



SUNCOR ENERGY INC.
Base Mine Extension

DETAILED PROJECT DESCRIPTION SUMMARY

July 2020



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EXECUTIVE SUMMARY

Suncor Energy Inc. (Suncor) is submitting a proposal to develop the Base Mine Extension Project (the Project). All plausible pathways to address global emissions need energy from fossil fuels and Suncor views Canada's world class, strategic oil sands resource as a key part of the energy future for decades to come. Commensurate with Canada's ambitions, Suncor is committed to a long-term strategy of reducing absolute emissions. With the innovation we are known for, Suncor can provide the world with trusted low carbon energy.

Suncor has invested billions of dollars in infrastructure that produces value added products to meet the energy needs of Albertans and Canadians. This Project is necessary to continue to add value with this infrastructure. The bitumen from this project will supply the existing upgraders at Suncor's Oil Sands Base Plant operations (Base Plant) when the current mines are depleted. The Project is adjacent to Base Plant and includes an open pit mining operation and extraction facilities. Production is expected to be nominally 225 thousand barrels per day of replacement bitumen during the estimated 25-year operational life of the Project.

The Project application will be based on the best-available technology. In parallel, Suncor is assessing new technologies, such as non-aqueous extraction. The potential benefits of these new technologies under evaluation include the improvement of operational performance, reduction of the overall footprint, acceleration of reclamation timelines, and/or reduction of greenhouse gas emissions associated with operations. In addition, Suncor will concurrently be pursuing paths to reduce emissions in other areas of its business and in ways that sequester carbon and produce net benefits.

Significant socio-economic benefits and opportunities for Indigenous communities, local communities, the Province of Alberta, and Canada are expected to be generated by the Project. The benefits include:

- continued generation of municipal, provincial, and federal tax and royalty revenue
- direct and indirect local and national employment
- investment in innovation and technology development

Production is anticipated to support continued operations of existing infrastructure as mining transitions from the existing mines to the Project. Suncor is committed to working with regulators, governments, Indigenous communities, and stakeholders to seek approval for this Project, while ensuring we are caring for each other and the earth, with a view to the long-term interests of Canada and its Peoples.

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INTRODUCTION

This summary has been prepared according to the *Impact Assessment Act* Guide to Preparing an Initial Project Description and a Detailed Project Description (Government of Canada 2019a) and Annex II of the guide, which aligns with Schedule 2 of the Information and Management of Time Limits Regulations. This summary corresponds to requirement 25 as outlined in Annex II of the guide. A list of references is provided in Appendix A. A glossary of technical terms and definitions of abbreviations used in this document are provided in Appendix B.

PART A: UPDATED GENERAL INFORMATION

1. THE PROJECT'S NAME, TYPE OR SECTOR AND PROPOSED LOCATION

Suncor Energy Inc. (Suncor) is proposing to develop the Base Mine Extension Project (the Project) to sustain the supply of bitumen to the existing upgraders at Suncor's Oil Sands Base Plant operation (Base Plant) as the mineable bitumen resource is depleted in the existing mines. The Project includes an open pit mining operation supplying oil sands to a new bitumen froth production facility, from which bitumen froth will be delivered by pipeline to Suncor's existing Base Plant facilities where further processing occurs, including upgrading into various product blends for market. The Project is located adjacent to Base Plant and north of the city of Fort McMurray, Alberta, within the Regional Municipality of Wood Buffalo (Figure 1). Additional details on the Project location are provided in Section 13.

2. PROPONENT'S NAME AND CONTACT INFORMATION

The proponent's name is Suncor Energy Inc.

Contact information for the Project is:

Blair Penner

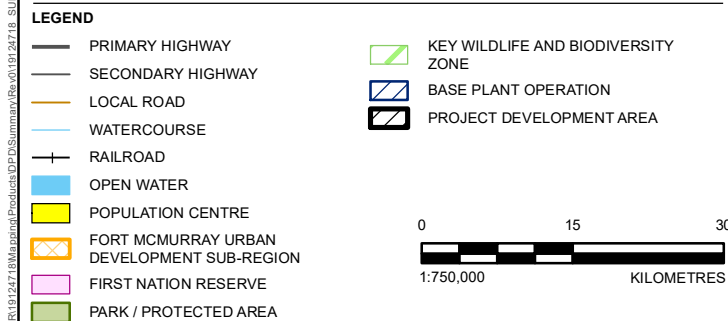
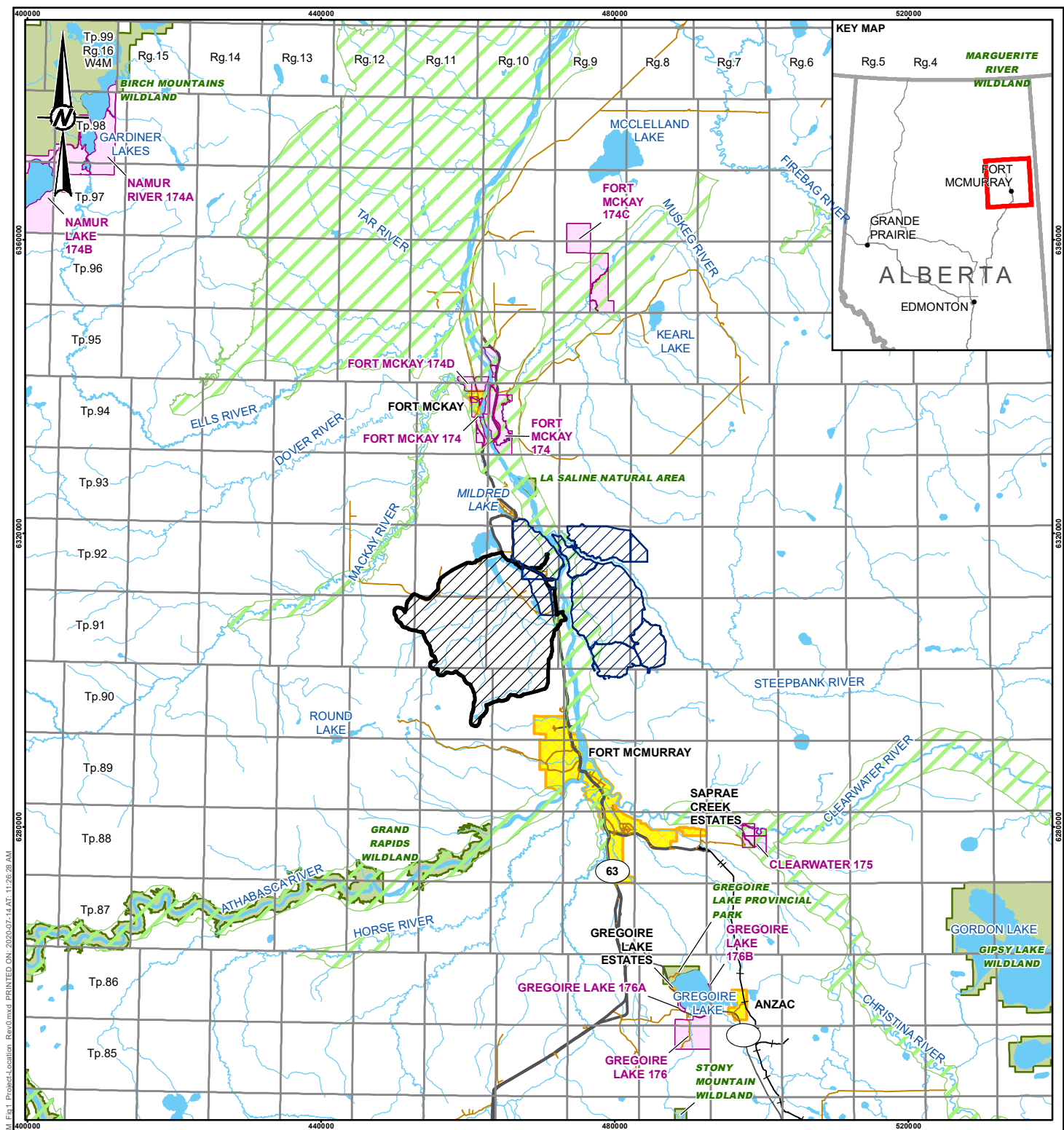
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Calgary, Alberta T2P 3E3

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Project phone number: 1-855-955-3054



PROJECT
BASE MINE EXTENSION

TITLE
PROPOSED PROJECT LOCATION

CLIENT	YYYY-MM-DD	2020-07-14
DESIGNED	JG	
PREPARED	PT	
REVIEWED	ZG	
APPROVED	JH	

PROJECT NO. 19124718 PHASE REV. 0 FIGURE 1

PART B: PLANNING PHASE RESULTS

The planning phase results part of the Detailed Project Description provide a summary and results of any engagement undertaken with any jurisdictions or other party as well as with Indigenous peoples of Canada. Included within this part is Suncor's response to the Summary of Issues that were issued in response to the Initial Project Description. This part also reviews studies, plans, or strategic assessments that are relevant to the Project.

Suncor recognizes that the COVID-19 pandemic presents some unique challenges for engagement with stakeholders and Indigenous communities. Suncor has responded by adapting engagement approaches to rely on direct mail, individual email correspondence, phone, and conference calls as well as video conferencing where available. Suncor also has accommodated needs of stakeholders and Indigenous communities by collaborating with the Impact Assessment Agency of Canada (IAAC) to extend the Initial Project Description comment period from 20 to 60 days. The comment period closed on May 1, 2020.

3. ENGAGEMENT WITH JURISDICTIONS OR OTHER PARTIES

Engagement with Jurisdictions and other parties continued during the preparation of the Detailed Project Description, with interactions with the Impact Assessment Agency of Canada, Fisheries and Oceans Canada, Alberta Energy Regulator, Alberta Aboriginal Consultation Office and the Regional Municipality of Wood Buffalo. These engagement activities have included phone discussions and in person meetings to review Project matters including:

- Project scope, location, schedules, engagement planning and regulatory processes
- discussions regarding alignment of Federal and Provincial regulatory processes
- review of Initial Project Description
- discussions on the content of the Detailed Project Description
- extension of the comment period for the Initial Project Description
- discussions regarding fish habitat offsetting, requirements, options, and engagement approaches
- discussions on regulatory requirements and field work
- discussions on Alberta's Wetland Policy
- discussions regarding assessment of resource drilling density for the Project
- Pre-Consultation Assessment submitted and processed by the Alberta Aboriginal Consultation Office
- submission for review of an information package to the Alberta Aboriginal Consultation Office

The Summary of Issues and Suncor's responses to those issues is provided in Appendix C of the Detailed Project Description. Issues raised only by jurisdictions and other parties include (note that issues raised by jurisdictions, other parties and Indigenous groups are noted in the list of issues included in Section 4):

- potential effects to the environment from accidents and malfunctions
- clarity on the spill prevention, preparedness, response measures and systems, response capacity and emergency management plans
- clarity on alternate means of carrying out the Project
- clarity and further details on the alternatives to the Project
- clarity on whether Canadian Ambient Air Quality Standards and Objectives will be used
- consideration of secondary pollutants such as ozone
- potential for increased production of secondary organic aerosols
- potential effects of the Project and cumulative effects to terrestrial and aquatic ecosystems associated with changes in air quality and deposition of atmospheric contaminants

- acidification and exceedance of ecosystems' critical loads
- contribution of the Project to light pollution and potential effects to nearby communities
- clarity on the scope of activities included in the annual estimates of greenhouse gas emissions for each phase of the Project
- clarity on the specific technologies and practices under consideration to reduce the Project's greenhouse gas emissions
- potential effects of the Project on the ability to achieve the Wood Buffalo National Park Action Plan goals
- potential effects to drinking water treatment facilities
- potential effects to local municipal infrastructure and increased financial and environmental liability associated with re-routing of the Poplar Creek Road
- potential effects of climate change on the Project
- production of silica dust and potential effects on human health
- effects of the Project to regional Indigenous peoples, residents, and businesses of Fort McMurray and Fort McKay due to impacts to visual aesthetics
- potential generation of odours and solvent vapors
- potential health effects of diesel exhaust particulate matter
- clarity on the proponent's plans to ensure compliance with the *Migratory Birds Convention Act*
- potential effects of the Project and cumulative effects to migratory birds
- potential mortality of migratory birds due to contact with harmful substances in tailings ponds or other contaminated open water on the Project site
- clarity on measures to mitigate, monitor, and adaptively respond to potential effects to migratory birds
- potential effects of the Project and cumulative effects to wildlife and other species at risk due to the loss of habitat and migration corridor area and quality, diversity, change in predator movements, and potential changes in soil quality and quantity that may result in reduced soil productivity
- potential injury or death of species at risk
- potential effects of the Project and cumulative effects to species at risk
- consideration of all migratory bird, non-migratory bird, and terrestrial species at risk
- potential effects of the Project to whooping crane population survival and migration behaviours
- analysis of current socio-economic environment, considering demographics, socio-economic conditions, and cultural trends, including relevant laws and policies
- inclusion of monitoring programs to reveal inequalities and design mitigation strategies regarding effects to specific populations
- potential effects of the Project and cumulative effects to groundwater recharge and discharge quantities, groundwater levels, and groundwater-surface water interactions
- potential effects of tailings facilities and wastewater streams
- potential effects to ecosystem function due to the removal of waterbodies and watercourses in the Project area

Suncor believes there is one issue raised by jurisdictions in the Summary of Issues that, while Suncor will conduct Gender Based Analysis Plus (GBA+) assessments to support the Project application, as well as participate in the suggested monitoring programs, it believes the establishment and management of such programs is outside of its care and control. The concern requires further clarification of the expectations of this statement from the Summary of Issues:

- inclusion of monitoring programs to reveal inequalities and design mitigation strategies regarding effects to specific populations

Suncor will continue engagement activities through regular project updates and meetings. Suncor will also gather further input from jurisdictions and agencies, as well as the public through the public comment periods on the Proposed Terms of Reference and the Tailored Impact Statement Guidelines.

In addition to this ongoing engagement, Suncor will:

- provide project-related information through news releases, radio advertisements, advertising, and the company's website
- provide communication through mail-outs, community newsletters and public meetings
- hold discussions on Project plans to identify issues and seek resolution of concerns
- continue to monitor and respond to messages received at the project email address and the toll-free phone number
- initiate a dialogue to investigate community interest in establishing a committee for residents of Parsons Creek to provide input on the Project

4. ENGAGEMENT WITH INDIGENOUS PEOPLES OF CANADA

Early engagement has occurred, and feedback has been provided by the following Indigenous groups and Trappers during preparation of the Detailed Project Description:

- Athabasca Chipewyan First Nation
- Bigstone Cree First Nation
- Chipewyan Prairie Dene First Nation
- Christina River Dene Nation Council
- Fort Chipewyan Métis Association (Local 125)
- Fort McKay First Nation
- Fort McKay Métis Nation
- Fort McMurray 468 First Nation
- Fort McMurray Métis Local 1935
- Gift Lake Métis Settlement
- K'alt'odeeche First Nation
- Little Red River Cree Nation
- Métis Nation of Alberta Region 1
- Mikisew Cree First Nation
- Willow Lake Métis Association

Details outlining the specifics of these early engagement activities are found in Appendix D of the Detailed Project Description. These engagement activities have included in-person meetings to review preliminary material including project location, project type, project schedule information, regulatory processes and schedules, and future engagement opportunities. Topics and concerns raised by Indigenous groups related to the Project include:

- potential impacts to waterbodies, watercourses, water quality and water quantity during operations and at closure, including potential impacts to water access and navigation
- potential impacts to quality and quantity of fish and fish habitat during operations and at closure
- potential impacts to the wildlife and wildlife habitat during operations and at closure
- potential impacts to ecosystems and harvesting areas, such as loss of traditional use plants and vegetation and reduced quantity of wildlife in harvesting areas
- potential impacts to air quality, including odours, noise, and dust from operations
- potential impacts to health status and Indigenous community health
- potential impacts to Indigenous communities, culture, and heritage resources, including the inability to practice and pass on Indigenous culture, laws, customs, and knowledge
- potential impacts on Indigenous communities' sense of wellbeing, remoteness, solitude, privacy, and safety
- potential impacts to visual aesthetics including light pollution
- reduced land access during construction, operations, and reclamation activities for Indigenous community members to exercise rights, such as hunting, fishing, gathering, and/or trapping
- potential inability to achieve planned land uses at closure
- potential cumulative environmental effects of existing and planned projects within the region
- reduced land available in the region to exercise traditional land uses and rights
- questions on how the Lower Athabasca Regional Plan (Government of Alberta 2012) balances industrial activity and the rights of Indigenous groups
- increased real or perceived contamination of land and food sources, which impacts use of the land and consumption of traditional foods
- inclusion of an external tailings area in the Project plan

Suncor's stakeholder identification process determined a number of Indigenous communities, in addition to those listed above, that could potentially be impacted by the Project. Through that initial process, the following Indigenous communities may have interest in engagement activities related to the Project:

- Athabasca Landing Community Association (Metis Local 2010)
- Buffalo Lake Métis Settlement
- Conklin Métis Local #193
- Deninu K'ue First Nation
- Driftpile Cree Nation
- East Prairie Métis Settlement
- Fort Resolution Métis Council
- Fort Smith Métis Council
- Gift Lake Metis Settlement
- Hay River Métis Council
- Heart Lake First Nation

- Lakeland Métis Community Association
- Kikino Métis Settlement
- Métis Local 1954 Touchwood Lake/Big Bay Area
- Métis Local 2002 Buffalo Lake
- Métis Local 2097 Lac La Biche
- Métis Nation of Alberta
- Northwest Territory Métis Nation
- Original Fort McMurray/Fort McKay Band/Society/Clearwater River Band #175
- Owl River Métis Community
- Peavine Métis Settlement
- Registered Fur Management Area/TPA 2457 Trapper
- Salt River First Nation
- Smith's Landing First Nation

In addition to those already engaged, more than forty trappers within or adjacent to the Project development area that may be directly affected by Project activities have been identified by Suncor and were notified of the Project development activities and submissions.

Suncor maintains active partnerships with the Indigenous communities of Wood Buffalo. The trust and support of these Indigenous communities are important to Suncor and foundational to successful energy development. As such, Suncor plans to engage early, broadly, and often to enable timely discussions, provide opportunities for Indigenous communities to influence the Project and allow relationships to continue to evolve. Suncor will continue to engage and consult with Indigenous communities throughout the entire lifecycle of the Project. Future engagement activities will vary depending on the nature and extent of impacts on communities, priorities of the individual communities and how individual communities want to be engaged. Suncor recognizes that the Crown has consultation obligations with Indigenous communities that may supplement Suncor's planned engagement practices.

In addition to this ongoing engagement, Suncor will:

- implement an ongoing communication program making use of traditional mail-outs of project information and updates combined with video and conference calls to advance engagement
- provide project-related information through news releases, radio advertisements and the company's website
- provide communication through mail-outs, community newsletters and public meetings
- hold discussions on Project plans to identify issues and seek resolution to concerns
- continue to monitor and respond to messages received at the project email address and the toll-free phone number

Appendix C of the Detailed Project Description provides the complete Summary of Issues as identified by all stakeholders including Indigenous Groups. Issues raised by Indigenous groups in the Summary of Issues, that are over and above those raised during engagement activities described above include the following (note that those marked with an "*" were also raised by jurisdictions and other parties):

- *potential effects to human health and well-being due to increased noise levels from Project activities
- *effects to air quality and to local residents' health and well-being due to increased fugitive dust emissions and concentrations of particulate matter
- *effects to air quality, including cumulative effects due to emissions of criteria air contaminants
- *assessment of the Project greenhouse gas emissions and contribution to climate change

- *clarity on the specific technologies and practices under consideration to reduce the Project greenhouse gas emissions
- *effects on carbon sinks
- description and/or map of existing land disturbances in the area and information on their reclamation plans and how these integrate with the reclamation plan for the Project
- current status of regional and local environmental monitoring and trends including air, water, and sediment quality
- *clarity on whether a joint review of the Project will be conducted with the Mackenzie Valley Resource Management Board
- *clarity on how information from the environmental assessment of the Voyageur South Project will be considered
- *potential effects of the Project and cumulative effects on Wood Buffalo National Park and the Peace-Athabasca Delta
- request that if the Lower Athabasca Regional Plan is referenced that clarity is provided regarding Indigenous perspectives on the document
- *potential effects to drinking and recreational water quality
- *potential effects to the local economy
- *potential for the Project to cause harmful alteration, disruption, or destruction of fish habitat, or death of fish
- *potential effects to fish and fish habitat in Poplar Creek
- potential effects to benthic invertebrate communities
- potential changes to water quality that may result in fish tainting, and effects on fish health and productivity
- *requirement to conduct a Human Health Risk Assessment and a Health Impact Assessment
- *potential human health effects of local and regional degradation of ambient air quality from the Project
- *clarity on consultation and engagement processes with Indigenous groups and local residents
- need for meaningful and collaborative consultation and engagement with Indigenous communities
- need for co-management and positive collaboration between Indigenous groups and the proponent
- need for consultation and engagement with Indigenous communities that follows appropriate consultation protocols
- need for traditional use studies to augment proponent studies
- need to provide Indigenous communities with capacity to support community-specific and project-specific cultural impact assessments
- consideration of existing reports and studies where appropriate
- potential effects of the Project and cumulative effects to Indigenous peoples' culture, connections to the land and interconnectedness with the ecosystem
- potential effects of the Project and cumulative effects to biodiversity and species of cultural importance to Indigenous peoples
- *potential effects of the Project and cumulative effects to Indigenous peoples' health through consumption or use of country foods and medicinal plants
- potential effects of the Project and cumulative effects on the mental health and culture of Indigenous peoples and communities
- potential impacts of the Project and cumulative impacts to Aboriginal or Treaty rights

- need for collaborative development and shared understanding of methodologies for assessing impacts to rights and Indigenous engagement in development of mitigation and accommodation measures
- request that the Agency undertake a regional assessment focused on cumulative effects and sustainability with deliverables being concrete actions and management plans to address cumulative effects and sustainability and to accommodate impacts to rights
- clarity on potential job and training opportunities for Indigenous peoples, including women and youth
- effects of the Project and cumulative effects on the social and economic conditions of Indigenous peoples
- potential effects of the Project and cumulative effects to infrastructure and Indigenous communities due to the influx of workers from outside the region
- effects of the Project and cumulative effects to structures, sites, or things of historical, archaeological, and palaeontological significance to Indigenous peoples
- *potential effects of the Project and cumulative effects on wetlands function, direct loss of wetlands, quality of wetland habitat, and residual effects
- potential effects of the Project and cumulative effects to navigation and safety on the Athabasca River
- *potential effects of the Project and cumulative effects associated with tailings and tailings management
- *potential effects of the Project and cumulative effects related to increased land disturbance, and clarity on the proposed reclamation plan for the Project
- *description of uncertainties regarding regional reclamation success for the Project and related projects
- clarity on whether the reclamation plan for the existing Base Mine will use the newest strategies, technologies, and timelines
- clarity on whether intact pockets of healthy boreal forest within the Project area will be preserved for wildlife habitat and to support future reclamation
- potential effects to the future viability and usability of the Project area for traditional purposes
- *potential effects to forest resources, including cumulative effects, due to the Project on the hydrology of surrounding surface watersheds
- *positive and negative impacts of the Project on diverse groups of people and across the Project's lifecycle
- *potential effects of the Project and cumulative effects to groundwater and surface water quality from dust deposition in waterbodies and soil erosion
- *potential alterations to water table and groundwater elevation from depressurization of basal aquifer
- *potential effects of the Project and cumulative effects to stream flow and water levels, and to sediment quality in the receiving environments due to excavation and the loss of Beaver Creek and Poplar Creek Reservoirs

Suncor believes that there are two issues raised by Indigenous peoples in the Summary of Issues that should not be included in the scope of review. The issues are:

- clarity on whether a joint review of the Project will be conducted with the Mackenzie Valley Resource Management Board to assess potential transboundary effects on water quality and quantity in the Northwest Territories. Suncor notes that this type of assessment has not been conducted for other oil sands projects and believes that review of the Project by the Agency and the Alberta Energy Regulator is sufficient.
- request that the Agency undertake a regional assessment focused on cumulative effects and sustainability with deliverables being concrete actions and management plans to address cumulative effects and sustainability and to accommodate impacts to rights. A Federal regional assessment is a separate process under the *Impact Assessment Act*. This should not be undertaken as part of a review of the Project.

5. STUDIES OR PLANS RELEVANT TO THE PROJECT

The Project is located within the Athabasca Oil Sands Region, an area in which several developments have been the subject of provincial or joint federal-provincial regulatory review. Each of the reviewed developments provided information on environmental conditions within northeastern Alberta. Suncor proposed development in 2007 of the Voyageur South Project in the same general area as the Project. The Voyageur South application was subsequently withdrawn by Suncor; however, data collected as part of baseline information gathering for the development area is of relevance and will be used for the Project.

Other environmental information on the Athabasca Oil Sands Region is available from historic environmental studies as well as a number of ongoing environmental monitoring programs within the proposed development area. Additional environmental policies, plans and knowledge are available from the federal and provincial governments, and through input from regional Indigenous groups. In addition, Indigenous groups have developed reports that are relevant to the Oil Sands Region. These reports, where available, may be relevant to the Project.

The Lower Athabasca Regional Plan 2012 – 2022 (LARP - Government of Alberta 2012) identified strategic directions for the region over a ten-year period, including the responsible development of oil sands resources. As noted in LARP (Government of Alberta 2012, page 23), “The vision describes a desired future state for the Lower Athabasca in which the region’s diverse economic opportunities are balanced with social and environmental considerations using a cumulative management approach. Cumulative effects management focuses on achievement of outcomes, understanding the effect of multiple development pressures (new and existing), assessment of risk, collaborative work with shared responsibility for action and improved integration of economic and social considerations.”

In 2014, a Review Panel was established under the *Alberta Land Stewardship Act* to review the LARP following applications for review by Indigenous groups, including Athabasca Chipewyan First Nation, Mikisew Cree First Nation, Cold Lake First Nations, Onion Lake Cree Nation, Fort McKay First Nation, Fort McKay Métis Nation, and Chipewyan Prairie Dene First Nation. A report was issued in 2015 that describes the Review Panel’s findings.

The Alberta Government also developed a Climate Leadership Plan (Government of Alberta 2018) that outlines climate initiatives. Regional Traditional Ecological Knowledge for Athabasca River water flow and water levels have been completed in the Athabasca Oil Sands Region by Athabasca Chipewyan First Nation and Mikisew Cree First Nation (e.g., Chandler et al. 2010).

While preparing the Detailed Project Description, Suncor communicated with the IAAC to find out whether a regional assessment relevant to the Project existed or is planned. According to the information received from IAAC, no such regional assessment has been or is in the process of being prepared.

6. STRATEGIC ASSESSMENTS RELEVANT TO THE PROJECT

The Athabasca Oil Sands Region, in general, has not been the subject of a federal strategic assessment. However, Suncor is aware of two federal assessments with relevance to the Project. The first is the Strategic Environmental Assessment of Wood Buffalo National Park World Heritage Site (IEC 2018); and the second is the draft Strategic Assessment of Climate Change (Government of Canada 2019b), which will apply to projects that undergo a federal impact assessment under the *Impact Assessment Act*.

The Wood Buffalo National Park Action Plan (Parks Canada 2019), which was informed by the Strategic Environmental Assessment for Wood Buffalo National Park World Heritage Site (IEC 2018), requires that the Outstanding Universal Value of Wood Buffalo National Park is considered in environmental assessments where potential specific or cumulative impacts may occur to Wood Buffalo National Park, including the Peace-Athabasca Delta. The Project impact assessment will include consideration of potential effects of the Project and cumulative effects on Wood Buffalo National Park and the Peace-Athabasca Delta.

The draft Strategic Assessment of Climate Change provides an approach to quantifying the greenhouse gas emissions of projects, including:

- outlining the approach to be used to estimate net and upstream greenhouse gas emissions
- clarifying that downstream emissions will not be assessed
- explaining how avoided emissions and greenhouse gas offsets are to be factored into estimates of greenhouse gas emissions

While preparing the Detailed Project Description, Suncor communicated with the IAAC to find out whether any other strategic assessments relevant to the Project existed or are planned. According to the information received from IAAC, no such strategic assessment relevant to the Project has been or is in the process of being prepared.

PART C: PROJECT INFORMATION

7. PURPOSE OF AND NEED FOR THE PROJECT

The purpose of the Project is to sustain the supply of bitumen to the existing upgraders at Suncor's Base Plant when the mineable bitumen resource at Base Plant is depleted. Bitumen froth production from the Project is required in 2030 to support safe and stable upgrader operations as production transitions from Base Plant.

The Project is needed to:

- realize the value of a responsibly produced strategic oil resource that helps to meet ongoing global energy needs and provides energy security for Canada
- sustain socio-economic benefits and employment
- support Natural Resource Canada's vision of "Improving the quality of life of Canadians by creating a sustainable resource advantage" (Natural Resources Canada website [<https://www.nrcan.gc.ca/nrcan/about-us/10838>] accessed January 9, 2020)

The potential benefits of the Project include:

- continuing the use of existing oil sands processing facilities at the Base Plant
- creating value from Canada's oil sands resources, proximal to existing Suncor facilities and infrastructure
- generation of significant socio-economic benefits and opportunities for Indigenous communities, local communities, the Province of Alberta, and Canada, including continued generation of municipal, provincial, and federal tax and royalty revenue, continued direct local and national employment, as well as indirect and induced provincial and national economic benefits and employment
- fostering opportunities to implement innovations that are currently being developed and enabling ongoing investment in research and development
- providing stable revenue that can be reinvested in assets that support the transforming global energy economy
- creating value for Suncor's shareholders
- satisfying the Alberta Energy Regulator's mandate to "ensure(s) the safe, efficient, orderly, and environmentally responsible development of oil, oil sands, natural gas, and coal resources over their entire life cycle" (Alberta Energy Regulator website [<https://www.aer.ca/providing-information/about-the-aer/who-we-are>] accessed January 9, 2020)

8. PROVISIONS IN THE SCHEDULE TO THE *PHYSICAL ACTIVITIES REGULATIONS* (PROJECT LIST)

The relevant provision, Section 25 of Schedule 2, to the *Physical Activities Regulations* is:

“The expansion of an existing oil sands mine, if the expansion would result in an increase in the area of mining operations of 50% or more and the total bitumen production capacity would be 10 000 m³/day or more after the expansion.”

The development area of existing mining operations is approximately 23 thousand hectares. The Project development area is expected to be approximately 30 thousand hectares, which represents an increase in the area of mining operations that is greater than 50%. The Project will not increase total bitumen production capacity. Total production is currently higher than 10 thousand cubic metres per day.

In the Initial Project Description, the term “development area” only considered the Project disturbance footprint, which was approximately 20 thousand hectares. The term “Project development area” used in this document considers both the Project disturbance footprint and corresponding buffer. As such, the Project development area has increased from approximately 20 thousand hectares to approximately 30 thousand hectares since described in the Initial Project Description. The reasons for this increase include:

- areas between the planned diversion channels associated with the Project and the Project disturbance footprint have been included in the development area, which allows for consideration of direct and indirect effects to these areas – added approximately 4 thousand hectares
- a 500 metre buffer was added to the planned Project disturbance footprint to account for potential adjustments that could occur as design of the Project continues – added approximately 6 thousand hectares.

9. CONSTRUCTION, OPERATION, AND DECOMMISSIONING ACTIVITIES

Key activities for the Project include oil sands mining, bitumen froth production, tailings management and reclamation activities. The Detailed Project Description describes the Project oil sands mining, extraction, tailings, and reclamation processes, providing context for the infrastructure, structures and physical works during the construction, operation, and decommissioning phases. The existing Base Plant Emergency Response Plan will be modified or adopted for the Project construction, operation and decommissioning phases.

The Project will integrate with existing water, power, heat, and fuel utilities and use existing approved secondary extraction and upgrading facilities at the Base Plant. Infrastructure associated with the Project includes plant site buildings, mining infrastructure, and related linear infrastructure. The Project will include buildings to accommodate direct staff and support services on the Project footprint. Maintenance and emergency services will have facilities on the Project footprint intended to provide most of support services required. Some existing support services may remain located at the Base Plant. The existing infrastructure, structures and physical works that will be operated in association with the Project are described in the Detailed Project Description.

Access to the Project during construction will be via the existing AOSTRA road and the Highway 63 overpass until the permanent access road is constructed. Plans will be developed as the application progresses to address third party infrastructure timing and relocation requirements. For any additional third party infrastructure that may be required, Suncor will make specific applications under relevant legislation prior to Project construction.

Decommissioning includes facility removal and final reclamation of the Project site.

10. ESTIMATE OF MAXIMUM PRODUCTION CAPACITY AND DESCRIPTION OF PRODUCTION PROCESSES

The Project is expected to produce up to 80 million barrels per year (nominally 225 thousand barrels per day) of bitumen froth during its estimated 25-year operational life.

The Project is an open pit mine and Suncor plans to employ the best available oil sands development practices. Ore is mined with large mine shovels and transported by mine trucks to the Ore Preparation Plant where the ore is crushed and mixed with warm process water. The resultant slurry is transported by pipeline to the Primary Extraction Plant where a bitumen froth is produced and is subsequently transported by pipeline to the existing Base Plant secondary extraction facility. Tailings from both the primary and secondary extraction operations for the Project will be managed on the Project site. The conceptual layout for the Project and its location relative to the existing Base Plant are shown in Figure 2.

The key processes and produced materials for the Project include:

- **Excavation** – Large mine shovels dig and load oil sands and overburden into mine trucks. Overburden is located above the oil sands and must be removed before the oil sands can be mined.
- **Transportation of Mined Materials** – Mine trucks transport material to assigned destinations. Overburden is transported to construction projects such as roads, dams, and overburden disposal areas. Oil sands are transported to the Ore Preparation Plant where it is crushed to reduce the occurrence of lumps in the oil sands prior to slurry preparation.
- **Ore Slurry Preparation** – Warm water is added to the crushed oil sands to create a slurry that is transported via pipeline to the primary extraction plant.
- **Primary Extraction** – This stage involves the separation of bitumen from the slurry, producing a bitumen froth. The bitumen froth is subsequently transported by pipeline to the secondary extraction facility at Suncor's existing Base Plant. The remaining material (primary extraction tailings) is transported by pipeline to a tailings area for disposal at the Project (see Coarse Tailings).
- **Secondary Extraction** – This stage involves the addition of a light hydrocarbon (naphtha) to clean the bitumen by removing residual minerals and water before the bitumen is transported by pipeline to upgrading for further processing. The residual minerals and water are treated to recover the light hydrocarbon before being transported by pipeline to a tailings area at the Project for disposal.
- **Coarse Tailings** – The primary extraction tailings are comprised of water, sand, clay, and residual hydrocarbon. This material is deposited in a tailings area, whereby the sand, some clay and some water quickly separate to form a coarse tailings deposit.
- **Fluid Tailings** – The disposal of coarse tailings in a tailings area results in the natural separation of fluid tailings, comprised primarily of water with suspended fine minerals. Over time, the fine clay minerals in the fluid tailings settle while water rises to the surface. This water is recycled for re-use in the extraction process.
- **Treated Tailings** – The fluid tailings are transferred to a dedicated disposal area within a mined-out area of the mine pit for treatment and deposition. The treatment promotes rapid settlement and expression of water using coagulants and flocculants. This water is recycled for re-use in the extraction process. Treatment of fluid tailings accelerates the reclamation process for the fluid tailings stream.
- **Reclamation** – Disturbed areas are reclaimed progressively as the necessary reclamation criteria are met. The final landscape is expected to be a mix of uplands, wetlands, lakes, and streams. The closure drainage system will be designed to convey water via streams to lakes and wetlands prior to release to the surrounding environment, subject to meeting approved water release criteria.

REFERENCE(S)

PROJECT
BASE MINE EXTENSION

TITLE
**PROPOSED PROJECT DEVELOPMENT AREA WITH
CONCEPTUAL LAYOUT**

CLIENT



YYYY-MM-DD	2020-07-14
DESIGNED	JG
PREPARED	PT
REVIEWED	ZG
APPROVED	JH

PROJECT NO.
19124718

PHASE

REV.
0

FIGURE 2

11. ANTICIPATED SCHEDULE FOR THE PROJECT

The anticipated schedule for the Project is to undertake and complete the regulatory process between 2019 and 2026. Construction of the Project is planned for 2026 to 2030, with operations scheduled for 2030 to 2055. Decommissioning of the Project is expected to start in 2055.

12. POTENTIAL ALTERNATIVE MEANS AND ALTERNATIVES TO THE PROJECT

The purpose of the Project is to sustain the supply of bitumen to the existing upgraders at Suncor's Base Plant facility when the mineable bitumen resource at Base Plant is depleted. Bitumen froth production from the Project is required in 2030 to support safe and stable upgrader operations as production transitions from Base Plant to the Project.

Alternatives to the Project include development of a different Suncor-owned oil sands lease, and import of bitumen from existing bitumen production operations, which could be Suncor-owned or owned by other operators.

Suncor has a long history in the oil sands industry, starting in 1967, during which there have been numerous advances made in technology to increase the health and safety of personnel, production and operations efficiency, and improve the economics of its operations.

Suncor utilized bucketwheel excavators and overland conveyor systems to mine and transport the oil sands to the extraction facilities at Base Plant until the early 1990s. A major shift to the use of large mine haul trucks and shovels for the transport of all mine materials occurred in the 1990s. Although variations of the truck and shovel mining method have been evaluated for many years, this mining method continues to be proven as the most efficient, productive, and economic to meet the demands of oil sands operations. Current operations at Base Plant are incorporating autonomous mine trucks to improve productivity, and health and safety. This technology will be utilized for the Project. This will provide an experienced pool of personnel for operations and maintenance and best practices as the mining and primary extraction operations shift from the Base Plant to the Project.

The primary extraction technology chosen for the Project is the same as the current Base Plant technology as this continues to be an effective technology to maximize bitumen recovery. Suncor will be evaluating waterless or near waterless technology in the coming years. If successful, this technology may be used for the Project at a future date but will not be available in time for this regulatory application process.

Integration of the Project with Base Plant assets is planned to be limited to the existing secondary extraction, bitumen upgrading processes and utilities, including the river water intake, hot water, and steam, downstream of the Project's primary extraction facility. This level of integration maintains the current Base Plant oil sands operation and reclamation schedule as planned and approved, unimpeded by the Project activities.

Suncor has invested significant time and expense to improve tailings management to increase long term reclamation certainty. The current processes utilized at the Base Plant for the management of fluid tailings have been tested and proven to be effective at improving performance during operations and for the final landscape at closure. These technologies, which include the Tailings Reduction Operations (TRO; started in 2009) and Permanent Aquatic Storage Structure (PASS; started in 2018), utilize coagulants and flocculants to accelerate settlement of the fines in the fluid tailings (see Glossary in Appendix B). The Project will use the PASS technology.

The use of PASS for the treatment of fluid tailings enables an aquatic closure landscape to be developed for treated fluid tailings that are deposited in the mined-out pit. The aquatic closure landscape is expected to manage the settlement rates of fluid tailings more effectively than terrestrial landscapes, improving certainty of achieving closure goals and timelines.

The reclamation methods and practices that have been developed and refined on the Base Plant operation will be utilized for the Project. These proven methods and practices are effective at achieving planned reclamation targets.

Suncor continues to evaluate new technologies that may have one or more benefits, including improvement of operational performance, reduction of the overall footprint, acceleration of reclamation timelines, and/or reduction of greenhouse gas emissions associated with operations. Suncor will work with groups like Canada's Oil Sands Innovation Alliance, communities, regulators, and stakeholders to share information as development is advanced.

PART D: LOCATION INFORMATION AND CONTEXT

13. GEOGRAPHIC INFORMATION

The Project, as shown in Figure 1, is located north of the city of Fort McMurray, Alberta, within the Regional Municipality of Wood Buffalo, approximately three kilometres north of the Fort McMurray Urban Development Sub-Region boundary on the west side of Highway 63, in Township 92, Ranges 9-11, West of the 4th Meridian; Township 91, Ranges 9-11, West of the 4th Meridian; and Township 90, Ranges 9-11, West of the 4th Meridian. Fort McKay, which is approximately 21 kilometres north, and Anzac, which is approximately 50 kilometres south, are other communities located near the Project development area.

The Project is located adjacent to two active open pit mining operations: west of the Base Plant and south of Syncrude Mildred Lake operations, as shown in Figure 2, and in an area where Traditional Land Use is practiced. There are five potential trapper cabins close to the Project development area that will be validated with owners during consultation. There are five temporary worker camps within the Project development area and three located within two kilometres of the Project development area.

The Project will be developed on the following mineable Oil Sands Leases under the Alberta *Mines and Minerals Act*: 7280060T23, 7406090415, 7414060262, 7411060938, 7411060939, and 7405080346.

The development area for the Project is approximately 30 thousand hectares in size, with the centre of the development being located at Latitude 56° 53' 37.51" and Longitude 111° 35' 23.51" (Figure 2).

There are several Indigenous communities with reserve lands located within a 200-kilometre radius of the Project. The reserve lands closest to the Project are Fort McKay First Nation, which are approximately 14 kilometres away. No portion of the Project development will occur on federal lands. In addition to the reserve lands described above, the closest federal lands to the Project are Wood Buffalo National Park, which is located approximately 120 kilometres north of the Project.

14. PHYSICAL AND BIOLOGICAL ENVIRONMENT

The Project is located in the Central Mixedwood natural subregion (Natural Regions Committee 2006). This subregion is spatially the largest in the province covering 25% of Alberta's land area. The cool boreal climate regime is conducive to the growth of mixed aspen-spruce forests. The Central Mixedwood subregion contains a significant component of wetlands in poorly drained areas. The topography of the Project development area generally has subdued relief, with nearly level to gently rolling topography.

The Project is located in the Athabasca Oil Sands Region, which is generally described as having a cool, continental climate. Three Environment Canada stations, using data from 1971 to 2000, are used to represent the range of climate conditions in the region: Fort Chipewyan (north), Fort McMurray (central) and Cold Lake (south).

Similar wind patterns are observed at Fort Chipewyan, Fort McMurray, and Cold Lake. There is a general east-west wind pattern at all stations; however, east-northeasterly winds are observed more frequently at Fort Chipewyan, while east-southeasterly winds are observed more frequently at Fort McMurray. Calm conditions occur 16% of the time at Fort Chipewyan, 17% of the time at Fort McMurray and 13% of the time at Cold Lake.

Similar temperatures are observed at all stations during the summer months. The average temperature in July is 17 degrees Celsius. There are greater differences during the winter months when Fort Chipewyan is about 4 degrees Celsius cooler than Fort McMurray and Cold Lake is about 2 degrees Celsius warmer than Fort McMurray. The lowest winter temperatures occur in January where the average temperatures are -24.2 degrees Celsius at Fort Chipewyan, -19.8 degrees Celsius at Fort McMurray and -17.5 degrees Celsius at Cold Lake. The average annual temperature is -2.1 degrees Celsius at Fort Chipewyan, 0.2 degrees Celsius at Fort McMurray and 1.4 degrees Celsius at Cold Lake.

The Project is located within the Lower Athabasca Region of Alberta primarily on provincial Crown lands that are administrated under the Alberta *Public Lands Act*. As discussed in Section 13, the Lower Athabasca Regional Plan 2012 – 2022 (LARP - Government of Alberta 2012) identified strategic directions for the region over a ten-year period, including the responsible development of oil sands resources. The current zoning designation is rural district. Zoning designations for the Project are shown in Figure 1.

The Project development area includes several existing land uses, including oil and gas, recreation (including fishing, hunting, using all-terrain vehicles, snowmobiling, and canoeing), trapping, traditional uses, and timber harvesting. The Project development area contains both privately owned and provincial Crown surface rights. Geological exploration drilling has taken place at various times within the Project development area since the 1940s. Much of the Project development area was impacted by a wildfire that burned through the area in May 2016.

Project development area and regional valued components identified previously include:

- sport and forage fish species such as Arctic grayling, burbot, goldeye, lake whitefish, mountain whitefish, northern pike, yellow perch, longnose sucker, white sucker, brook stickleback, emerald shiner, fathead minnow, brassy minnow, finescale dace, flathead chub, lake chub, northern redbelly dace, pearl dace, trout-perch, spoonhead sculpin and slimy sculpin
- terrestrial vegetation including white spruce, jack pine, aspen or mixed stands of aspen, white spruce, balsam poplar and/or white birch
- forested and non-forested wetlands types
- old growth forest areas

Valued wildlife species include those of ecological significance or with status both nationally and provincially, including moose, black bear, beaver, muskrat, fisher, lynx, woodland caribou, Canadian toad, ducks and geese, old growth forest birds, marsh birds (e.g., yellow rail), mixedwood forest birds, boreal owl and whooping crane.

A description of the approach and methodology that will be undertaken to define baseline conditions for biophysical components is provided in Appendix E of the Detailed Project Description.

15. HEALTH, SOCIAL, AND ECONOMIC CONTEXT

A description of the approach and methodology that will be undertaken to define baseline conditions for health, social and economic components is provided in Appendix E of the Detailed Project Description.

15.1. Health

The Project is located in the Alberta Health Services North Zone, which was formed in 2009 and includes the former Northern Lights Health Region, the Aspen Health Region, and the Peace County Health Region.

The North Zone is the largest health zone in Alberta. While the Project is in the North Zone, much of the health-related research was conducted in the previous Northern Lights Health Region but is still considered relevant for the Project.

The Royal Society of Canada produced a report in 2010 on the oil sands that includes information on health status within the Northern Lights Health Region (RSCEP 2010). The report indicates that the Northern Lights Health Region has a less favourable health status than the provincial average for a number of

indicators, such as prevalence of diabetes, substance-related disorders, mortality due to homicide and motor vehicle collisions, and sexually transmitted infections. The Northern Lights Health Region also has the lowest availability of medical doctors among similarly sized centres (RSCEP 2010).

A comparison of cancer rates in the North Zone to the provincial average is provided by Alberta Health Services in the *2019 Report on Cancer Statistics in Alberta* (AHS 2019). The report indicates that between 2012 to 2016, there were no statistically significant differences in the age-standardized incidence rates for all cancers (per 100 thousand population, all ages) between the North Zone and the provincial average.

15.2. Socio-Economics

Development of the Regional Municipality of Wood Buffalo (RMWB), and Fort McMurray in particular, has been tied to the development of the oil sands. Prior to commercial development of the oil sands industry, the region's economy was reliant on its function as a transportation thoroughfare to regions further south, and on traditional resource industries such as hunting, fishing, trapping and forestry.

Large-scale development of the region's oil sands resource began in the mid-1960s and helped lead to several significant changes over the next five decades. The following information highlights periods of substantial change in regional socio-economic conditions, often driven by development of the oil sands industry.

Early 1960s to 1986 - The construction and subsequent operation of the Great Canadian Oil Sands Plant (now Suncor Energy Inc.) in the 1960s, followed by the Syncrude Mildred Lake operation in the 1970s, ushered in the first period of rapid growth. The regional population grew from about 2,600 in the early 1960s to approximately 37 thousand by 1986. This rapid population growth placed pressure on several local services and infrastructure.

1986 to the late 1990s - The next wave of development faltered in the early 1980s under pressure of technical challenges, rising costs, and depressed product prices. Employment in the oil sands during this timeframe was stable or marginally declining. By 1999 the population of Fort McMurray remained virtually unchanged from 1986.

Late 1990s to 2008 - Construction and sustaining capital expenditures in the province's oil sands industry increased from \$1.5 billion in 1998 to over \$18 billion in 2008. This expansion resulted in employment growth as the number of workers more than doubled, driving rapid population growth in the region, leading to high demand for regional infrastructure and services. The resident population of Fort McMurray increased from approximately 36 thousand in 1999 to over 70 thousand by 2008. In the mid to latter part of the 2000's, the increase in oil sands projects being proposed further north of Fort McMurray led to the development of several permanent work camps to support ongoing operations.

2008 to 2011 – A number of oil sands projects were halted in response to the global financial and debt crisis, leading to a drop of nearly 40% in annual construction and capital expenditures in the province's oil sands industry between 2008 and 2009. As a result of this slowdown, growth in the region moderated. The population in Fort McMurray grew by an estimated 3% per year between 2008 and 2010. Between 2010 and 2012, the urban population remained virtually unchanged. The reduced population growth provided infrastructure and service providers an opportunity to catch up, in part, on earlier demand (i.e., pre-2008).

2012 to 2015 - Rebounding oil prices drove stronger than anticipated increases in oil sands investments. Some projects that were halted in 2008/2009 were back on track by the end of 2011. As a result, the resident population in Fort McMurray grew by over 10% between 2012 and 2015, reaching an approximate population of 80 thousand. The region appeared poised for another extended period of growth driven by expansion of the oil sands industry.

2015 to Present - In late 2014, oil prices declined rapidly, falling over 50% by year's end. This led to a retraction of economic activities and a worsening economic environment. Many oil sands producers shelved future expansion projects in favour of streamlining existing operations, including implementing operational workforce reductions. Fort McMurray and surrounding areas was also severely affected by a large wildfire in 2016 that forced the rapid evacuation of the community and destroyed thousands of homes and other structures. As a result, the region's permanent population decreased nearly 9% between 2015 and 2018.

The RMWB is a relatively large and diverse municipality, principally comprised of:

- Fort McMurray, a regional service centre with a permanent population of approximately 72 thousand in 2018
- smaller rural communities with a combined permanent population estimated at approximately 3 thousand in 2018
- a shadow population estimated at over 36 thousand, with approximately 90% of this population housed in temporary worker dwellings (i.e., camps)
- an on-reserve population estimated at just over 1,700 in 2016

Fort McMurray has grown over time from a relatively small, isolated northern town with few amenities into one of Alberta's larger urban centres. This transition means that the breadth and nature of services and infrastructure in the community have also grown. Today, Fort McMurray offers a range of health, education, social, recreation, and cultural amenities and services that are commensurate with a community of its size. In addition, several of the hamlets within the Regional Municipality of Wood Buffalo also have local community and recreation facilities to support residents in those communities.

Drawing on available demographic data over a period of approximately 20 years, several key elements of the region's current social environment were identified, including:

Relatively young population - Ample work opportunities over the past two decades have attracted relatively young workers to the region which has helped to keep the median age in Fort McMurray (33.1) below both the provincial and national averages. However, with the recent economic slowdown, the median age in the community has increased slightly as the number of people aged 15 to 29 has decreased.

Relatively diverse population - There are a relatively larger number of Indigenous people in the region as well as many different ethnic communities that call Fort McMurray home. These demographic factors influence the types of programs and services needed by residents as well as the way they need to be delivered (e.g., different educational and cultural backgrounds).

Relatively large shadow (i.e., non-resident) population - Although the majority of the shadow population are housed in temporary worker dwellings (i.e., camps), there are approximately two thousand additional people who stay in residential accommodations (e.g., houses, apartments, condos) and approximately 1,600 people who stay in non-residential accommodations (i.e., hotels and motels) when working in the region.

PART E: FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS OR MUNICIPAL INVOLVEMENT AND EFFECTS

16. FINANCIAL SUPPORT FROM FEDERAL AUTHORITIES

The Project is planned with no proposed or anticipated federal financial support.

17. FEDERAL LAND USED FOR PROJECT

No federal lands will be used for the Project.

18. LIST OF PERMITS, LICENSES OR AUTHORIZATIONS REQUIRED IN RELATION TO THE PROJECT'S ENVIRONMENTAL EFFECTS

The Alberta Energy Regulator, established under the *Responsible Energy Development Act*, has jurisdiction for provincial permits or authorizations that may be required to carry out the Project pursuant to the *Oil Sands Conservation Act*, the *Water Act*, and the Alberta *Environmental Protection and Enhancement Act*. The Historic Resources Management Branch under Alberta Culture, Multiculturalism and Status of Women has provincial jurisdiction for assessment of impacts to archaeological sites, paleontological sites, historic buildings, and traditional use sites pursuant to the *Historical Resources Act*.

Federally, a decision statement will be required from the Impact Assessment Agency of Canada. Additionally, Fisheries and Oceans Canada has duties related to the assessment of effects and authorization of impacts to fish and fish habitat pursuant to the *Fisheries Act*. Potential changes to the environment or to health, social or economic conditions that may occur in Canada that are directly linked or necessarily incidental to the involvement of a federal authority that would permit or enable the Project to be carried out in whole or in part could include changes associated with Fisheries Offsetting options located outside of the proposed Project development area.

In addition to the jurisdictions listed above that are related to environmental effects, Suncor would also acquire permits from other agencies, as required. Other jurisdictions listed in the Initial Project Description, such as Environment and Climate Change Canada, were included because they may have duties or functions related to the review of the Project Environmental Impact Statement; however, they are not included above as they do not issue permits, licenses or authorizations.

PART F: POTENTIAL EFFECTS OF THE PROJECT

Suncor has an extensive history with project development and operation in the Athabasca Oil Sands Region. This history has afforded Suncor with a unique perspective of the key issues associated with oil sands project development and operation. The knowledge on key issues is gained through experiences with its own projects and through participation in project application reviews and regulatory hearings, or through collaborative efforts among Suncor and fellow operators.

Further knowledge on key issues associated with project development in the Athabasca Oil Sands area has come directly through the submission, review and finalization of project applications that go through regulatory reviews. Suncor has had more than eleven oil sands mine-related projects that have gone through formal regulatory reviews, including two involving both federal and provincial regulatory hearings (i.e., Project Millennium and Voyageur Project). Suncor has also participated in several regulatory hearings for oil sands projects by other proponents.

An important component of the knowledge Suncor has on key issues comes from its long and extensive history of working with the Indigenous communities and groups that reside in the Regional Municipality of Wood Buffalo. Additional input has been gained through Suncor's extensive history with research and monitoring programs in the Athabasca Oil Sands area, including both Suncor's own efforts, as well as those it has undertaken cooperatively with other industry members, Indigenous groups, and regulatory teams.

The key issues that will be addressed as part of the Project will be finalized through the planned consultation process for the Project. Based on its experience, Suncor believes the key social and environmental issues to be addressed as part of the Project impact statement will include:

- Positive and negative social effects, including those on:
 - population
 - housing and workforce
 - social and municipal infrastructure
 - traffic and navigation
 - community well-being
 - archaeology

- Positive and negative economic effects, including those on:
 - employment levels and staffing pressures
 - economic effects at local, provincial, and national levels, including taxes and royalties
- Positive and negative environmental effects, including those on:
 - air quality, including odours and dust
 - greenhouse gas emissions
 - climate change effects on the Project
 - air emissions and their effects on water quality, wildlife, vegetation, and soils
 - noise and light
 - water quantity and quality for both groundwaters and surface waters, including flows and water levels in the Athabasca River
 - aquatic health
 - fish and fish habitat
 - soils
 - vegetation, including wetlands and old-growth forests
 - wildlife, including species at risk and other wildlife
 - wildlife health
 - biodiversity
 - pace and outcomes from reclamation, considering sustainable ecosystems and end land uses
 - sustainability
- Positive and negative human health effects, including those on:
 - human health risks related to air quality, noise, water quality and food quality
 - health-related social infrastructure
- Effects of potential accidents and malfunctions
- The role of the Project within Canada's environmental and climate obligations
- Project's contribution to sustainability

The evaluations of social effects will include the application of GBA+ to the analysis to describe disproportionate effects for diverse subgroups.

A description of the approach and methodology that will be undertaken to assess the potential effects of the Project is provided in Appendix E of the Detailed Project Description. Included as integral parts of the component assessments will be identification of mitigation and monitoring plans or programs appropriate to the predicted effects identified for the component.

19. POTENTIAL CHANGES TO COMPONENTS OF ENVIRONMENT WITH LEGISLATIVE AUTHORITY OF PARLIAMENT

The development of the Project may impact fish and aquatic habitat due to the diversion or elimination of waterbodies and watercourses in the Project development area. Potential changes in water quality may result in fish tainting, effects on fish health, productivity, and population. The development of the Project is not expected to impact aquatic species at risk.

The development of the Project may impact wildlife (including species listed in the *Species at Risk Act*) and wildlife habitat. Potential impacts may result in changes to wildlife habitat, wildlife availability, movement, health, and populations.

The development of the Project may impact species designated under the *Species at Risk Act* or the *Migratory Birds Convention Act*. Potential impacts to migratory birds may result in changes to habitat (including breeding, foraging and stopover areas), direct and indirect mortality, abundance, and diversity.

The hydrology and water quality assessment will evaluate potential impacts on water quantity and quality in Wood Buffalo National Park.

20. POTENTIAL CHANGES TO THE ENVIRONMENT ON FEDERAL LANDS AND LANDS OUTSIDE ALBERTA AND CANADA

The Project is not expected to result in direct physical changes to reserve lands and federal lands because no portion of the Project development will occur on reserve lands or federal lands. The potential impacts to air quality, hydrology and water quality may have indirect impacts on reserve lands or federal lands. The air quality assessment will evaluate potential impacts on ambient air quality, based on proximity of the Project to reserve and federal lands. The hydrology and water quality assessment will evaluate potential impacts on water quantity and quality in Wood Buffalo National Park.

The Project is not expected to result in direct physical changes outside of Alberta. The air quality assessment will evaluate trans-boundary impacts on ambient air quality, based on proximity of the Project to the Alberta/Saskatchewan border. The hydrology and water quality assessments will evaluate potential trans-boundary impacts on water quantity and quality to the Alberta/Northwest Territories border.

The Project is not expected to result in changes outside of Canada.

21. IMPACT TO INDIGENOUS PEOPLES – PHYSICAL AND CULTURAL HERITAGE, CURRENT USE OF LANDS AND RESOURCES FOR TRADITIONAL USE, AND HISTORICAL, ARCHAEOLOGICAL, AND PALEONTOLOGICAL RESOURCES

Suncor is engaging with Indigenous peoples to determine the potential impacts to physical and cultural heritage due to the Project. Concerns raised by Indigenous peoples during ongoing engagement activities are listed in Section 4.

The Project may result in impacts to Indigenous peoples, Treaty Rights and Traditional Uses through potential changes to land access, loss of traditional lands and ability to hunt, fish, gather and/or trap as well as the ability to practice their culture.

Structures, sites, or things that are of historical, archaeological, paleontological, or architectural significance to Indigenous peoples within the Project development area may be impacted by development of the Project. These will be identified through ongoing engagement and consultation with potentially impacted Indigenous peoples.

Suncor's response to input received from the review of the Initial Project Description and identified potential impacts to Indigenous peoples on physical and cultural heritage, Indigenous rights, traditional land use, historical, archaeological and paleontological resources is provided in Appendix C of the Detailed Project Description.

22. IMPACT TO INDIGENOUS PEOPLES – SOCIAL, ECONOMIC AND HEALTH CONDITIONS

Suncor is engaging with Indigenous peoples to determine the potential impacts to health, social and economic conditions due to the Project. Concerns raised by Indigenous people during ongoing engagement activities are listed in Section 4. Through past engagement, Suncor understands that there are both positive and negative impacts to social, economic and health conditions to Indigenous peoples due to oil sands development.

Key socio-economic issues raised by Indigenous groups through previous engagements on Suncor-related initiatives as well as through review of the Initial Project Description include:

- the ability to participate in employment and business opportunities (for individuals, as well as Indigenous communities)
- the effect of developments on traditional lands and ways of life / culture
- the effects of developments on Indigenous people's health and well-being
- contribution of the Project to cumulative effects already being experienced in the region
- impacts to physical infrastructure in the region, including housing affordability and roads / traffic levels and related impacts to road safety
- impacts to social infrastructure and ability to access needed services (health, education, social, emergency, policing) for Indigenous communities
- changes in social conditions brought on by population change in the region

Suncor's response to input received from the review of the Initial Project Description and how identified issues for impacts to Indigenous peoples on social, economic and health conditions will be addressed is provided in Appendix C of the Detailed Project Description.

Suncor will continue to engage with Indigenous peoples, seek to identify specific impacts to economic, social and health conditions and incorporate into ongoing assessment work and planning for the Project.

The evaluations of Project-related impacts to social, economic and health conditions for Indigenous peoples will include the application of GBA+ to describe disproportionate effects for diverse subgroups. Included as integral parts of the assessments will be identification of mitigation and monitoring plans or programs appropriate to the predicted effects associated with the Project that are identified for the social, economic and health conditions.

23. ESTIMATE OF POTENTIAL GREENHOUSE GAS EMISSIONS

An initial estimate of annual greenhouse gas emissions associated with the Project has been developed based on previously modelled estimates for other Suncor operations. The initial estimate is approximately three million tonnes of carbon dioxide equivalent annually over the life of the Project.

Detailed information on the estimated greenhouse gas emissions from the Project, as well as an assessment of those emissions and how they contribute to climate change, would be provided following the guidance in the draft Strategic Assessment of Climate Change (Government of Canada 2019b).

24. TYPES OF WASTE AND EMISSIONS GENERATED BY PROJECT

Land - For all phases of the Project, wastes that may be generated in or on the land during any phase of the Project include regulated and non-regulated waste products. The management plan for Project wastes will be based on successful practices now in place at Base Plant. Non-regulated domestic and industrial waste products will be managed through approved landfills, which may be located at the Base Plant. Regulated waste products including chemical liquid wastes, inorganic compounds, bitumen sludge, flammable and corrosive liquids, dipentene, methanol, and paints are disposed of through third party waste management facilities. Recyclable and reclaimable materials include, but are not limited to aerosols, batteries, containers, cardboard, tires, and scrap metal. End destinations for these materials will vary by material type.

Air - Air emissions that may be associated with any phase of the Project include oxides of nitrogen emissions from the mine fleet and combustion sources. Volatile organic compounds and other hydrocarbon emissions are expected from mine fleet exhaust, the mine pit area, extraction operations and tailings areas. Potential sources of total reduced sulphur and hydrogen sulphide include the groundwater management system and tailings areas. Particulate matter emissions are expected from site clearing, mining and tailings areas, and combustion sources. Greenhouse gases are also expected from combustion sources and tailings areas on the Project development area. As the Project is designed to sustain the supply of bitumen to Base Plant, annual air emissions from Base Plant operations are not expected to increase because of Project activities.

Water - Waste is not expected to be generated in or on water during any phase of the Project. All liquid wastes and water-carried waste that result from industrial processes related to Project activities are managed within a closed-circuit system and will not be released to the environment without appropriate management and approvals.

APPENDIX A

References

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APPENDIX B

Abbreviations, Acronyms and Glossary

ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Definition
%	percent
\$	dollars (Canadian)
e.g.,	for example,
GBA+	Gender Based Analysis Plus
IAAC	Impact Assessment Agency of Canada
i.e.,	that is,
LARP	Lower Athabasca Regional Plan
PASS	Permanent Aquatic Storage Structure
RMWB	Regional Municipality of Wood Buffalo
TRO	Tailings Reduction Operations

GLOSSARY

Term	Definition
Base Mine	Mining operations (Lease 86/17, Steepbank Mine, Millennium Mine, and North Steepbank Extension Mine) that are part of Base Plant.
Base Plant	Suncor's existing oil sands processing plant and associated mines (Lease 86/17, Steepbank Mine, Millennium Mine, and North Steepbank Extension Mine).
Base Plant Facilities	Oil sands processing plants and facilities that are part of Base Plant.
Bitumen	A highly viscous, tar-like, black hydrocarbon material having an American Petroleum Institute gravity of about 9 (specific gravity about 1.0). It is a mixture of complex organic compounds.
Bitumen Froth	Air-entrained bitumen with a froth-like appearance that is the product of the primary extraction process.
Bitumen Froth Production Facilities	A collective term used to describe the ore preparation plant and primary extraction facilities.
Boreal Forest	Forest growing in high-latitude environments where freezing temperatures occur for six to eight months and in which the trees can reach a minimum height of 5 metres and a canopy cover of 10 percent. The Boreal Forest areas are covered in forested lands that are made up of trees, such as pine, spruce, larch (tamarack), fir, poplar, and birch. The boreal forest also includes lakes, rivers, and wetlands. It is home to an extensive range of mammals, birds, insects, fungi, and micro-organisms.
Coarse Tailings	Coarse tailings, a subset of primary extraction tailings, is comprised of approximately 71 to 76 weight percent coarse particles (sand), 18 to 22 weight percent water, and 5 to 10 weight percent fine particles (clays).
External Tailings Area	A tailings area that is located outside the mine pit. External Tailings Areas are enclosed by dams made with tailings and overburden materials.
Fisheries Offsetting Plan	A plan to compensate for the effects of a project on productive fish habitats to help maintain and enhance the sustainability and ongoing productivity of downstream fisheries.

Term	Definition
Fluid Tailings	Fluid tailings is a subset of the coarse tailings stream, comprised of fine particles, water and bitumen, that is not captured within the coarse tailings matrix at deposition, and collects within the tailings area separate from the coarse tailings. Fluid Tailings contain more than 5 weight percent suspended solids and has an undrained shear strength that is less than 5 kilopascals (as per Alberta Energy Regulator Directive 085 – Fluid Tailings Management for Oil Sands Mining Projects).
Greenhouse Gas	Gases such as carbon dioxide (CO ₂), water vapour, methane (CH ₄), nitrous oxide (N ₂ O), and other trace gases which trap heat in the atmosphere, producing the greenhouse effect.
Hydrogen Sulphide	Hydrogen sulphide is a chemical compound with the formula H ₂ S. It is a colourless chalcogen hydride gas with the characteristic foul odour of rotten eggs.
Lower Athabasca Regional Plan	The Lower Athabasca Regional Plan (LARP) is a comprehensive, forward-thinking, and legally binding roadmap that enhances the Alberta government's environmental management, addresses growth pressures, and supports economic development. It is the first of seven regional plans committed to under Alberta's innovative Land-use Framework. The regional plan considers the cumulative effects of all activities on air, water and biodiversity. It establishes new environmental frameworks with limits to protect air and surface water quality and increases the total conserved land within the region to more than two million hectares.
Mine Pit	The areas where oil sands ore are mined.
Oil Sands Deposit	A sand deposit containing a heavy hydrocarbon (bitumen) in the intergranular pore space of sands and fine-grained particles. Typical oil sands comprise approximately 10 weight percent bitumen, 85 weight percent coarse sand (>44 µm), and a fines (<44 micrometre) fraction.
Overburden	Overburden is the material that lies above the mineable oil sands deposit. Overburden is removed during surface mining and may be deposited in external disposal areas, backfilled into mine pit areas, used as part of reclamation activities, or used for construction purposes. Overburden material that has specific strength attributes can be used for the construction of dams for the containment of fluids, such water and/or tailings.
Ore Preparation Plant	The bitumen production facility where the mined oil sands ore is crushed (sized) and mixed with hot/warm water to form a slurry that can be pumped to the primary extraction plant.
Particulate Matter	Refers to any mixture of solid particles or liquid droplets that remain suspended in the atmosphere for appreciable time periods. Examples of particulates are dust and salt particles, water, and acids.
Permanent Aquatic Storage Structure	A process that involves treatment of fluid tailings with both in-line flocculation and coagulation followed by deposition into a dedicated disposal area, where water is expressed from the tailings. The objective is to create a deposit that can then be reclaimed by capping with water to develop a viable aquatic ecosystem.
Primary Extraction Plant	A processing plant where slurried oil sands from the Ore Preparation Plant is separated into a bitumen froth and a tailings stream. The bitumen froth is delivered via pipeline to the Secondary Extraction Plant. Tailings from the primary extraction plant is sent to the external tailings area via pipeline.
Project	The Suncor Energy Inc. Base Mine Extension Project

Term	Definition
Reclamation	The return of disturbed land or wasteland to a state of useful capability. Reclamation is the initiation of the process that leads to a sustainable landscape (see definition), including the construction of stable landforms, drainage systems, wetlands, soil reconstruction, addition of nutrients and revegetation. This provides the basis for natural succession to mature ecosystems suitable for a variety of end uses.
Revegetation	The process of replanting and rebuilding the soil of disturbed land.
Secondary Extraction Plant	This plant receives bitumen froth from the primary extraction plant where it is diluted with a light hydrocarbon (naphtha) and centrifuged to produce a clean bitumen product for refinement in the upgraders. The waste by-product of this plant is a tailings stream (froth treatment tailings).
Tailings Areas	Constructed impoundments required to contain tailings and effluent enclosed by dams made with materials such as coarse tailings, overburden, and other mined waste materials suitable for construction.
Total Reduced Sulphur	A term used to collectively describe hydrogen sulphide and mercaptans.
Traditional Land Use	Use of the land by Indigenous groups for harvesting traditional resources such as wildlife, fish, or plants, or for cultural purposes such as ceremonies or camping.
Tailings Reduction Operations	Tailings Reduction Operations is a holistic tailings management approach that includes Sand Dumps, Fluid Transfer and Storage Systems and Dedicated Disposal Areas.
Upgrader	A facility for processing heavy oil or bitumen to reduce the density and viscosity of oil, and otherwise improve the value of the oil.
Volatile Organic Compounds	Volatile organic compounds are compounds that easily become vapours or gases. They have high vapour pressure at ordinary room temperatures. They are released from burning fuels such as gasoline, wood, coal, or natural gas.