livelihood as well as contributing to ongoing social changes within the community (e.g., changes in family and community practices and relations).

Recognizing that development is affecting the traditional land and resources of Aboriginal communities in the region, industrial proponents have carried out several actions, including:

- supporting TLU and TK studies, oral history projects, and other initiatives;
- supporting Aboriginal community projects, cultural retention programs, and historical preservation initiatives; and
- supporting Aboriginal community consultation offices (e.g., Industry Relations Corporations (IRC), Government and Industry Relations, Sustainability Department).

A further discussion of the effects of development on TLU is included in Section 4.0.

Oil Sands development has had a number of positive socio-economic effects on Aboriginal peoples in the region, primarily by way of increased employment and income levels. Table 4 provides labour force data for the Aboriginal identity population, age 15 years and over, in the Regional Municipality of Wood Buffalo, Alberta, and Canada.

Table 4 Labour Force Indicators for the Aboriginal Identity Population 15 Years and Over

Labour Force Indicators	Wood Buffalo[(a)]		Alberta		Canada	
	2001	2006	2001	2006	2001	2006
Participation rate	71.8	76.0	64.2	68.3	61.4	63.0
Employment rate	63.2	69.9	54.6	60.8	49.7	53.7
Unemployment rate	12.1	7.9	14.9	11.1	19.1	14.8

[(a)] Census subdivision.

Source: STATSCAN 2006 and 2001.

The data in Table 4 shows that:

- Labour force participation and employment rates for the Aboriginal identity population in the Wood Buffalo area are higher than the Alberta averages and well above the Canadian averages.
- Unemployment rates for Aboriginal identity population in the Wood Buffalo area are significantly lower than the Alberta rate and almost half the Canadian rate.
- Labour force indicators have all improved between 2001 and 2006 for the Aboriginal identity population in the Wood Buffalo area.

Income data for Fort McMurray and outlying communities in the area are shown in Table 5.

Table 5 Median Family Income in 2008

	Couple Family	Lone-Parent Family	Persons Not in Census Families	Overall Median Family Income
CAD $				
Canada	75,880	35,990	24,810	53,370
Alberta	94,170	41,170	33,150	67,657
Fort McMurray	167,870	60,970	71,220	125,149
Anzac	163,650	71,800	55,520	114,059
Fort McKay	104,890	23,840	29,260	45,719
Conklin	80,420	28,150	40,690	50,101
Fort Chipewyan	80,010	25,600	25,760	44,999

Source: STATSCAN 2010.

Data for largely Aboriginal communities, such as Fort McKay, Fort Chipewyan and Conklin indicate, that:

- Incomes are above the national average for couple families and persons not in census families, but below the national average for lone-parent families.
- Incomes for couple families are above the provincial average in Fort McKay but below the provincial average in Fort Chipewyan and Conklin.
- Incomes for lone-parent families and persons not in census families are below the provincial average in all three communities.

Total income in all three communities is influenced by the higher percentage of lone-parent families. As a result, overall median family incomes are below both the provincial and national averages. However, between 2006 and

2008, overall median family incomes in all three communities grew at a faster rate (from 13% to 21%) than the provincial and national averages of 10% and 8%, respectively.

Although increased incomes have benefits for many community members, there is greater income disparity in the region compared to the provincial average. The median family income for couple families in Fort McKay and Fort Chipewyan is about 4.4 and 3.1 times higher, respectively, than for lone-parent families, while in Fort McMurray and Conklin it is 2.8 times higher. The corresponding provincial average is 2.3. A high level of income inequality within a community has the potential to reduce social cohesion. As well, increasing incomes may contribute to negative behaviours, including increased alcohol and drug abuse and gambling, especially among those lacking financial experience.

The distribution of effects is not equally shared among all community members. Those with education, employment, stronger support systems and internal resiliency will likely cope better with, and obtain more benefits from, change.

Industry has been carrying out initiatives to enhance the positive effects of development by encouraging the employment of local Aboriginal workers, supporting local Aboriginal educational opportunities, and contracting with local Aboriginal businesses. For example, in 2010 alone, Wood Buffalo Aboriginal companies performed over $1.3 billion in contract work with member companies of the Oil Sands Developers Group (OSDG). In addition, Oil Sands companies have contributed over $35 million in the past ten years to Aboriginal communities in the region for school and youth programs, celebrations, cultural events, literacy, community projects and other programs (OSDG 2011).

Many industrial proponents have also negotiated benefit agreements with local First Nations, which may contain provisions regarding training, employment and business opportunities, and support for social, cultural and community initiatives.

Aboriginal peoples in the region have faced fundamental change since pre-development. However, there is no clearly defined way to assign those changes to specific Oil Sands projects, Oil Sands development in general, or other external factors such as government policy, education and technology. Pre-existing and coexisting trends, changes in data collection methodologies, and government policies and programs all confound interpretation of the data. While Oil Sands development has contributed to ongoing social and cultural change Aboriginal peoples in the region, it has also offered resources and tools for managing the challenges brought about not only by Oil Sands development but other external factors.

3.5 Traditional Land and Resource Uses

The Project is located within the traditional territories of the FMFN, ACFN, and MCFN. The Project is also located within a larger region in which Métis have hunted, trapped, or fished. For example, *Mark of the Métis* (FMA 2007) indicates that Métis affiliated with Fort McMurray Métis Local 1935 have trapped, hunted and fished in a larger area that includes JME. The Fort McKay Specific Assessment (Fort McKay IRC 2010) considers the perspectives of the FMFN and the Métis of Fort McKay. While information specific to the Métis of Fort Chipewyan Métis Local #125 was not available, this assessment assumes that the patterns of use for Fort Chipewyan Métis are similar to those of the ACFN and MCFN. The Project is also located on the northern fringe of a larger traditional territory identified by the Fort McMurray #468 First Nation (FM468). While available information suggests that FM468 may have harvested in the area around McClelland Lake, the large majority of

their traditional activities have occurred south of Fort McMurray and the Clearwater River. Although available information suggests that FMFN 468 engages in less traditional activity in the general area in which the Project is situated, this assessment assumes that the projects potential effects to their cultural elements will be similar to the assessed effects on cultural elements of other Aboriginal groups.

The FMFN, ACFN, and MCFN have indicated that they have traditionally hunted, trapped, and fished throughout a larger region that includes the Project's Terrestrial Regional Study Area (RSA) and Terrestrial Local Study Area (LSA). A review of *Mikisew Cree Use of Lands and Resources in the Vicinity of the Proposed Shell – Jackpine and Shell – Pierre River Operations* (Elias 2011) show the MCFN patterns of land use over several decades. While Elias (2011) shows some polygons of non-defined traditional land use activity overlapping the LSA, other more concentrated areas of traditional activities are located on the west side of the Athabasca River, in the area of Birch Mountain, and Namur and Gardner Lakes. Traditional activities are also indicated in the Fort Chipewyan and Wood Buffalo National Park region. The *Mikisew Cree First Nation Report on the Southern Territory Use and Occupancy Mapping Project* (PACTeam 2007) indicates that since the 1920s, some traditional land uses of the MCFN retreated into Wood Buffalo National Park as a result of increased non-Aboriginal harvesting activities in the larger region.

A review of the *ACFN Integrated Knowledge and Use Report for the Jackpine Mine Expansion and Pierre River Mine* (Candler 2011) indicates a variety of traditional uses within the larger Oil Sands Region and within the Project's Terrestrial LSA. Within the Terrestrial LSA, Candler (2011) identifies subsistence use values, habitation use values, and transportation use values. The transportation use values appear to be related to the Muskeg River. The TLU Assessment prepared for Shell (2007, Volume 5, Section 8.3) indicates that Registered Fur Management Area (RFMA) #1714 is partially overlapped by the Project area, and is registered to a member of the ACFN. Figure 7 in Candler (2011) indicates that a large majority of the "site-specific use values" of the ACFN occur in the Fort Chipewyan region, and in the area of Indian Reserve (IR) 201G, just north of the Firebag River, outside the Terrestrial LSA.

A review of the TLU Assessment prepared for Shell (2007, Volume 5, Section 8.3) indicates that RFMAs #1716 and #2137 are held by members of the Fort McKay community, and are partially overlapped by the Project area. The Project area partially overlaps the moderate use area of the FMFN's Culturally Significant Ecosystem (CSE) for "All Traditional Uses," partially overlaps the intense use area of the Large Game Harvesting CSE, and partially overlaps low and moderate use areas of the Traditional Plant Harvesting CSE. Based upon information found in Fort McKay IRC (2010a, Section 9), the Project area partially overlaps the low use area of the Fish Utilization CSE, partially overlaps the high and moderate use areas of the Bird Utilization CSE, and the high and moderate use areas of the Fur Bearer Utilization CSE.

Aboriginal peoples access their traditional lands by water or land. The ACFN and MCFN indicated that they rely on the Athabasca River as an important access corridor within the Terrestrial RSA (Elias 2011; Candler 2011; Candler 2012). Within the Project's Terrestrial LSA, the Muskeg River is also used for accessing traditional lands (Candler 2011; Elias 2011). The Fort McKay Specific Assessment (Fort McKay IRC 2010a, Section 9) did not discuss water access to traditional lands, but this assessment assumes that the same water corridors used by the ACFN and MCFN are also important to the FMFN and other Aboriginal groups who might use the area.

Interviews were held with the holders of directly affected RFMAs, registered to members of the FMFN and ACFN. During interviews held for the TLU Assessment (EIA, Volume 5, Section 8.3), trappers indicated that

Canterra Road, the winter road, the old winter road, and the Synenco access road provide access to their traplines. Trappers indicated that they also use snowmobiles. With the exception of the holder of RFMA #1716, none of the trappers directly affected by the Project indicated that the Project would affect their access to their traplines. The holder of RFMA #1716 indicated that industrial development to date has impeded access to his trapline by all terrain vehicle and he now relies on his son (and son's truck) to drive him to his trapline via the existing road. The Fort McKay Specific Assessment (Fort McKay IRC 2010a, Section 9) indicated that within the Fort McKay Forty Township Study Area (FTSA) there are 1,343 km of traditional trails (Fort McKay IRC 2010a, Section 9, Table 9-11). Table 9-12 (Fort McKay IRC 2010a, Section 9) shows that 91 km of traditional trails will be disturbed within the Project's Terrestrial LSA. The amount of disturbance represents about 7% of the traditional trails within the FTSA.

4.0 EIA RESULTS AND RELATIONSHIP TO CULTURE

This section of the assessment assesses the following TLU related issues and how they may affect culture:

- availability of land for harvesting or other cultural activities;
- access to land for traditional activities;
- availability of resources to sustain harvesting or other cultural activities;
- availability of habitats to support wildlife, aquatic and plant resources; and

Where possible, this section also describes the assessed impacts, as they vary between the FMFN, ACFN, and MCFN.

4.1 Traditional Land and Resources

The TLU assessment contained in the EIA (Volume 5, Section 8.3) assessed the potential impacts of the Project's activities on specific linkages within the terrestrial and aquatics RSAs, based on the information outlined in Section 8.3.2.3 in the EIA. These linkages included effects on:

- fishing;
- hunting;
- trapping;
- traditional plant gathering;
- trapper access;
- cabins;
- burial sites; and
- spiritual sites.

Additional linkages included the effects of the following on the above:

- noise;
- air quality; and
- changes in access by traditional users.

4.1.1 Availability of Land for Harvesting or Other Cultural Activities

A 2012 assessment was completed to evaluate the potential for effects on TLU as a result of JME in combination with existing and planned developments within the Oil Sands Region. The approach taken in this assessment is generally the same as the approach taken in the EIA except this assessment uses the Traditional Territory of the FMFN that is identified in FMFN IRC (2010).The TLU presented in the May 2012, Jackpine Mine, Joint Review Panel Supplemental Information Request document (Shell 2012a; Appendix 2, Section 3.5.1) indicates that Base Case disturbances represent about 18% of the area of the traditional territory of the FMFN; about 11% of the area of the traditional territory of the ACFN; and about 6% of the traditional territory of the MCFN. The additional Project disturbances (under the Application Case) are calculated to represent less than 1% of the traditional lands of the FMFN, ACFN, and MCFN, respectively. The 2012 JME Application Case disturbances due to Project activities are expected to increase disturbance to FMFN CSEs by the following amounts:

- All Traditional Uses CSE: 2% of the moderate use area of the CSE (29% of moderate use area, and 20% of the total CSE disturbed under the Base Case).
- Large Game Harvesting CSE: 2% of the intense use area of the CSE (30% of the intense use area, and 17% of the total CSE disturbed under the Base Case).
- Traditional Plant Harvesting CSE: Less than 1% of the low use area, and 3% of the moderate use area of the CSE (23% of the low use area, 31% of the moderate use area, and 26% of the total CSE disturbed under the Base Case).
- Fish Utilization CSE: Less than 1% of the low use area of the CSE (19% of the low use area, and 21% of the total CSE disturbed under the Base Case).
- Bird Utilization CSE: 2% of the intense use area, and 2% of the moderate use area of the CSE (32% of the intense use area, 25% of the moderate use area, and 24% of the total CSE disturbed under the Base Case).
- Fur Bearer Utilization CSE: 2% of the intense use area of the CSE (29% of the intense use area, and 17% of the total area of the CSE disturbed under the Base Case).

Disturbances due to Project activities will disturb an additional 22% of the area of RFMA #1714 (45% disturbance under the Base Case), held by a member of the ACFN (Appendix 2, Section 3.5-1, Shell 2012a). Project-related activities will affect an additional 13% and 6% of RFMAs #1716 (44% disturbance under the Base Case) and #2137 (47% disturbance under the Base Case) respectively, both of which are held by members of the FMFN (Appendix 2, Section 3.5-1, Shell 2012a).

4.1.2 Effects to Tangible and Intangible Elements of Culture due to the Availability of Land for Harvesting or Other Cultural Activities

The Project will result in some additional disturbance to lands within the traditional territories of the FMFN, ACFN, and MCFN. The disturbed lands will not be available for traditional activities until reclamation in the far future. While the effects of the disturbance are considered small in relation to the size of the traditional territories, the effects may contribute to effects to the following intangible elements:

- ability to pass on TK to successive generations;
- stories and oral history; and
- social relationships and values.

Effects on the ability to pass TK to successive generations may result from a reduction in the traditional land base. While there are many factors that may affect the transmission of TK, such as the desire of young people to participate in traditional activities, a reduced land base may be one factor. Traditional Knowledge is often passed on through learning activities on the land. Registered Fur Management Areas are used to teach trapping skill, and may also be used to teach other harvesting skills. The Project will cause additional disturbance to two RFMAs registered to members of the FMFN, and additional disturbance to one RFMA registered to a member of the ACFN. Project-related disturbances will affect less than 1% of the land area within the territories of the FMFN, ACFN, and MCFN.

Effects of the Project on traditional stories and oral history may also arise through a reduction in the traditional land base. Similar to the potential Project-related effects on the transmission of TK, the potential effects of the Project on the transmission of stories and oral history may arise from a reduction in time spent on the land and interacting with traditional knowledge holders, as a result of a reduced land base.

Changes in social relationships and values may result from reduced time spent on the land due to a reduction in land base caused by Project disturbance, in combination with other factors, such as participation in the wage economy, or exposure to mass media, such as radio, internet, and television.

Because the Project is expected to have some effect on the availability of land for traditional activities, these related effects on intangible elements of culture are similarly expected to be small. The potential effects of the Project on the availability of traditional lands will be experienced most by the FMFN and ACFN.

4.1.3 Ability to Access Land or Water Resources for Harvesting

Access to land or water resources that are used for harvesting or other traditional activities is considered important by Aboriginals. Water access to traditional lands will depend upon the availability of navigable waters. A review of information provided by the FMFN, ACFN, and MCFN indicates that First Nations believe that water levels in important navigable waters (e.g., Athabasca River, and Muskeg River) are negatively affected by Oil Sands development, and result in periodic low water levels that make river navigation difficult. An assessment of the Project's hydrologic effects on the Muskeg River, Athabasca River, and local small streams, and local waterbodies was made in the Surface Water Hydrology Assessment (EIA, Volume 4, Section 6.4; Shell 2008; Shell 2011).The Muskeg River Diversion Alternative (MRDA) Assessment (Shell 2011) report showed that the

predicted effects on the surface hydrologic conditions on the Muskeg River, Athabasca River, local small streams, and local waterbodies is practically the same as those presented in the EIA as updated.

Based on the report, *As Long as the Rivers Flow* (Candler et al. 2010) which includes the results of consultation with ACFN and MCFN, the Muskeg River near the mouth and the Athabasca River have been identified as navigable water courses that are important to First Nations.

For the Muskeg River, the MRDA Assessment Report (Shell 2011) shows that there will be a small predicted change of +/- 0.02 m in mean annual runoff from the pre-development scenario for Muskeg River over the course of the mine expansion and development (from 2012 to far future). For 10-year flood flows, the average water depths are predicted to be lower by 0.5 to 0.7 m. In terms of navigability, the lowered water depths at these flood flows are not deemed to be a limiting factor for navigation. An analysis of the water level changes can be found in Section 3.3 of the MRDA Assessment Report (Shell 2011). In addition, the proposed MRDA will provide connectivity to upstream areas of Muskeg River watershed.

For the Athabasca River, the water level changes due to the mining operations outlined in the Project EIA Application (EIA) and corresponding EIA update documents (Shell 2008) show that mean water levels will not be substantially altered (predicted changes +/- 0.01 m for both mean annual flows and 2, 20 and 100 year flood flows). Hence, the small change in water depths are not deemed to be a limiting factor for navigation and access to land and water resources. A detailed analysis of water level changes can be found in the EIA (EIA, Volume 4, Section 6.4.7) and updated Pre-Development Case (Shell 2012a).

Regarding land access to traditional harvesting areas, Fort McKay IRC (2010a, Section 9, Table 9-12) indicates that in the Application Case, about 39 km will be disturbed in the Terrestrial LSA, compared to 28 km in the Base Case. There are 91 km of trails in the JME and PRM LSA. Fort McKay indentified 1,343 km of traditional trails within the FTSA, which is considered as their regional-scale study area (Fort McKay IRC 2010a, Section 9, Table 9-11). The Application Case disturbances for JME and PRM represent 42% of the traditional trails in the LSA, and 3% of the traditional trails in the FTSA. While access to sections of traditional trails may be limited during Project operation, connectivity around these sections will exist. After closure, trail access through the site will be possible. Interviews with directly affected Aboriginal trappers indicated that they will be able to access their traplines by way of existing roads, such as the Canterra Road, and winter road to Fort Chipewyan.

The effects of the Project on land access were assessed in the Resource Use Assessment (EIA, Volume 5, Section 8.4.6). While access may be increasing in some areas throughout the region, such as by the proposed bridge over the Athabasca River to provide year-round access to the proposed Pierre River Mine site, a small decrease in access will result for users who may have travelled along cutlines around the Project area. This loss of access during operations will not have any effect on resource users beyond the effects of site clearing in the Terrestrial LSA, because access around the outside of the LSA will be possible from other cutlines. The public will retain access along the length of Highway 63 east of the Athabasca River, although this road is scheduled to be re-routed. Overall, FMFN harvesters will still be able to access their traplines, and the existing roads will provide access through the LSA to harvesting areas on the east side of the Athabasca River. This access will also be available to harvesters from the ACFN, and MCFN. The Project will have no effect on access to traditional harvesting areas of the FMFN, ACFN, and MCFN on the west side of the Athabasca River. The Resource Use Assessment (EIA, Volume 5, Section 8.4.6, Table 8.4-20) assessed changes in access resulting from the Project to have negligible environmental consequence at the LSA and RSA level.

The Project will not have any effect on access to traditional lands used by the ACFN or MCFN in the Fort Chipewyan or Wood Buffalo National Park region, north of the RSA.

4.1.4 Effects to Tangible and Intangible Elements of Culture due to the Ability to Access Land or Water Resources for Harvesting

Changes in access to traditional lands have the potential to affect intangible elements of culture by making portions of traditional lands unavailable for traditional activities during Project operations. The potential effects are expected to be similar to effects resulting from disturbances to traditional lands, and include the following:

- ability to pass on TK to successive generations;
- stories and oral history; and
- social relationships and values.

Project-related activities are expected to have a negligible environmental consequence on land access in the LSA and RSA. As a result, the Project is expected to have a negligible effect on intangible elements of culture as a result of changes in land access.

These effects are expected to be similar for the FMFN, ACFN, and MCFN.

4.1.5 Availability of Wildlife, Vegetation, and Fish to Sustain Traditional Harvesting

The ability to undertake traditional harvesting activities, such as trapping, hunting, plant harvesting and fishing, is largely dependent on the presence of the resources that support the activities (e.g., wildlife, plants, fish). The potential effects of the Project on Terrestrial Resources were assessed in Shell's EIA (Volume 5, Section 7) and Appendix 1, Section 4.0 (Shell 2012a). The potential effects of the Project on wildlife abundance were assessed in the EIA, Volume 5, Section 7.5.3 and in Appendix 4, Section 4.4 (Shell 2012a). The potential effects of the Project on vegetation resources were assessed in the EIA, Volume 5, Section 7.5.2 and Appendix 1, Section 4.3 (Shell 2012a). The potential effects of the Project on fish and fish habitat were assessed in Shell EIA, Volume 4, Section 6.7.5.

4.1.6 Availability of Wildlife

The potential effects of the Project on wildlife abundance considered the following linkages:

- interactions with infrastructure;
- site clearing;
- removal of nuisance wildlife;
- increased vehicle-wildlife collisions; and
- sensory disturbance.

The wildlife assessment considered species identified by First Nations, such as moose, black bear, Canada lynx, beaver, and fisher. The residual effects classification for the Jackpine Mine Expansion on wildlife abundance for the Application Case (during construction and operations) are summarised in Appendix 1, Section 4.4.1.1 (Shell

2012a). The results indicate that the net change due to the Project is assessed to have a low environmental consequence at the LSA level for moose, Canada lynx, fisher, beaver, black bear and black-throated green warbler, Canada warbler, common nighthawk, olive-sided flycatcher, peregrine falcon, red knot, short-eared owl, horned grebe, rusty blackbird, yellow rail, and whooping crane; and a negligible environmental consequence at the LSA for wolverine, Canadian toad, western toad, and barred owl. The net change due to the Project is assessed to have a negligible environmental consequence for most KIRs at the RSA level, except for horned grebe, rusty blackbird, and yellow rail, which are assessed a low environmental consequence

4.1.7 Availability of Traditional Plants

The effects of the Project on traditional use plants were assessed in Volume 1, Section 4.3.1 of the *May 2012, Jackpine Mine Expansion, Joint Review Panel Supplemental Information Requests*. In the Terrestrial LSA, the JME will alter 4,584 ha (77% of resource) of the high traditional use plant potential, 8,481 ha (92% of resource) of the moderate traditional plant potential and 10,129 ha (70% of resource) of low traditional use plant potential during construction and operations. In the RSA, the JME will alter 5,749 ha (less than 1% of the RSA) of the high traditional plant potential, 9,623 ha (less than 1% of the RSA) of the moderate traditional plant potential and 10,591 ha (less than 1% of the RSA) of the low traditional plant potential in the RSA. The JME will result in a negative, moderate environmental consequence to high traditional use plant potential areas in the LSA during construction and operations, with no additional effects due to drawdown. In the RSA, the JME results in a negative, negligible environmental consequence to high traditional plant potential areas during construction and operations.

At Closure, high traditional use plant potential areas are predicted to occupy 5,522 ha in the LSA, a decrease of 424 ha (7% of resource). At Closure, moderate traditional use plant potential areas will decrease by 4,733 ha (52% of resource). Low traditional use plant potential areas will increase by 5,159 ha (36% of resource) over the Base Case. In the RSA at Closure, following reclamation, high traditional plant potential areas are predicted to decrease by 1,452 ha (less than 1% of the RSA) and moderate plant potential areas are expected to increase by 1,531 ha (less than 1% of the RSA), while low traditional plant potential areas are expected to decrease by 78 ha (less than 1% of the RSA) over the 2012 Base Case. At Closure, the JME is expected to have a negative, negligible environmental consequence for high traditional use plant potential at the LSA and RSA scales, and will not change the environmental consequence as assessed in the EIA.

4.1.8 Availability of Fish

The Aquatic Resources Assessment in the EIA (Volume 4A, Section 6.7.5), determined the effects to fish abundance and fish habitat in local waterbodies, local small streams, the Muskeg River, and the Athabasca River as follows:

- Muskeg River, Kearl Lake, Wapasu Creek, unnamed creeks and waterbodies in the Jackpine Mine Expansion development area (EIA, Volume 4A, Table 6.7-17);
- Pierre River, Eymundson Creek, Asphalt Creek, First Creek, Big Creek, Redclay Creek, unnamed creeks and waterbodies in the Pierre River Mine development area (EIA , Volume 4A, Table 6.7-20); and
- Athabasca River (EIA, Volume 4A, Table 6.7-22).

This assessment concluded that given the proposed mitigation and compensation as described in Volume 4A, Section 6.1.6.2 of the EIA, there is no net environmental consequence of the residual impacts to fish habitat and fish abundance due to the Project

4.1.9 Effects to Tangible and Intangible Culture due to the Availability of Wildlife, Vegetation, and Fish to Sustain Traditional Harvesting

The EIA and 2012 JME Application Case Assessment (Shell 2012a) determined the potential effects of the Project on the availability of wildlife, plant, and fish resources used by the FMFN, ACFN, and MCFN for traditional harvesting. The assessments determined that the Project will have a negligible to moderate environmental consequence on the availability of wildlife, plants, and fish for traditional harvesting at the LSA, and a negligible to low environmental consequence to the availability of traditional resources at the RSA level. As a result, the Project is expected to have a small effect on intangible aspects of culture, such as the transmission of TK, or social values due to effects on wildlife, plants, or fish.

4.1.10 Availability of Habitats to Support Wildlife and Aquatic Resources

The assessment of the availability of habitat to support wildlife and aquatic resources considers the Wildlife Assessment (EIA, Volume 5, Section 7) and Appendix 1, Section 4.4 (Shell 2012a) and the Fish and Fish habitat Assessment (EIA, Volume 3, Section 2).

4.1.11 Habitat Availability for Wildlife

The residual impacts of the Project on wildlife habitat for the Application Case at Closure were assessed in Appendix 1, Section 4.4 (Shell 2012a). Representative habitats for large game and fur bearers considered the following: black bear, moose, woodland caribou, wood bison, lynx, beaver, fisher, and wolverine.

At the LSA level, the environmental consequence ranged from moderate to high for beaver, Canada lynx, and black bear habitats; and from negative low to high for the habitats of the remaining species. On the regional level, the environmental consequence was assessed as negligible to low for the above species.

4.1.12 Habitat Availability for Aquatic Resources

During the course of the JME mine construction, operations, closure and reclamation activities, changes in habitat area will occur, in the upper Muskeg River watershed, including the upper Muskeg River mainstem, lower Wapasu Creek, as well as unnamed tributaries and waterbodies within the upper watershed. The Conceptual Compensation Plan (CCP) will offset predicted habitat losses such that there is No Net Loss in the productive capacity of fish habitats and no adverse residual effects on fish populations in the region.

The Project will likely have a negative, low magnitude impact on fish habitat for a moderate duration under the 2052 snapshot based on reduced flows for all flow statistics.

The potential changes to habitat accessibility from the reduction in peak flows and increased density of beaver dams are likely negative in direction and low in magnitude, and are likely to vary depending on the fish species and life stage. However, consideration of the habitat losses in the Muskeg River for migratory species has been included in the CCP.

Taking into account the mitigation and habitat compensation associated with the Project, the residual impacts to fish habitat and fish abundance in JME were classified as having no environmental consequence.

No residual impacts of the Project to fish and fish habitat diversity are expected for the Athabasca River.

4.1.13 Effects to Tangible and Intangible Elements of Culture due to the Availability of Habitats to Support Wildlife and Aquatic Resources

The effects of the Project on the availability of habitats to support wildlife and fish resources may affect intangible elements of culture. These intangible elements include the ability to pass on traditional knowledge, values, and social roles resulting from change in values. The environmental consequences of the Project on habitats to sustain wildlife were considered negligible to low at the regional level, and the environmental consequences of the Project on fish resources were considered negligible at the regional level. Because the local environmental consequence of Project impacts on large game and furbearer habitat are expected to be low to high, the Project is expected to have some effect on intangible aspects of culture as they relate to the availability of wildlife habitats. These effects are expected to be focused on traditional activities occurring at the two directly affected RFMAs held by members of the FMFN, and an RFMA held by a member of the ACFN. As a result, the Project may have some effect on the intangible cultural elements of the FMFN and ACFN. The potential effects on intangible culture may relate to the ability to transmit TK to successive generations, or changes in social values.

The Project effects on wildlife habitat are not expected to affect intangible cultural elements of the MCFN.

4.2 Historical Resources

The discussion of effects to historical resources considers the Historical Resources Impact Assessment (HRIA) (EIA, Volume 5, Section 8.6).

Twelve previously unknown historical resource sites were identified during the HRIA for the Project. Based on the results of the HRIA, further archaeological work is recommended for two of the new sites in the form of additional subsurface testing or staged mitigation. All of the sites are believed to represent pre-contact use of the area. As currently proposed, the development of the Project may eventually impact all of the identified sites.

Assuming appropriate and effective mitigation strategies will be established by Alberta Culture and Community Services, and followed by Shell, negligible direct effects on historical resources have been predicted for the Project. Indirect negative effects resulting from increased access due to the Project are predicted to be negligible to low.

4.2.1 Effects to Tangible and Intangible Elements of Culture due to Historical Resources

The Project is not expected to have an effect on intangible aspects of culture as a result of the impacts on historic resources.

4.3 Air Quality

Project impacts to air emissions and ambient air quality were assessed in the EIA, Volume 3, Section 2.2 and also assessed in Appendix 1, Section 2.2 (Shell 2012a). Of the 129 ambient air quality parameters assessed in the Application Case, all are classified as having either a negligible or low environmental consequence. The JME emissions have little to no incremental effect on air quality at the regional community receptors, and there are no predicted occurrences above the Alberta Ambient Air Quality Objectives (AAAQOs) or other applicable criteria for Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), hydrogen sulphide (H_2S), carbon disulphide (CS_2) and select Volatile Organic Compounds (VOCs). For particulate matter with a mean

aerodynamic diameter of 2.5 microns (µm) or smaller ($PM_{2.5}$) predictions are above the AAAQO of 30 µg/m³ at Fort McKay, Fort McMurray, Cabin J, Cabin K and the Oil Sands Lodge; however, these exceedances are due to existing and approved projects in the region and there is no increase in predicted concentrations due to the JME. The maximum 1-hour acrolein prediction at Cabin J is slightly above the Texas Commission on Environmental Quality (TCEQ) Effects Screening Levels (TCEQ 2003); however, there is no change due to the JME.

4.3.1 Effects to Tangible and Intangible Elements of Culture due to Air Quality

The Air Quality Assessment predicts that there will be changes in ambient air quality that will have a negligible to low environmental consequence. Because the community of Fort McKay is located closer to the Project than Fort Chipewyan, and one of the directly affected traplines in the LSA is held by a member of the ACFN the Project effects on ambient air quality are expected to be noticed more by the FMFN and ACFN than by the MCFN. Because the Project will result in changes to ambient air quality that are expected to have a negligible to low environmental consequence, this may result in some effect on intangible forms of culture. These effects are expected to be experienced more by the FMFN and ACFN than by other Aboriginal groups included in this assessment.

4.4 Human and Wildlife Health

The effects of the Project on human and wildlife health were assessed in the Human Health Risk Assessment (HHRA) Shell (2007, Volume 3, Section 5.3) and (May 2012, Jackpine Mine Expansion, Joint Review Panel Supplemental Information Requests, Appendix 1) and the Wildlife Health Risk Assessment (WHRA) (EIA, Volume 3, Section 5.4) and (May 2012, Jackpine Mine Expansion, Joint Review Panel Supplemental Information Requests, Appendix 3.3).

4.4.1 Effects to Human Health

Consistent with the original HHRA (EIA), for the current HHRA (May 2012, Jackpine Mine Expansion, Joint Review Panel Supplemental Information Requests, Appendix 3.3), consideration was given to JME-related emissions or releases predicted to result in changes to environmental quality. These included possible Project emissions to air and releases to water. The current HHRA is based on the Joint Review Panel request for a re-evaluation of the effects associated with the JME alone (i.e., without inclusion of the PRM), along with a re-assessment of an updated planned development case.

Overall, emissions from the JME alone, and in combination with emissions from other sources, are not expected to result in adverse health effects in the area. The changes between the Base Case and Application Case risks are generally small, suggesting that the JME is not expected to contribute appreciably to health risks in the region. Similarly, the changes between the Base Case and PDC risks are generally small. Cumulative environmental risks associated with the additional projects and activities planned for the region are not expected to result in adverse health effects.

4.4.2 Effects to Wildlife Health

The WHRA followed a conventional risk assessment paradigm with emphasis placed on the worst-case conditions to ensure risks were not underestimated. The findings and conclusions are based on the conservative assumptions incorporated into the assessment. The potential risks to terrestrial wildlife were assessed based on the exclusion of PRM from the EIA Application Case. The results of the WHRA indicate that the overall risks posed to wildlife health will be low. Therefore, no impacts to wildlife populations are expected based on

estimated wildlife exposures to predicted maximum acute and chronic air concentrations or predicted soil and surface water concentrations. The full update of the Wildlife Health Risk Assessment (WHRA) is presented as an attachment to the HHRA update (Appendix 3.3, Attachment A).

4.4.3 Effects to Tangible and Intangible Elements of Culture due to Human and Wildlife Health

The Project is not expected to result in adverse health effects in the larger area, or result in impacts to wildlife health. As a result, no changes to intangible culture are expected due to Project-related effects on human or wildlife health.

4.5 Availability of Trusted Sources of Water for Consumption

The assessment of the availability of trusted sources of water for consumption considers the Water Quality Assessment (EIA, Volume 4A, Section 6).

4.5.1 Constituent Concentrations From Project Activities

During the operational snapshots of 2033 and 2052, closed circuiting of natural areas, diversion of upstream reaches and discharges of muskeg drainage and overburden dewatering are predicted to increase concentrations of chromium, cobalt, copper and PAH Groups 2 and 5 in the Muskeg River.

At closure, concentrations of aluminum, beryllium, boron, chromium, molybdenum, PAH Group 6, potassium, strontium, sulphate, total nitrogen and vanadium in the Muskeg River are predicted to increase above Base Case levels when the Jackpine North Pit Lake begins to discharge.

In the Far Future, the large residence time of the pit lakes results in a more gradual flushing of constituents than is observed in the Base Case. Consequently, median values of barium, beryllium, boron, cobalt, iron, PAH Group 6, potassium, strontium, sulphate, total nitrogen and vanadium are predicted to be higher than the corresponding concentrations under Base Case conditions.

4.5.2 Constituent Concentrations From Drainage Integration

The proposed expansion activities will not release water to Jackpine Creek. Therefore, Project effects on water quality of Jackpine Creek are negligible. However, changes to the integrated closure drainage plan will result in increased concentrations of beryllium, boron, chromium, cobalt, molybdenum, PAH Group 1, potassium, strontium, sulphate and vanadium.

Peak concentrations of aluminum, cadmium and copper will increase in Kearl Lake under the 2012 snapshots. These increases in concentration are due to reduced residence time resulting from mine plan integration with adjacent developments, involving diversion of runoff from natural lands into the lake. In addition, beryllium, boron, cadmium, cobalt, molybdenum, PAH Group 6, potassium, strontium, sulphate, total nitrogen and vanadium are predicted to increase in 2065 due to changes to the integrated closure drainage plan.

Only cadmium, molybdenum and total nitrogen have higher concentrations in Kearl Lake than the applicable aquatic life guideline values. Concentrations of these constituents are predicted to decrease from 2065 to the Far Future as the loading from process affected waters decrease due to flushing of porewater from tailings materials in the closure landscape.

Imperial Oil Kearl Compensation Lake will receive runoff inflow entirely from Kearl Lake; therefore, the predictions for Kearl Lake water quality above apply to Imperial Oil Kearl Compensation Lake. The Jackpine Mine Compensation Lake will be fed primarily by discharge from Kearl Lake; therefore, predictions for Kearl Lake water quality above apply to Jackpine Mine Compensation Lake.

4.5.3 Water Quality

The Project is predicted to have small to negligible effects on concentrations of key constituents, such as labile naphthenic acids, acute and chronic toxicity, tainting potential and Total Dissolved Solids (TDS) in surface waters within JME. The concentrations of these constituents under the Application Case are generally appreciably lower than the applicable aquatic life guideline or a threshold values.

Project activities are predicted to have negligible effects on water quality in the Athabasca River. Key constituents such as labile naphthenic acids, acute and chronic toxicity, tainting potential and TDS are predicted to increase only marginally in the Athabasca River under the Application Case. Similarly, Project activities are predicted to have negligible effects on most constituents. However, concentrations of boron and refractory naphthenic acids in the Athabasca River are predicted to increase downstream of the Muskeg River during at the end of the decommissioning period and in the Far Future. These increases are restricted to a small area of the river, and they are predicted to have negligible effects on fish, wildlife and human health.

The lenticular patterned fen located upstream of the Project will not receive runoff from the Project. Project activities may result in negligible reduction in groundwater discharge and associated solutes to the fen with no changes in substance concentrations in water within the fen. Therefore, the Project is predicted to have negligible effects on water quality of the lenticular patterned fen.

4.5.4 Effects to Tangible and Intangible Elements of Culture due to Availability of Trusted Sources of Water for Consumption

Project impacts on water quality in the lenticular patterned fen, surface waters within the JME, and the Athabasca River were assessed to be negligible. As a result, the Project is not expected to have an effect on tangible or intangible elements of culture, as a result of changes in water quality.

4.6 Noise and Aesthetics

Project-related noise and visual effects may have the potential to disturb the lifestyle and quality of life element of culture that comes from a sense of wilderness or solitude that Aboriginals value. The effects may arise from being able to see or hear a Project from areas that are used by Aboriginals. Noise effects also have the potential to affect the availability of wildlife for traditional purposes, such as harvesting.

The effects of Project related noise on receptors at Fort McKay, and the 1.5 km criteria boundary for JME were determined in the Noise Assessment (EIA, Volume 3, Section 2.3). The visual effects of Project related activities were assessed in the Visual Effects Assessment (EIA, Volume 5, Section 8.5.5).

The effects of Project-related noise on wildlife were considered in the Wildlife Abundance Assessment (EIA, Volume 5, Section 7).

4.6.1 Noise Assessment

The assessment found that noise impacts from JME Project activities were negligible at Fort McKay and at the 1.5 km criteria boundary for JME. Bird deterrent cannons on the external tailings disposal area will generate intermittent noise that may result in a measurable change but Project noise levels will comply with the permissible sound level for these locations. Effects of traffic and construction noise were reviewed and the results indicate that effects for these sources are expected to be negligible.

4.6.2 Visual Effects Assessment

The environmental consequences of the Project on visual aesthetics were determined for two phases of the Project: during operations, and at closure (after decommissioning and reclamation). During the period of operations (40 to 45 years), environmental consequences range from negligible to moderate, depending on the viewpoint in question. The viewpoints most affected by the Project during operations are the:

- Athabasca River, where viewpoints will be affected by the bridge, and visible plumes from JME;
- Muskeg River, where viewpoints will be affected by the JME mine landforms; and
- Kearl Lake, where the JME east Overburden Dump Area can be observed.

At closure, impacts to visual aesthetics will be mitigated as the project development area will be reclaimed and facilities such as the plant sites, and bridge will be decommissioned and removed. The magnitude of visual aesthetics impacts due to the Project will be reduced to negligible. Therefore, the environmental consequence of the Project on all Landscape Units is negligible.

4.6.3 Effects to Tangible and Intangible Elements of Culture due to Noise and Aesthetics

The Project will be visible to Aboriginal groups included in this assessment who travel on the Athabasca River within the vicinity of the proposed bridge over the Athabasca River. Plumes from the Project may also be visible from the Athabasca River. Intermittent noise cannons may be heard by FMFN and ACFN trappers in the vicinity of the Project. Because the community of Fort McKay is located about 20 to 25 km from the Project, members of the FMFN, as a whole, are expected to be affected to a greater degree than other Aboriginal groups who use the area but are located in Fort Chipewyan, Fort McMurray or south of Fort McMurray. Because the Project will have noise and visual effects during Project operations, there are potential effects to the lifestyle and quality of life components of culture (i.e. the sense of wilderness and solitude experienced by Aboriginals). However, because noise and visual effects of the Project are considered negligible to moderate, the related effect on culture is expected to be negligible. The FMFN is expected to be affected to a greater degree than Aboriginal groups that are not proximate to development.

4.7 Socio-economic Impact Assessment

4.7.1 Participation in the Labour Market

4.7.1.1 Labour Force Indicators

The expansion of the regional economy has created employment and business opportunities for local Aboriginal workers and businesses. A review of Statistics Canada data (2006) indicates that Aboriginal peoples in the region have similar or better labour market indicators than Aboriginal peoples in comparable communities, but

still lag behind the non-Aboriginal population (StatsCan 2007). Aboriginal peoples in the region face a number of barriers to employment similar to those faced by Aboriginal peoples in other parts of the country, including a lack of required education and transportation.

Strong economic growth in the region is also reflected in the personal incomes of Aboriginal peoples in the region. Median incomes for the Aboriginal identity population in the region, whether in the urban centre, rural communities, or reserves are higher than for Aboriginal peoples in comparable communities in Alberta (StatsCan 2007). Although increased incomes have benefits for many community members, there is greater income disparity in the region as compared to the provincial average (StatsCan 2010). A high level of income inequality within a community has the potential of reducing social cohesion.

The Project will provide additional employment and business opportunities for local Aboriginal peoples and businesses, thus offering prospects for continued improvements in income. Construction of JME will require approximately 9,310 person-years of on-site employment, while construction of PRM will require 17,800 person-years. Operation of the two projects will collectively create 2,130 direct permanent jobs. It is recognized that the distribution of employment and income effects from development is not equally shared among all community members. Those with education, employment, stronger support systems and internal resiliency will likely cope better with, and obtain more benefits from, change.

Most project-related jobs are expected to accrue to people new to the region. However, Shell is committed to working with the Industry Relations Corporations (IRCs) and employment coordinators to identify and remove barriers to employment, wherever possible.

4.7.1.2 Income

Strong economic growth in the region is reflected in the personal incomes of Aboriginal peoples in the region. Median incomes for the Aboriginal identity population in the region, whether in the urban centre, rural communities, or reserves are higher than for Aboriginal peoples in comparable communities in Alberta. These higher incomes are the result of higher earnings, largely driven by economic activity related to Oil Sands development.

4.7.1.3 Effects

The Project will provide additional employment and business opportunities for local Aboriginal peoples and businesses, thus offering prospects for continued improvements in income. Construction of JME will require approximately 9,310 person-years of on-site employment, while construction of PRM will require 17,800 person-years. Operation of the two projects will collectively create 2,130 direct permanent jobs, 750 for JME and 1,380 for PRM. Most of these jobs are expected to accrue to people new to the region. However, Shell is committed to working with the Industry Relations Corporations (IRCs) and employment coordinators to identify and remove barriers to employment, wherever possible.

Although increased incomes have benefits for many community members, there is greater income disparity in the region as compared to the provincial average. A high level of income inequality within a community has the potential of reducing social cohesion. Wage economy income may contribute to negative behaviours, including increased alcohol, drug abuse, and gambling, especially among those lacking financial experience.

4.7.2 Effects to Tangible and Intangible Elements of Culture due to Participation in the Labour Market

In summary, the Project is expected to provide additional income, employment and business opportunities for local Aboriginal peoples and businesses.

Depending on the degree to which Aboriginal peoples and businesses participate in project-related employment and business opportunities, this has the potential to contribute to changes in the ability of Aboriginal peoples to pass on TK. On one hand steady employment may lead to less time being available to carry out traditional pursuits, meaning fewer opportunities are available for practicing and transmitting traditional culture. On the other hand, increased income may lead to the purchase of hunting and harvesting equipment (e.g., rifles, snowmobiles) that increases the effectiveness in carrying out traditional pursuits. This includes being able to cover greater distances, helping to somewhat mitigate the limitation on the land available for traditional pursuits as a result of development.

Increased engagement in the wage economy may also affect existing social and family values (e.g., decreasing the quantity of time workers spend with their families, elevating the role of the wage earner in the community). However, it should be noted that unemployment and poverty also induce negative cultural change.

Given the opportunities that already exist for participation in the wage economy, in the context of existing and other proposed developments, the Project's contribution to the expansion of wage economy opportunities for members and companies of the FMFN, ACFN, and MCFN is expected to be small.

4.7.3 Language Retention

An overview of Aboriginal language knowledge and use among the region's Aboriginal identity population is shown in Table 7. The data indicates that Aboriginal language knowledge and use is highest in smaller communities and lowest in larger communities, such as Fort McMurray.

Table 6 Language Characteristics of the Aboriginal Identity Population

	Select Reserves[a]	Fort McKay	Fort Chipewyan[b]	Fort McMurray
	% of the Aboriginal Identity Population			
speak an Aboriginal language most often at home	31.9	11.0	5.2	0.6
with knowledge of Aboriginal language(s)[c][d]	53.6	43.0	38.3	9.0

[a] Select reserves include reserves around or north of Fort McMurray.

[b] Fort Chipewyan's results should be interpreted with caution. Allison Bay 219 and Dog Head.

[c] 218 reserves, which border Fort Chipewyan, are included in Select Reserves.

[d] Knowledge of Aboriginal language(s): refers to the ability to conduct a conversation in an Aboriginal language.

Source: Statistics Canada 2006, Aboriginal Population Profile.

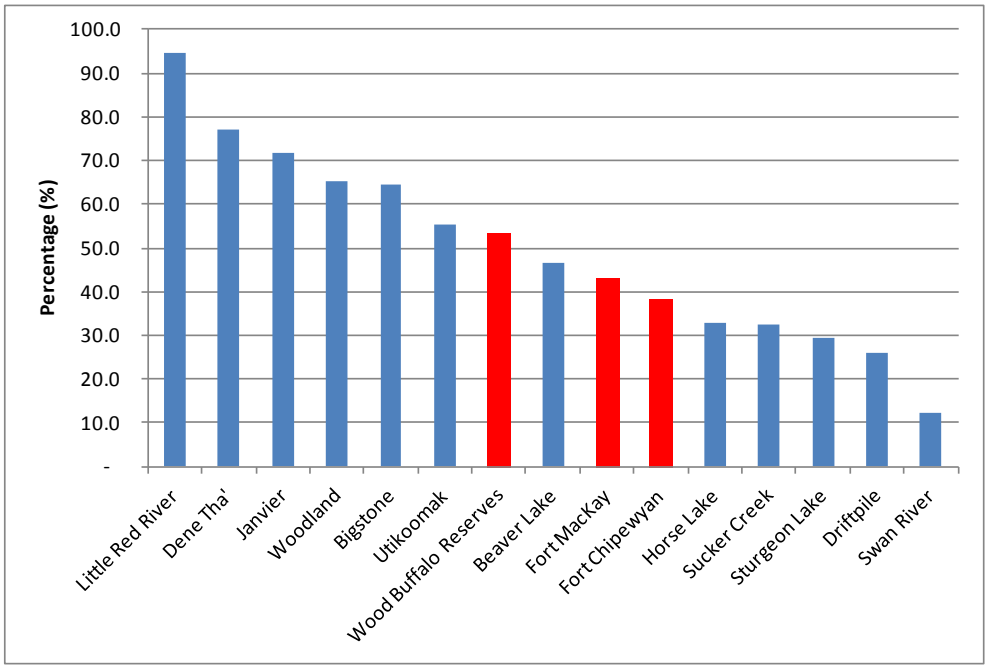
Based on Statistics Canada Aboriginal Population Profile data, the knowledge and use of Aboriginal language by Aboriginal peoples in rural areas of the region is comparable or somewhat lower than in other Aboriginal communities in northern Alberta. Knowledge of Aboriginal languages by those who identify as Aboriginal in select Alberta communities is displayed in Figure 2.

The loss of Aboriginal languages is a concern for Aboriginal communities across Canada. It is dependent upon a number of factors, including increasing exposure to the non-Aboriginal population and exposure to English through the school system, the workplace, and other mediums (e.g., television, films and the internet).

The working language of the Project is English and Aboriginal people working for Shell or its contractors will be required to speak English on the job. While the Project may contribute to the reduced use of Aboriginal language in the region, changes in the knowledge and use of Aboriginal languages has been ongoing for some time, and is expected to continue irrespective of the Project. Industrial operators, including Shell, have attempted to mitigate some of these effects by supporting language retention and promotion initiatives.

The preservation of Aboriginal languages will also depend upon the ability of Aboriginal peoples and communities to cope with external disturbances. For example, while the Aboriginal population whose mother tongue is an Aboriginal language has been dropping considerably across Canada, the number of second language learners has been growing. An increase in second language learners is an important part of the language revitalization process and points to an increased recognition among Aboriginal people that speaking an Aboriginal language is important (Norris 2007).

Figure 2 Percentage of the Aboriginal Identity Population with Knowledge of Aboriginal Language(s)



Source: Statistics Canada 2006, Aboriginal Population Profile.

Notes:

1) Select reserves includes reserves around or north of Fort McMurray.
2) Fort Chipewyan's results should be interpreted with caution. Allison Bay 219 and Dog Head 218 reserves, which border Fort Chipewyan, are included in Select Reserves.

Knowledge of Aboriginal language(s): refers to the ability to conduct a conversation in an Aboriginal language.

4.7.3.1 Effects to Tangible and Intangible Elements of Culture due to Language Retention

Aboriginal language retention has been dropping for some time, and is expected to continue regardless of the Project's development. Because the language of the workplace is English, the Project may have some effect on Aboriginal language retention, given the context of the downward trend in language retention, the Project's

contribution to the decline is considered to be small. This effect is considered to be the similar for all of the Aboriginal groups included in this assessment.

4.7.4 Increased Non-Aboriginal Population

4.7.4.1 Background

Oil Sands industrial expansion has led to substantial growth in the region's non-Aboriginal population. Population estimates from the RMWB municipal census[5] indicate an increase in the regional population and mobile workers in camps from 42,850 in 1999 to 103,330 in 2008 (RMWB 2010). More recently, delays in Oil Sands project schedules in the wake of the financial crisis of 2008 has led to a more moderate population growth rate.

The vast majority of growth has occurred in the urban service area and camp-based populations. Since 1999, the urban population has grown by an annual average of 6.8%, reaching over 76,000 people in 2010. The camp-based population has grown from under 4,000 to over 23,000 in that same time period (RMWB 2010). Camp providers have increased the breadth and quality of on-site camp amenities and services as a way to attract and retain workers. The increased level of services in camps has helped to reduce the demands of the non-resident population on housing, health, and other services in existing communities.

The total rural, largely Aboriginal, population north of Fort McMurray, including reserves, is estimated to be in the range of 2,000 to 2,300.[6] Population changes in these communities have mostly been related to community level demographic pressures, which include:

- a young population, with a relatively higher proportion, as compared to Fort McMurray, of the female population currently of childbearing age or reaching that age in the near future; and
- a mobile population with people leaving the community in search of employment opportunities, and returning to it, in part to avoid high housing prices in the urban centre.

4.7.4.2 Future Population Growth

Based on projections from the RMWB Population and Employment Projection Model, the long-range regional and project accommodation population growth trend is expected to be over 3% per year, reaching over 230,000 by 2030. This projection includes both permanent and non-permanent residents. Model results project that nearly 95% of regional growth will be accommodated in the urban service area, while 5% will occur in rural communities both north and south of Fort McMurray. Growth in project accommodations is projected to remain fairly static.

The RMWB's recently completed Municipal Development Plan (RMWB 2011) has designated Fort McKay and Fort Chipewyan as "areas of stability" where "rapid growth is not desired and where the existing character and structure of the community is to be respected."

Current high house prices in the urban service area will be influenced by population growth and the availability of sufficient developable land and house building capacity. Plans are under way in early 2012 to develop an Urban Development Sub-Region and improve on timely land release. This may relieve some house price pressures,

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5 Population counts, forecasts, and methods have been the subject of considerable discussion between the RMWB and various departments of the Alberta government.

6 The estimate should be interpreted with caution due to the fluid demographic situation in many small communities and short comings of most published data sources on population levels there.

thus reducing pressure on some Aboriginal peoples to move back to Fort Chipewyan and Fort McKay. If so, this may focus housing and community infrastructure demands in these smaller communities mostly on natural growth.

The Project will not be a significant driver of population growth in the in the region. Population growth related to the Project is expected to be accommodated in the urban service area, accounting for 7.5% of growth in the next 10 years.

The Project is not expected to have a direct population effect on Fort McKay or Fort Chipewyan. To the degree that Shell supports economic activity in Fort Chipewyan and Fort McKay – via employment and business contracts with local Aboriginal workers and businesses – the Project may assist in retaining current Aboriginal peoples in these communities or attracting Aboriginal peoples back to these communities from other locations.

The Project will also temporarily contribute to the region's camp-based population during the construction phase. In addition, the PRM Project will house its on-site operations workforce of approximately 1,380 in an on-site camp. These on-site camps will be full service, with health care, security, emergency, and recreation facilities and services, thus limiting the need for workers to visit local communities or engage with local Aboriginal peoples outside the Project area.

4.7.5 Competition for Traditional Resources

The Project is not expected to increase competition for traditional resources in a substantive way. This is based on:

- the relatively small resident population effects of the project in relation to the current resident population and anticipated future growth in the region,
- the results of a 2007 survey of mobile workers that shows that mobile workers in camps engage in few backcountry activities (Nichols 2007); and
- the fly-in/fly-out mode of transportation being used for transporting workers during construction, thus limiting the ability of camp-based workers to leave camp while in the region.

4.7.6 Municipal Services and Infrastructure

Population growth will increase demand for infrastructure and services in the region, requiring additional facilities, programming and staffing. The project will have a small effect on services and infrastructure in the urban service area, in-line with the effect on the resident population.

Although demands will increase, service providers are in a much better position to deal with this increased growth than in previous years largely as a result of additional resources made available and planning being carried out. In addition, the global financial crisis of 2008 and 2009 led to a period of more moderate growth in the region giving service providers additional time to plan and act.

Responsible authorities are aware of anticipated future growth and have been carrying out a number of planning initiatives in anticipation. It is imperative that these planning initiatives be properly resourced and carried out in a timely manner so as to avoid socio-economic pressures associated with growth.

4.7.7 Effects to Tangible and Intangible Elements of Culture due to Increased Non-Aboriginal Population

The assessment determined that the Project is not expected to be a significant driver of growth in the region. The camps in which much of the Project's workforce will be housed will have medical facilities, recreation facilities, and other services, thus limiting the need for workers to visit local communities or engage with local Aboriginal peoples outside the Project area. Project effects resulting from increased non-Aboriginal population growth in the region have the potential to contribute to change in social values, competition for traditional resources (e.g., wildlife and fish) and the ability to pass on TK in Aboriginal communities. Because the effects of increased population growth in the region as a result of Project activities is considered to be relatively small and accommodated in either project accommodations or the urban service area, the resulting effects on the intangible elements of culture for Aboriginal groups in the region, is also expected to be small. These effects are expected to be similar for the FMFN, ACFN, and MCFN.

4.7.8 Shell's Approach to Community Engagement

Shell has engaged the following Aboriginal communities on the JME Project, since as early as 2003, to discuss relevant issues and work towards minimizing Project impacts on traditional lands:

- ACFN;
- FMFN;
- FMFN 468;
- MCFN;
- Métis Local 63;
- Métis Local 125; and
- Métis Local 1935.

As a result of its community engagement efforts, and in response to Aboriginal concerns, Shell has agreed to implement several mitigations to reduce the impacts of Project effects on TLU and culture. A summary of Shell's commitments, and policies related to the potential effects of the Project on the traditional aspects of culture are found in Table 8.

First Nations in the region operate IRCs or Government and Industry Relations (GIRs) organizations. The IRCs/GIRs facilitate and support ongoing communication with industry and government on existing and planned Oil Sands development. Between 2007-2009, the Oil Sands industry (including Shell) provided approximately $22 million in funding for IRCs/GIRs, including funding for project- specific reviews.

With the expiration of the All Parties Core Agreement, which established and maintained funding for the GIRs, individual arrangements between proponents and First Nations are being developed or renewed through Memorandums of Understanding (MOU) and benefits agreements.

Table 7 Oil Sands Development Effects On The Local Aboriginal Population

Project Effect Pathways	What Aboriginal Communities Say	What Shell's Regulatory Application Says	Shell Principle	Shell Actions and Mitigations
Reduced access to and loss of Traditional lands	• The project will make portions of land unavailable for traditional pursuits for a sizeable period of time, if not permanently. This will result in reduced opportunities to carry out hunting, trapping and plant gathering activities and to enjoy cabin sites, spiritual and cultural sites within the project development area and its vicinity.	• The application acknowledges and quantifies the amount of land and the length of time for which land is unavailable for traditional uses. It estimates the amount of Traditional Land Use area still available under Application Case Total Disturbance in the Regional Study Area at roughly 90% (ACFN – 89%, MCFN – 93%, and FMFN – 92%) (EIA). • Consideration of additional traditional land use information gathered after filing has concluded that: - The JME project's effect on traditional activities such as fishing, hunting, trapping, and traditional plant gathering is not considered a likely significant adverse effect. - The Jackpine Mine Expansion and Pierre River Mine Projects will not prevent traditional land users from accessing any areas in the region, except within the Project development area itself prior to site reclamation.	• Shell acknowledges that the JME and PRM project will result in the temporary loss of specific traditional resources within the project development area until such time as reclamation is carried out. Shell will aim to minimize its terrestrial disturbance over the project life.	• Shell will facilitate access across the Project area for trappers and traditional users and provide compensation to trappers directly affected by the Project. • Shell will minimize as far as is practicable the land disturbance and practice progressive mitigation. • Shell actively participates in the Cumulative Environmental Management Association (CEMA), the Reclamation Working Group (RWG), and Sustainable Ecosystems Working Group (SEWG), which address issues of relevance to traditional land uses. • Shell continues to support ongoing capacity funding for Aboriginal communities (IRCs, GIRs). • Shell, through OSDG and other agencies supports the Land Use Secretariat of Alberta. Sustainable Resource Development (ASRD) and its work on developing a Lower Athabasca Regional Plan (LARP), which will set out economic, environmental and social outcomes and objectives for the region over the next 10 years. • Shell currently works through the OSDG Aboriginal Affairs committee and with the IRCs to determine how best to accommodate and mitigate the adverse social and cultural effects of development. • Shell actively participates in regional multi-stakeholder planning and research initiatives that consider the long-term sustainability of effective traditional land use.
	• The loss of lands on which traditional pursuits can be carried out affects several intangible elements of culture including the transmission of culture and oral history (e.g., place names, stories, etc.) that are related to these lands. The inability to transmit culture on the land has implications for wider inter-generational relationships (e.g., a potential weakening of bonds between elders and youth).	• The application acknowledges that traditional land use is intimately related to the culture, spirituality and identity of Aboriginal peoples. • The application notes that traditional cultural and environmental knowledge is changing, moving from a mostly oral and activity-based tradition of preservation to a greater emphasis on systematic documentation.	• Shell acknowledges the value of the culture of its Aboriginal neighbours. Shell aims to carry out ongoing consultation with Aboriginal communities to understand the potential impacts of its projects and activities on Aboriginal land use and culture, and to work with communities to identify appropriate ways to enhance positive effects and minimize adverse effects.	• Shell supports a number of cultural retention and other initiatives, which aim at helping Aboriginal communities maintain their social cohesion and unique characteristics. Initiatives include: - Supporting the collection of traditional ecological knowledge on medicinal plants, wildlife and spiritual and cultural sites on traditional lands in the region. - Supporting cultural retention programs, including Dene gatherings, Elder/Youth programs through the Fort McKay Elders Centre, language retention initiatives, and video documentation of traditional knowledge. - Supporting historical preservation initiatives such as the Fort Chipewyan Museum and the Cree Burn Lake Education Project. - Promoting the Quarry of Ancestors.
	• Disturbance of the land resulting from development can lead to a perception among some Aboriginal peoples that the land has lost spiritual meaning or value even after reclamation has taken place (e.g., the spirit of the land is gone).	• The application acknowledges but does not address the spiritual value of land directly.	• Shell acknowledges the concerns of traditional land users in the region with respect to current reclamation practices. Shell aims to work with Aboriginal stakeholders on reclamation and land use issues.	• Shell is committed to undertaking progressive reclamation whenever practical. • By means of the Shell/Ft McKay Reclamation Focus Group, elders advisory groups and other similar groups, Shell expects to be continuously using and expanding on how it uses TK information in reclamation planning. • Shell supports and executes research activities for furthering understanding on reclamation practices, including as part of the Reclamation Working Group and through the Canadian Oil Sands Network for Research and Development. (COSIA).
Concerns over pollution	• The perception of contamination to traditional lands, water, plants and animals from development has a direct effect on how and where traditional practices are carried out, thereby affecting cultural values associated with these traditional practices.	• Shell has carried out a comprehensive assessment of the Project's environmental effects. Based on this assessment, the predicted residual effects for the Project are not likely significant adverse environmental effects.	• Shell supports the use of science and TK to understand and measure biophysical changes in the environment, including water quality. • Shell recognizes local resident perceptions regarding the environmental effects of Oil Sands development. Shell aims to address these concerns by: - communicating with Aboriginal communities and other local stakeholders the results of its comprehensive environmental impact assessment - communicating its ongoing plans to manage and monitor the environmental effects of its Oil Sands activities, and - working with local communities in developing appropriate mitigations	• Shell has incorporated a suite of environmental initiatives into its current project design in order to effectively monitor and mitigate the environmental effects of its project. • Shell supports CEMA and other agencies in their conduct of investigations and communication of results. • Shell attempts to address local Aboriginal concerns by communicating and working with Aboriginal communities on an ongoing basis through open houses, regular meetings with consultation offices (e.g., Industry Relations Corporations), Advisory Committee meetings, technical review meetings and reports.
Concerns with industrial water use	• Aboriginal persons in the area believe changes they've observed in water quantity are attributable to Oil Sands development (e.g., concerns with low levels during low flow periods of the Muskeg and Athabasca Rivers). These perceptions might lead to lower use of these waterways in relation to traditional activities (e.g., fishing, accessing other traditional lands).	• Water quantity impacts are described in EIA Volume 4A.		

Table 7 Oil Sands Development Effects On The Local Aboriginal Population (continued)

Project Effect Pathways	What Aboriginal Communities Say	What Shell's Regulatory Application Says	Shell Principle	Shell Actions and Mitigations
Participation in the wage economy	• Time pressures related to work can limit opportunities for carrying out traditional pursuits and transferring TK to Aboriginal youth. • Working conditions are not always sensitive to the particular cultural needs of Aboriginal peoples (e.g., flexible work arrangements that would allow Aboriginal workers to take part in traditional activities). • Wage economy opportunities can increase exposure of Aboriginal persons to outside cultural values that might run contrary to traditional values. • The requirements of wage-economy jobs has increased the importance of non-traditional education. • Wage economy opportunities can increase an individual's sense of self-worth and sense of control.	• The SEIA acknowledges that increased participation in the wage economy impacts participation in traditional pursuits. • The SEIA quantifies the number of construction and operations jobs created by the Project. • The SEIA discusses Shell's local hiring, contracting and business development practices.	• Shell acknowledges that participation in the wage economy can impact participation in traditional pursuits. However, participation in the wage economy has also provided Aboriginal persons, companies and communities with benefits including resources with which to manage social and cultural change. Shell aims to carry out ongoing consultation with Aboriginal communities to understand the potential impacts of its projects and activities on culture, and to work with communities to identify appropriate ways to enhance positive effects and minimize adverse effects.	• Shell is active in local communities nearest its operations, employing local people, including Aboriginals, and providing training. Shell provides employment opportunities to Aboriginal persons and has supported a number of initiatives and programs to assist Aboriginal businesses and workers in tackling barriers to employment, including: - Working with the Northeastern Alberta Aboriginal Business Association - Supporting Aboriginal scholarships through contributions to the National Aboriginal Achievement Foundation and supporting environmental education of Aboriginal students in the region. - Initiating the Aboriginal Talent Pipeline project. - Delivering drilling rig and driver training in Fort Chipewyan. - Providing ongoing support for E-learning in Fort McKay. - Supporting a Diverse Recruiter in Calgary, an Aboriginal Recruiter at Albian Sands, and an Aboriginal Business consultant. - Sponsoring delivery of the Building Environmental Aboriginal Human Resources (BEAHR) program in Fort Chipewyan. • Shell is committed to providing a system for cultural diversity awareness training for its employees and contractors regarding respect for traditional users, traplines, cabins, trails and equipment. Currently, Shell offers Aboriginal Awareness Training to a number of its employees, and Abnet, an Aboriginal network that supports Aboriginal employees and the awareness of Aboriginal culture to all Calgary based Shell Canada employees. As well, Shell Canada annually hosts Aboriginal Awareness Week in Calgary. Aboriginal Awareness Activities are also hosted each year at the Albian and Scotford Upgrader sites. • Shell is focused on fostering and supporting Aboriginal business opportunities. Since 2005, the Athabasca Oil Sands Project has contracted $1 billion of business to Aboriginal companies. • Shell has set the goal of increasing Aboriginal participation in its workforce. • Shell is committed to working with the IRCs and employment coordinators to identify and remove barriers to education and employment opportunities for Aboriginal persons in the region. • Shell is committed to diversity and inclusion within its workforce. Shell's diversity and inclusion aspirations focus on three areas that are key to a successful business model – Talent, Leadership and Competitiveness. Shell's efforts are underpinned by targeted metrics that monitor progress and ensure that action takes place.
Increased non-Aboriginal population	• Concern that increasing the local non-Aboriginal population in the region and their access to traditional lands will increase competition for traditional resources. • Decreased feelings of security among some Aboriginal persons when carrying out traditional activities (e.g., berry-picking, fishing) as a result of increased numbers of non-Aboriginal persons pursuing recreational activities on the land. • Concern that an increased non-Aboriginal population could increase the exposure of Aboriginal persons to outside cultural values that might run contrary to the values of cooperation and sharing associated with Aboriginal use and stewardship of traditional lands.	• The application acknowledges that Oil Sands industry development is increasing the regional population and access to previously hard-to-get places, thus increasing competition for traditional resources. • The SEIA quantifies the Project effect on the regional population with the use of a fly-in/fly-out camp-based approach to construction. With the project, the urban population is expected to be about 4% higher in the long term than under Base Case conditions.	• Shell acknowledges the value of the culture of its Aboriginal neighbours. Shell aims to carry out ongoing consultation with Aboriginal communities to understand the potential impacts of its projects and activities on Aboriginal land use and culture, and to work with communities to identify appropriate ways to enhance positive effects and minimize adverse effects.	• Shell's fly-in/fly-out camp-based approach to project construction, along with adopting extended work schedules so that workers stay busy while living in camp, will reduce the Project effect on population compared to housing people in Fort McMurray. It will also serve to limit opportunities for workers to access traditional lands and visit mainly Aboriginal communities in proximity to the development area. • Shell is committed to providing a system for cultural diversity awareness training for their employees and contractors regarding respect for traditional users, traplines, cabins, trails and equipment. • Shell will restrict access across the Project area to trappers and traditional land users. • As an active member of the OSDG, Shell is committed to supporting ongoing long-term planning by the RMWB and other regional service providers to address growth-related issues in the region.

4.7.9 Shell's Support for Training, Employment and Business Development

Shell has a diversity framework which emphasizes achieving a labour force that is representative of the areas in which they operate. Diversity and inclusion within the labour force helps to better understand local communities, and aid in the development of relationships between communities and the developer (Shell 2012b, pers. comm.).

While Shell does not currently have a specific Aboriginal hiring policy, Shell has set the goal of increasing Aboriginal participation in its workforce. As such, Shell focuses on:

- ensuring that community members have the skills required to gain employment;
- working with local training facilitators to identify and access training for community members to meet the skilled labour needs of Projects; and
- focusing on individual development plans for employees from local communities aimed at helping the employee grow within the organization (Shell 2012b, pers. comm.).

Baseline information for Aboriginal employment with Shell is limited due to the Freedom of Information and Protection of Privacy Act and the Personal Information Protection Act of Alberta. Aboriginal employment participation is determined through a process of self-identification which is managed by Shell's human resources department (Shell 2012c, pers. comm.).

The 2010 Shell employee self-identification survey showed that 111 Shell Albian Sands (SAS) employees are of Aboriginal descendent, which represents 6.8% of the workforce at SAS. It is not possible to attribute employee membership to an Aboriginal group or community as it is unlawful to disclose personal information including but not limited to; employee occupations, ancestry or Band affiliation. Shell is developing plans to track Aboriginal employee retention (Shell 2012c, pers. comm.).

Shell endeavours to use local contractor services where appropriate. As of June 2011, Shell had spent over $1 billion on services provided by Aboriginal contractors (e.g., the Fort McKay Group of Companies) working on the Athabasca Oil Sands Project, which includes the Jackpine Mine (Shell 2011).

There is concern among local First Nations that opportunities for increased engagement of Aboriginal peoples in the wage economy will reduce people's time and inclination to engage in traditional activities.

Shell acknowledges that participation in the wage economy can potentially reduce people's involvement in traditional pursuits. However, participation in the wage economy has also provided Aboriginal persons, companies and communities with benefits including resources with which to manage social and cultural change. Shell aims to carry out ongoing consultation with Aboriginal communities to understand the potential impacts of its projects and activities on the culture of Aboriginals communities in the area, and to work with the communities to identify appropriate ways to enhance positive effects and minimize adverse effects.

Shell is committed to providing a system for cultural diversity awareness training for its employees and contractors regarding respect for traditional users, trap-lines, cabins, trails and equipment. Currently, Shell offers Aboriginal Awareness Training to a number of its employees, and Abnet, an Aboriginal network that supports Aboriginal employees and the awareness of Aboriginal culture to all Calgary based Shell Canada employees. As well, Shell Canada annually hosts Aboriginal Awareness Week in Calgary. Aboriginal Awareness Activities are also hosted each year at the Albian and Scotford Upgrader sites.

To enhance the positive effects of its projects, Shell is committed to working with the IRCs and employment coordinators to identify and remove barriers to education and employment opportunities for Aboriginal persons in the region. Shell is active in local communities nearest to its operations, employing local people, including Aboriginal persons, and providing training. Shell has supported a number of initiatives and programs to assist Aboriginal businesses and workers in tackling barriers to contracting and employment opportunities, including:

- working with the Northeastern Alberta Aboriginal Business Association;
- supporting Aboriginal scholarships through contributions to the National Aboriginal Achievement Foundation and Banff Center (Aboriginal leadership development courses);
- initiating the Aboriginal Talent Pipeline project;
- delivering drilling rig training and sponsoring Building Environmental Aboriginal Human Resources (BEAHR) program in Fort Chipewyan;
- providing ongoing support for E-learning in Fort McKay;
- supporting two Diversity Recruiters in Calgary, and an Aboriginal Business consultant;
- Supporting the Steps Forward Program in Fort McKay.

4.7.10 Shell's Support for Cultural Initiatives

As indicated in the introduction, assessing the direct effects of Project activities on intangible aspects of culture are complex, due to factors such as the unique way that individuals or communities as a whole respond to change in their surroundings. Despite the complexity of such an assessment, Shell has recognized that intangible aspects of a community's culture are important. To minimize impacts on culture, Shell supports a number of cultural retention initiatives, which aim at helping Aboriginal communities to maintain their social cohesion and unique characteristics. Examples of mitigations and cultural initiatives that Shell has undertaken in association with Shell's projects include:

- supporting the collection of TK on medicinal plants, wildlife and spiritual and cultural sites on traditional lands in the region;
- supporting Dene gatherings, Elder/Youth programs for FMFN, MCFN and ACFN including, language retention initiatives (e.g. Shell provides funding for a Chipewyan language retention program), and video documentation of traditional knowledge;
- supporting historical preservation initiatives such as the Fort Chipewyan Museum and the Cree Burn Lake Education Project; and
- promoting the Quarry of Ancestors by partnering with Alberta Culture and Community Spirit to develop educational materials related to the quarry that can be distributed and used in schools in the region.

In addition to the above mitigations and commitments, Shell has supported a number of other initiatives over several years related to Aboriginal programs in Fort McKay, Fort Chipewyan and Fort McMurray, including the following:

- Aboriginal Days- All Nations Coming Together (January 2006);
- Aboriginal Day Celebration (February 2006);
- Annual Treaty Day Celebrations for FMFN, MCFN and ACFN;
- Catholic School Board- FMNI Program- Aboriginal Role Models (July 2007);
- Elders Pilgrimage to Lac St. Anne (July 2008);
- 2011 Treaty 8 Gathering and Youth Canoe Trip;
- 2009 Elders/Youth gathering at English River;
- Father Tucotte FNMI Program (July 2007);
- First Nations, Métis & Inuit Program (September 2006, July 2007, September 2008, October 2008);
- First Nation Métis Inuit (FMNI) Education Program (October 2008);
- Full Circle Mentoring Program (July 2010 and April 2011);
- Lac St Anne Pilgrimage (July 2007);
- Métis Festivals for Locals 1935, 63 and 125;
- Métis Youth Forum (December 2006);
- Nistawoyou Exhibition (January 2008);
- Reading on the Medicine Wheel (September 2008);
- Spirit Lake Elders Cultural Retreat (July 2009);
- Traditional Celebration of Achievement (March 2007); and
- Walking the path program – helping children and mothers develop self esteem through arts and crafts that also supports:
  - Training in TEK/TLU.
  - Development of traditional plant guides.
  - Feasibility study for a cultural center.

5.0 PROJECT EFFECTS ON CULTURE

The following summarises the effects of the JME Project on tangible and intangible elements of culture.

Availability of Land for Traditional Activities

The Project is expected to have a small effect on the availability of land for traditional activities, and these effects are similarly expected to have a small contribution on intangible elements of culture. However, Aboriginal people will still continue to have opportunities to hunt, trap and fish and pursue other traditional activities and pass on skills and TK to successive generations.

Ability to Access Land and Water Resources for Traditional Activities

Changes in access to traditional lands may have the same effects as the disturbances to traditional lands; generally making portions of traditional lands unavailable for traditional activities during Project operations.

Project-related activities are expected to have a negligible environmental consequence on land access in the LSA and RSA. Changes in land access, as a result of the project, are expected to have a negligible effect on intangible elements of culture, as Aboriginal people will retain access to land to carry out traditional activities. These effects are expected to be similar for all Aboriginal groups included in this assessment

Availability of Traditional Resources to Sustain Harvests and Other Cultural Activities

The environmental consequences of the Project on the availability of large game and furbearers at the regional and local scales were assessed to be negligible to low. Similarly, the environmental consequence of Project activities on traditional plants are expected to result in a negative moderate environmental consequence to high traditional plant potential areas in the LSA during construction and operations. At the RSA, the JME results in a negligible environmental consequence to high traditional plant use areas during construction and operations. The Projects effects on fish abundance were assessed to be negligible. Because the environmental consequences of Project activities on the availability of wildlife were assessed as negligible to low, the Project may contribute to adverse effects to intangible elements of culture. The effects of the Project on traditional plant harvesting were assessed as moderate in the LSA and negligible at the RSA level. As a result, the Project may have some effect on intangible elements of culture. The effects are expected to be limited to traditional activities occurring on the two RFMAs held by members of the FMFN, and the RFMA held by a member of the ACFN. The Project is not expected to have an effect on intangible elements of culture related to fishing.

Availability of Habitat to Support Wildlife, Aquatic and Plant Resources

Because the environmental consequence of Project impacts on large game and furbearer habitat are expected to be moderate to high at the local level, the Project is expected to have some effect on intangible aspects of culture as they relate to the availability of wildlife habitats. These effects however are expected to be limited to traditional activities occurring at two directly affected RFMAs held by members of the FMFN, and an RFMA held by a member of the ACFN. The Project's effects on wildlife habitat at the RSA level are assessed to be negligible to low. As a result, the Project may have some effect on the intangible cultural elements of the FMFN, ACFN, and MCFN. The residual impacts of the Project on fish habitat in JME were classified as having no environmental consequence.

Historic Resources

The Project is predicted to have a negligible direct effect on historical resources. Indirect effects are predicted to be negligible to low. As a result, the Project is not expected to have an effect on intangible aspects of culture as a result of impacts on historic resources.

Availability of Trusted Sources of Water for Consumption

The Project is not expected to result in small to negligible changes to water quality. As a result, the Project effect on changes to water quality is not expected to contribute to effects on intangible elements of culture, as fish, an important part of diet, will not be affected due to any deterioration of water quality.

Air Quality

The Air Quality Assessment predicts that there will be changes in ambient air quality that will have a negligible to low environmental consequence. Because the community of Fort McKay is located closer to the Project than Fort Chipewyan, and one of the directly affected traplines in the LSA is held by a member of the ACFN the Project effects on ambient air quality are expected to be noticed more by the FMFN and ACFN than by the MCFN. The effects of the Project on ambient air quality may also affect intangible elements of culture. Potentially affected intangible elements may include social relationships. For example, people may relocate to avoid changes in ambient air quality. Because the Project will result in changes to ambient air quality that are expected to have a negligible to low environmental consequence, this effect may have a small effect on intangible forms of culture. These effects are expected to be experienced more by the FMFN and ACFN than by the MCFN.

Human Health Risk

Overall, emissions from the JME alone, and in combination with emissions from other sources are not expected to result in adverse health effects. The changes between the Base Case and Application Case risks are generally small, suggesting that JME is not expected to contribute appreciably to health risks in the region.

Noise and Visual Effects

During Project operations, the environmental consequences of Project-related visual effects were assessed to be negligible to moderate. Although noise impacts from the Project were assessed as negligible at Fort McKay, intermittent noise cannons may be heard by FMFN and ACFN trappers in the vicinity of the Project. Because the Project will generate noise and visual effects during Project operations, there are potential effects to the sense of wilderness and solitude experienced by Aboriginals. Effects to the sense of wilderness and solitude may also affect cultural values. To manage noise, Shell will develop an operational noise management plan and implement it during detailed design to address the potential for moderate magnitude impacts. Potentially affected parties will be consulted during Project construction and operations regarding noise levels. Impacts on visual aesthetics will be mitigated as the project development area will be reclaimed and facilities will be decommissioned and removed. The magnitude of visual aesthetics impacts as a result of the Project will be reduced to negligible. Therefore, the environmental consequence of the Project on all landscape units will be negligible.

Participation in Wage Economy

The Project is expected to provide additional income and business opportunities for local Aboriginal peoples and businesses. Depending on the degree to which Aboriginal peoples and businesses participate in project-related employment and business opportunities, this has the potential to contribute to changes in the ability of Aboriginal

peoples to pass on TK. On one hand, steady employment may lead to less time being available to carry out traditional pursuits, meaning fewer opportunities are available for practicing and transmitting traditional culture. On the other hand, increased income may lead to the purchase of hunting and harvesting equipment (e.g., rifles, snowmobiles) that increases the effectiveness in carrying out traditional pursuits. This includes being able to cover greater distances, helping to somewhat mitigate the limitation on the land available for traditional pursuits as a result of development.

Increased engagement in the wage economy may also affect existing social and family values (e.g., decreasing the quantity of time workers spend with their families, elevating the role of the wage earner in the community). However, it should be noted that unemployment and poverty also induce negative cultural change.

Given the context of existing development, and proposed developments, the Project's contribution is expected to be small. This effect is considered to be similar for the FMFN, ACFN, and MCFN.

Language Retention

Aboriginal language retention has been dropping for some time, and is expected to continue regardless of the Project's development. While the Project may have some effect on Aboriginal language retention, given the context of the downward trend in language retention, the Project's contribution to the decline is considered to be small. This effect is considered to be the same for the FMFN, ACFN, and MCFN.

Effects of Increase in Non-Aboriginal Population

The assessment determined that the Project is not expected to be a substantial driver of population growth in the region. The camps in which much of the Project's workforce will be housed will have medical facilities, recreation facilities, and other services, thus limiting the need for workers to visit local communities or engage with local Aboriginal peoples outside the Project area. Project effects resulting from increased non-Aboriginal growth in the region have the potential to contribute to change in social values, competition for traditional resources (e.g., wildlife and fish) and the ability to pass on TK in Aboriginal communities. Because the effects of increased population growth in the region as a result of Project activities is considered to be small and accommodated in either project accommodations or the urban service area, the resulting effects on the intangible elements of culture for Aboriginal groups in the region is also expected to be small.

6.0 CONCLUSION

The effects of the Project on tangible and intangible elements of culture were determined to range from negligible to moderate. Many of the effects were considered small, such as Project-related affects to availability of lands for traditional activities, availability of wildlife habitats, ability to pass on Traditional Knowledge, and Project-related effects on language retention, income disparity, and increases in non-Aboriginal population. The larger effects were assessed to be Project-related effects to visual aesthetics, which will have an effect on wilderness character and a sense of solitude.

Table 8 Element of Culture and Project Effects Summary

Element of culture	Project Effect on Element of Culture
Availability of Land for Traditional Activities	• The project is expected to have a small effect on the availability of land for traditional activities. Aboriginal people will continue to have opportunities to hunt, trap and fish and pursue other traditional activities and pass on skills and TK to successive generations.
Ability to Access Land and Water Resources for Traditional Activities	• Project-related activities are expected to have a negligible environmental consequence on land access in the LSA and RSA. Aboriginal people will retain access to land to carry out traditional activities.

Availability of Traditional Resources to Sustain Harvests and Other Cultural Activities	• The environmental consequences of the Project on the availability of large game and furbearers at the regional and local scales were assessed to be negligible. Hunting opportunities are not expected to be affected by the Project. • The environmental consequence of Project activities on traditional plants are expected to result in a negative moderate environmental consequence to high traditional plant potential areas in the LSA during construction and operations. At the RSA, the JME results in a negligible environmental consequence to high traditional plant use areas during construction and operations. • The Projects effects on fish abundance were assessed to be negligible. • The effects of the Project on traditional plant harvesting were assessed as moderate in the LSA and negligible at the RSA level.
Availability to Support Wildlife, Aquatic and Plant Resources	• The environmental consequence of Project impacts on large game and furbearer habitat are expected to be moderate to high at the local level. • The Project is expected to have some effect on intangible aspects of culture as they relate to the availability of wildlife habitats. These effects are expected to be limited to traditional activities occurring at the two directly affected RFMAs held by members of the FMFN, and an RFMA held by a member of the ACFN.
Historic Resources	• The Project is predicted to have a negligible direct effect on historical resources. Indirect effects are predicted to be negligible to low.
Availability of Trusted Sources of Water for Consumption	• The Project is expected to result in small to negligible changes to water quality. Fish, an important part of diet, will not be affected due to any deterioration of water quality.
Air Quality	• There will be changes in ambient air quality that will have a negligible to low environmental consequence.
Human Health Risk	• Project-related emissions are predicted to have minimal impacts on human health as a result of inhalation of acrolein, long-term inhalation of hydrogen sulphide, and long-term inhalation of nasal irritants. Incremental cancer risk due to exposure to carcinogens is assessed as negligible. The Project is not expected to contribute to potential adverse wildlife health effects. Aboriginal people can remain confident in country foods.
Noise and Visual Effects	• During Project operations, the environmental consequences of Project-related visual effects were assessed to be negligible to moderate. To manage noise, Shell will develop an operational noise management plan and implement it during detailed design to address the potential for moderate magnitude impacts. Potentially affected parties will be consulted during Project construction and operations regarding noise levels.
	• Noise impacts from the Project were assessed as negligible at Fort McKay, intermittent noise cannons may be heard by FMFN and ACFN trappers in the vicinity of the Project. Impacts on visual aesthetics will be mitigated as the project development area will be reclaimed and facilities will be decommissioned and removed. The magnitude of visual aesthetics impacts as a result of the Project will be reduced to negligible. Therefore, the environmental consequence of the Project on all landscape units will be negligible.
Participation in Wage Economy	• The Project's contribution to the expansion of wage economy opportunities for Aboriginal persons and companies is expected to be small in view of other already existing opportunities. Increased employment of Aboriginal people is a benefit.
Language Retention	• Aboriginal language retention has been dropping for some time, and is expected to continue regardless of the Project's development. The Project's contribution to the decline is considered to be small.
Effects of Increase in Non-Aboriginal Population	• The effects of increased population growth in the region as a result of Project activities is considered to be small, as competition for natural resources is not expected to increase due to Shell's workforce management. Hunting success is not expected to be affected.

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