



SUNCOR ENERGY INC.
Base Mine Extension

INITIAL PROJECT DESCRIPTION SUMMARY

February 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 be used to supply the existing upgraders at Suncor's Oil Sands Base Plant operations (Base Plant), when the existing 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 its estimated 25-year operational life.

The Project application will be based on best-available technology. In parallel, Suncor is developing new technologies, such as non-aqueous extraction. These new technologies have the potential to significantly reduce the overall footprint, reclamation timeline, and GHG emissions of mining and will be incorporated as appropriate. In addition, Suncor will concurrently be aggressively pursuing paths to reduce emissions in other areas of its business and in ways that sequester carbon and produce net benefits.

Significant socioeconomic 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; and
- investment in innovation and technology development.

Production is anticipated post this decade to support continued operations of existing infrastructure as production 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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1. PROJECT OVERVIEW

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 2019) and Annex I of the guide, which aligns with Schedule 1 of the Information and Management of Time Limits Regulations. This summary corresponds to requirement 25 as outlined in Annex 1 of the guide. A list of references is provided in Appendix A and a glossary of technical terms used in this document is provided in Appendix B.

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. The Project includes an open pit mining operation supplying oil sands to new bitumen froth production facilities, 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.

Contact information for the Project is:

Suncor Energy Inc.

Blair Penner

Address: P.O. Box 2844

150 – 6 Avenue SW

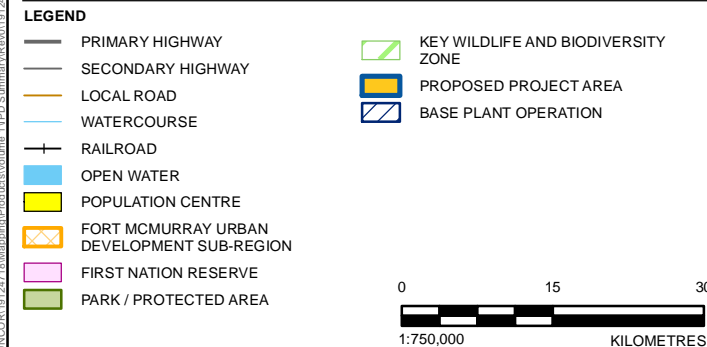
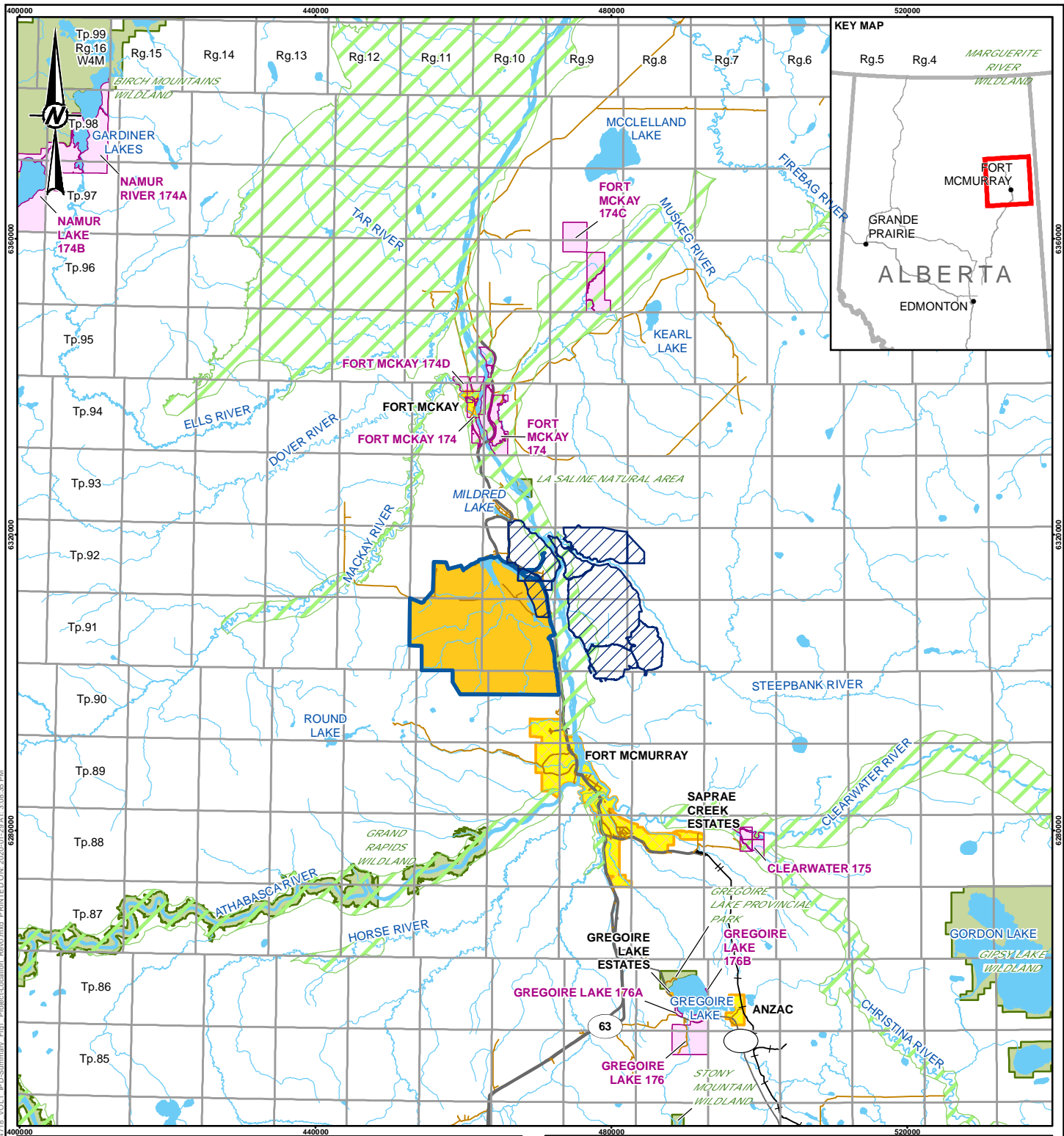
Calgary, Alberta T2P 3E3

Project email: BaseMineExtension@suncor.com

Project phone number: 1-855-955-3054

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. Other communities situated near the Project include Fort McKay (approximately 21 kilometres north) and Anzac (approximately 50 kilometres south) and is located in an area where Traditional Land Use is practiced. The development will be located adjacent to two active open pit mining operations: west of the Base Plant and south of the Syncrude Mildred Lake operation, as shown in Figure 2. There are two potential trapper cabins close to the Project that will be validated with owners during consultation. There are five temporary worker camps within the Project area and three located within two kilometres of the Project area.

The Project will be developed on the following mineable Oil Sands Leases under the *Mines and Minerals Act*: 7280060T23, 7406090415, 7414060262, 7411060938, 7411060939, and 7405080346. The development area for the Project is approximately 20 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).



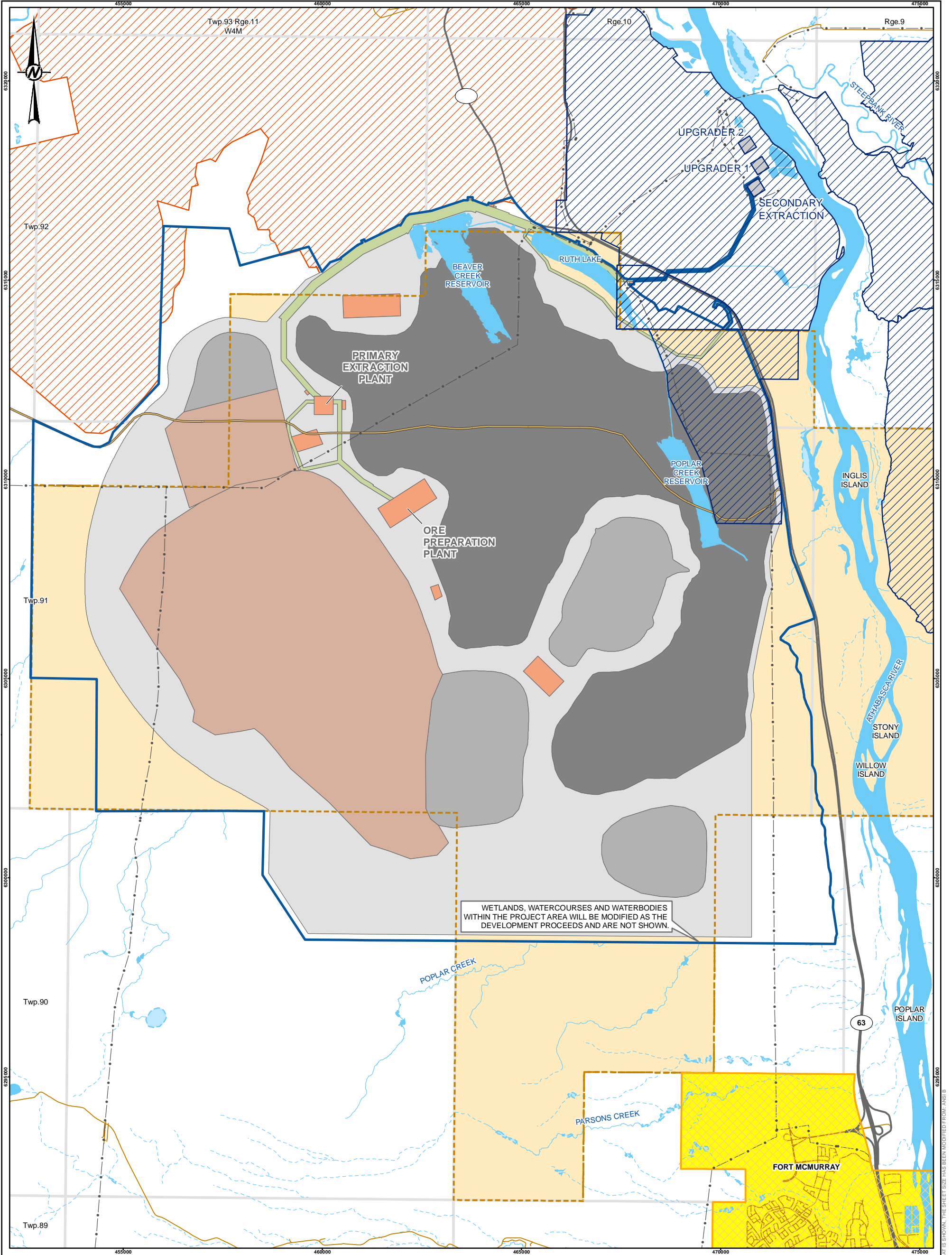
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 PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT
BASE MINE EXTENSION

TITLE
PROPOSED PROJECT LOCATION

CLIENT	YYYY-MM-DD	2020-01-29
	DESIGNED	JG
	PREPARED	PT
	REVIEWED	JG
	APPROVED	TD
PROJECT NO. 19124718	PHASE	REV. 0
		FIGURE 1

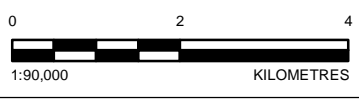
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WETLANDS, WATERCOURSES AND WATERBODIES WITHIN THE PROJECT AREA WILL BE MODIFIED AS THE DEVELOPMENT PROCEEDS AND ARE NOT SHOWN.

LEGEND

	PRIMARY HIGHWAY		BASE PLANT OPERATION
	LOCAL ROAD		SUNCOR OIL SANDS LEASES AND PERMITS
	AOSTRA ROAD	PROJECT FOOTPRINT	
	TRANSMISSION LINE		FACILITIES
	WATERCOURSE		LINEAR INFRASTRUCTURE
	INTERMITTENT WATERCOURSE		MINE AREA
	OPEN WATER		MINING INFRASTRUCTURE
	INTERMITTENT OPEN WATER		OVERBURDEN DISPOSAL AREA
	FORT MCMURRAY URBAN DEVELOPMENT SUB-REGION		TAILINGS AREA
	SUNCOR MILDRED LAKE MINE		
	PROPOSED PROJECT AREA		



NOTE(S)
WETLANDS, WATERCOURSES AND WATERBODIES WITHIN THE PROJECT AREA WILL BE MODIFIED AS THE DEVELOPMENT PROCEEDS.

REFERENCE(S)
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PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT
BASE MINE EXTENSION

TITLE
PROPOSED PROJECT AREA WITH CONCEPTUAL LAYOUT

CLIENT	YYYY-MM-DD	2020-01-29
DESIGNED	JG	
PREPARED	PT	
REVIEWED	JG	
APPROVED	TD	

PROJECT NO. 19124718 PHASE REV. 0 FIGURE 2

SUNCOR ENERGY

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANS 18 25mm

There are a number of Indigenous communities with traditional lands and/or reserve lands located within a 200 kilometre radius of the Project, including: Fort McKay First Nation, Fort McKay Métis Nation, Mikisew Cree First Nation, Athabasca Chipewyan First Nation, Chipewyan Prairie First Nation, Fort McMurray No. 468 First Nation, Fort McMurray Métis Local 1935, and Fort Chipewyan Métis Local 125. Of these, the closest reserve lands 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.

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*. The current zoning designation is rural district. The Project overlaps portions of the Mildred – Kearn Lakes, Athabasca – Clearwater, Stony – Birch and Fort McMurray Fringe Regional Management Areas. One of the broad objectives of the Fort McMurray – Athabasca Integrated Resource Plan is to “encourage development of the surface mineable and in situ oil sands reserves in the Athabasca Oil Sands deposit” (Alberta Sustainable Resource Development 2002).

2. EARLY ENGAGEMENT WITH JURISDICTIONS OR AGENCIES

During the preparation of the Initial Project Description, engagement activities specific to the Project included: Regional Municipality of Wood Buffalo, Alberta Energy Regulator, Alberta Environment and Parks, Alberta Aboriginal Consultation Office, Fisheries and Oceans Canada and the Impact Assessment Agency of Canada. These engagement activities have included phone discussions and in person meetings to review preliminary material including project schedule information, early engagement plans, regulatory processes and schedules, and planned project timing. Key topics identified included potential impacts to land use, potential impacts to wildlife, potential impacts to wetlands, potential losses to fish habitat, employment opportunities and the proximity of the Project to Fort McMurray. Suncor will continue engagement activities during the preparation of the Detailed Project Description through regular project updates and technical meetings.

3. EARLY ENGAGEMENT WITH INDIGENOUS GROUPS

Early engagement has occurred with the following Indigenous groups during the preparation of the Initial Project Description: Fort McKay First Nation, Mikisew Cree First Nation, Athabasca Chipewyan First Nation, Fort McMurray No. 468 First Nation, Fort Chipewyan Métis Local 125, Fort McKay Métis Nation, Fort McMurray Métis Local 1935, and Chipewyan Prairie First Nation. 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.

The following Indigenous groups may also have interest in being involved in engagement activities related to the Project: Bigstone Cree First Nation, Heart Lake First Nation, K'at'l'odeeche First Nation, Kikino Métis Settlement, Original Fort McMurray First Nation, Owl River Métis, Smith's Landing First Nation, Clearwater River Band #175, Willow Lake Métis Local 780, and Métis Nation of Alberta Region 1.

Topics 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 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.

Concerns raised by Indigenous groups related to the Project include: 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; 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 will continue to engage and consult with Indigenous groups following submission of the Initial Project Description. Future engagement activities may include open houses, on the land workshops, community meetings, and technical meetings. Suncor recognizes that the Crown has consultation obligations with Indigenous communities that may supplement Suncor's planned engagement practices.

4. STUDIES OR PLANS RELEVANT TO THE PROJECT (INCLUDING STRATEGIC ASSESSMENTS)

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. In addition, information is available from a variety of historic environmental studies as well as a number of ongoing environmental monitoring programs within the proposed development area. Additional environmental policies, plans and knowledge is available from the federal and provincial governments, and through input from regional Indigenous groups. The Lower Athabasca Regional Plan establishes strategic directions for the region for a ten-year period and includes environmental frameworks for air, water, land and biodiversity.

The Athabasca Oil Sands Region, as a whole, has not been the subject of a strategic assessment; however, the draft strategic assessment of climate change will apply to the Project.

5. 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 because the mineable bitumen resource is expected to be 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
- generate significant socioeconomic 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 contractor 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:

- continued 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
- 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)

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

The relevant provision, Section 25 of the 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 development area for the Project is expected to be approximately 20 thousand hectares, which represents an increase in the area of mining operations greater than 50%. The Project will not increase total bitumen production capacity. Total production is currently higher than 10 thousand cubic metres per day.

7. CONSTRUCTION, OPERATION, AND DECOMMISSIONING ACTIVITIES

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 the majority of support services required. Some existing support services may remain located at the Base Plant.

Access to the Project during construction will be via the existing AOSTRA road until the permanent access road is constructed. Plans will be developed as the application progresses to address third party infrastructure timing and relocation requirements. Some of the pipelines and the power lines required for the Project are part of the existing Base Plant Alberta *Oil Sands Conservation Act* approved scheme (Approval No. 8535N). For those not covered under existing approvals, Suncor will make specific applications under the Alberta *Pipeline Act* and the Alberta *Hydro and Electric Energy Act* and other relevant legislation prior to project construction.

Decommissioning includes facility removal and finalization of reclamation.

8. 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. Operations include oil sands mining, bitumen froth production, tailings management and reclamation activities.

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. Bitumen froth product from the primary extraction plant is 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 BMX Project and its location relative to the existing Base Plant are shown in Figure 2.

9. 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.

10. POTENTIAL ALTERNATIVE MEANS AND ALTERNATIVES 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. Potential alternate means of developing the Project include: alternate mining methods; alternate extraction technologies; alternative degrees of integration with existing facilities and infrastructure; alternative tailings management and treatment; and alternative reclamation and closure methods. Suncor is continuing to evaluate new technologies for commercialization and will work with communities, regulators and stakeholders to share information as development is advanced.

11. PHYSICAL AND BIOLOGICAL ENVIRONMENT

The current zoning designation is rural district. The Project is located in the Central Mixedwood natural subregion (Natural Regions Committee 2006) that is spatially the largest in the province covering 25 percent 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 area generally has subdued relief, with nearly level to gently rolling topography.

The Project is located within the Lower Athabasca Region of Alberta primarily on Crown lands that are administrated under the Alberta *Public Lands Act*. The Project development area includes a number of 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 within the Project development area since the 1940s. Much of the Project area was impacted by a wildfire that burned through the area in May 2016.

Project area/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.

12. HEALTH, SOCIAL, AND ECONOMIC CONTEXT

The Project is located in the Alberta Health Services North Zone, which includes the former Northern Lights Health Region, the Aspen Health Region, and 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 and is still considered relevant for the Project.

A 2010 Royal Society of Canada report on the oil sands indicated that the Northern Lights Health Region has a less favourable health status than the provincial average for a number of non-environmental 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 and the “rest of Alberta” (i.e., Alberta minus the North Zone) is provided by Alberta Health Service 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.

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 Plant 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 a number of 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 from Fort McMurray led to the development of a number of permanent work camps to support ongoing operations.

2008 to 2011 - Several 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 with 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 vast 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 roughly 90% of this population housed in temporary worker dwellings (i.e., camps); and
- 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 and years of experience analyzing the region, 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 persons 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 manner in which 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 2,000 additional people who stay in residential accommodations (e.g., houses, apartments, condos) when working in the region.

13. FINANCIAL SUPPORT FROM FEDERAL AUTHORITIES AND FEDERAL LAND USED FOR PROJECT

The Project is planned with no proposed or anticipated federal financial support. No federal lands will be used for the Project.

14. JURISDICTIONS THAT HAVE POWERS, DUTIES OR FUNCTIONS IN RELATION TO AN ASSESSMENT OF THE PROJECT'S POTENTIAL 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 Alberta Historic Resources Management Branch has provincial jurisdiction for assessment of impacts to archeological sites, paleontological sites, historic buildings, and traditional use sites pursuant to the *Historical Resources Act*.

Federally, Environment and Climate Change Canada has duties in relation to potential effects of the Project through the *Species at Risk Act* and the *Migratory Birds Convention Act*. Fisheries and Oceans Canada also 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 area. An explosives licence may also be required under the Federal *Explosives Act* for the storage and use of explosives as part of mining activities.

15. 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 migratory birds. Specifically, 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 impacts on water quantity and quality in Wood Buffalo National Park.

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

The Project is not expected to result in changes to reserve lands and federal lands - no portion of the Project development will occur on reserve lands or federal lands. The hydrology and water quality assessment will evaluate impacts on water quantity and quality in Wood Buffalo National Park.

The Project is not expected to result in potential 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 trans-boundary impacts on water quantity and quality to the Alberta/Northwest Territories border.

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

17. IMPACT TO INDIGENOUS PEOPLES – PHYSICAL AND CULTURAL HERITAGE, TRADITIONAL LAND USE, HISTORICAL, ARCHAEOLOGICAL, AND PALAEOLOGICAL RESOURCES, SOCIAL, ECONOMIC AND HEALTH CONDITIONS

Suncor is engaging with Indigenous peoples to determine the potential impacts to physical and cultural heritage due to the Project. 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 area may be impacted by development of the Project. These will be identified through ongoing engagement and consultation with potentially impacted Indigenous peoples and through completion of assessment activities to further understand existing impacts to physical and cultural heritage, traditional land use, historical, archaeological and paleontological resources. Suncor is engaging with Indigenous peoples to determine the potential impacts to health, social and economic conditions due to the Project. 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 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
- 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 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.

18. 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 metric tons of carbon dioxide equivalent annually over the life of the Project.

19. TYPES OF WASTE AND EMISSIONS GENERATED BY PROJECT

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 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 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.

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 required subsequent approvals.

APPENDIX A

References

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APPENDIX B

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 are capable of reaching 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.
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 <u>Land-use Framework</u> . The regional plan considers the <u>cumulative effects</u> 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.

Term	Definition
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.
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.
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 byproduct 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.
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.