



FORT MCKAY

FIRST NATION

May 7, 2021

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Crown Consultation Operations Division,
Impact Assessment Agency of Canada
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Dear Madame or Sir,

**RE: Fort McKay First Nation comments on Suncor Base Mine Extension (BMX) Project
Draft Tailored Impact Assessment Guidelines (TISGs) – Project Reference #80521**

On behalf of the Fort McKay First Nation (Fort McKay), we are writing to you regarding the Suncor Base Mine Extension (BMX) Project Draft Tailored Impact Assessment Guidelines (TISGs).

The Project is located at Townships 90, 91, 92, and Ranges 10, 11 W4M and is within Fort McKay's Traditional Territory:

- At approximately 21 kilometres south of the residential community of Fort McKay at Reserve 174;
- At approximately 70 km southeast of Fort McKay First Nation's sacred Moose Lake Reserves (174A&174B); and
- Intersects Registered Fur Management Area #587, which is a trapline held by a Fort McKay First Nation member. Traplines have been areas of intensive use for the exercise of treaty rights and traditional land use for Fort McKay families; and
- Intersecting the Project Development Area there are at least documented at least 81 documented traditional use sites and another 51 within 2 km around the PDA. These sites represent many traditional uses and values including but not limited to access, trails, camping, plant and wildlife habitat, trapping, hunting, fishing, and gathering areas for medicine, food and spiritual purposes and cultural transmission, place names, and historic resources.

The proposed BMX project is an open pit mine in close proximity to Fort McKay. Fort McKay relies on the Project area for the exercise of its Treaty and Aboriginal rights. The Project will "take up"



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traditional lands that will become unavailable for the exercise of Treaty 8 rights, including to harvest for cultural, social, consumptive and spiritual purposes. Fort McKay is concerned that the mining and disturbing of the Project lands, may also result in the negative and permanent impact to the value of these traditional lands into the future and on lands within the rest of the Territory and Reserves due to the direct, indirect, and cumulative impacts, including on wildlife, plants, groundwater and surface water, aquatic resources, historical resources, air quality, odours, dust, noise, and visual nuisance.

This project is of specific interest to Fort McKay because it could cause direct and adverse impacts on our community, its rights, health, and well-being. It is important that the TISG for the Impact Statement provide the appropriate information and assessment for Fort McKay, Suncor, the Agency and Crown, in order to understand the potential effects of the project on Fort McKay's Treaty and Aboriginal rights, including Reserves, culture, opportunities for traditional land use, health, safety, and socio-economic well-being.

Our comments and requests for revisions to the TISG are provided in the attached documents:

- Fort McKay First Nation Comments & Recommendations regarding Suncor BMX Project draft Tailored Impact Statement Guidelines
- Suncor Base Mine Extension Project Air, Odour, Acoustic, and Visual Assessment Supplementary Comments, Danlin Su & David Spink

We have focused our comments on providing a level of detail and specificity, so that baselines and assessments provide sufficient and meaningful information for Fort McKay to understand the potential effects of the project and to meaningfully inform measures necessary to avoid, mitigate, or accommodate impacts.

Engagement with Suncor

Fort McKay and Suncor have a long-established positive working relationship. Suncor has already started consultation with us regarding the BMX Project to guide our review of the project. Fort McKay values its engagement with Suncor on the Project and appreciates the early discussions we have already been able to have, and looks forward to continued collaboration to identify and address Fort McKay's project-specific concerns.



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Crown Consultation

The federal government has duties in this impact assessment related to Indigenous peoples and Reserves:

- Crown consultation/duty to consult;
- Direct and indirect effects on Reserves – Fort McKay’s Reserves could potentially be affected, for example, by effects on air and water quality;
- Management of cumulative effects
- Impacts on Indigenous Peoples – see our comments on Indigenous peoples aspects of the draft TISG (pp.25-31 of attachment), including on:
 - Physical and cultural heritage;
 - Current and historical use of lands for traditional purposes;
 - Treaty and Aboriginal Rights, including potential impacts to fish and fish habitat, migratory birds and species at risk;
 - Health, social and economic conditions; and
 - Mitigation and enhancement measures

The Government of Canada has yet to take concrete actions to ensure the sustainability of Fort McKay as an Indigenous community, which in the present day requires a respected balance between economic self-sufficiency and opportunities to live our traditional livelihood within a culturally and environmentally intact environment. Fort McKay, through its assertion of the right to co-management, has sought to achieve this by ensuring positive, collaborative and long-term relationships with companies like Suncor to mitigate project-specific environmental impacts, to seek protection from development of key cultural areas, and to enhance and protect the sustainability of Fort McKay's community and individual health on its Reserves and within our traditional territory.

Based on our recent involvement in the assessment of the Teck Resources Frontier Project, we have the benefit of recently developed concrete, practical and meaningful measures that can be taken with Canada to help address outstanding cumulative effects. These measures can be a starting point in order to efficiently advance our discussions while Suncor completes its impact assessment to allow for any necessary updates with information and data provided through Suncor’s impact statement.

We agree with and would like to take full advantage of the *IAA's* emphasis on early planning to seek to resolve both our project-specific and cumulative effects concerns with the proposed project as expeditiously as possible. We look forward to working with the Agency to implement our community-specific Aboriginal Consultation Agreement discussed at our meeting [March 29, 2021] and advance consultation to have our concerns addressed.



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We appreciate the opportunity to comment on the draft TISG and look forward to discussing these with the Agency.

Contact Information

Please direct all communications to:

Bori Arrobo

Director, Fort McKay Sustainability Department

<contact information removed>

Sincerely,

<Original signed by>

Bori Arrobo, M.Sc.

Director, Sustainability Department

Encl: 1) Fort McKay First Nation Comments & Recommendations on Suncor BMX TISG
2) Suncor Base Mine Extension Project Air, Odour, Acoustic, and Visual Assessment
Supplementary Comments to IAAC Tailored Impact Statement Guidelines. Prepared by Danlin Su,
P.Eng. and David Spink, P.Eng., March 17, 2021 for Fort McKay First Nation

CC: Claudette Bois, Senior Consultation Analyst, Crown Consultation Operations Directorate, Impact
Assessment Agency of Canada (<email address removed>)
Leah Nelson Guay, Sr. Advisor, Indigenous & Community Relations, Suncor Energy Inc.
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**Fort McKay First Nation’s Comments and Recommendations Regarding
Draft Tailored Impact Statement Guidelines (TISG) Suncor Base Mine Extension Project**

Topic, Section and Fort McKay’s Recommendations
PROJECT DESCRIPTION (s.3)
Overview (s.3.1)
<p>We request the following topics be included in the overview:</p> <ul style="list-style-type: none"> • Extent of mine excavation, processing, overburden and waste storage, and treatment and dump areas in each stage of the Project; • Summary of the current state or condition of environmental, social, economic and cultural factors within the local, sub-regional and regional Project area; and • Information on how Suncor will address the integration of the project with Base Plant and the upgraders including continuous improvement, safety and air emissions management.
Project Location (s.3.2)
<ul style="list-style-type: none"> • For project location Fort McKay recommends that, as appropriate, maps include geospatially referenced map layers published by Alberta¹ • Regarding services and infrastructure maps, describe the interface of project components with Highway 63, and health, safety, traffic and access considerations • On the project location maps of watersheds and waterbodies identify navigable waterways • Identify Treaty areas, traditional territories of Indigenous groups, Indigenous communities and Indian Reserves
Regulatory Framework (s.3.3)
<ul style="list-style-type: none"> • Fort McKay is pleased to see the requirement to identify Indigenous governance systems and Indigenous laws relevant to the project or the impact assessment and these are essential for the s35 rights assessment • In addition to federal and provincial environmental legislation add a list of federal and provincial human health assessment and protection legislation, policies, or regulations that will apply to the project; • For government policies include land use policies (regional and sub-regional) and frameworks, including cumulative effects management frameworks
Project Components and Activities (s.3.4)
<p>The project components and activities section outlines the key items to be described in the impact assessment. Fort McKay recommends the following items be included in that list:</p>

¹ Examples of base layers published by the government of Alberta are provided below and should be used to geospatially reference the project setting and used to identify the boundary conditions of the impact assessment and modelling exercises
 (https://www.isprs.org/proceedings/XXXVIII/part1/02/02_02_Paper_171.pdf) Geological formations - <https://ags.aer.ca/publication/alberta-table-formations>, Hydrology - <https://www.alberta.ca/hydrological-data.aspx>, Soil type - <https://cfs.nrcan.gc.ca/publications?id=39761>, Biophysical - <https://www.alberta.ca/biophysical-data.aspx#jumplinks-0>; <https://www.abmi.ca/home/data-analytics/da-top/da-product-overview>, Wildlife sensitivity - <https://www.alberta.ca/wildlife-sensitivity-maps.aspx>, <https://www.alberta.ca/access-fwms-data.aspx>, Land disturbance - <https://ags.aer.ca/publication/dig-2019-0020>

- Include a summary or diagrams of identified project related stressors, impact pathways (including possible interactions) and associated impacts for each identified project activity by phase and proposed mitigation;
- For constraints include those listed in the AER pToR list plus Fort McKay’s recommended additions to the constraints list (s. 2.2 of Fort McKay submission on the AER pToR, April 20, 2021);
 - *Alberta Land Stewardship Act* Regional Plan, add management frameworks;
 - Policies, regulations, guidelines, criteria etc. under the *Environmental Protection & Enhancement Act, Water Act, Fisheries Act, Canadian Environmental Protection Act*;
 - Any applicable National Air Quality Management System Air Zone Management Framework and associated air quality management plan(s);
 - Recommendations in the AER/Alberta “Health Recurrent Human Health Complaints Technical Information Synthesis: Fort McKay Area” (July 2016);
 - Ambient air quality targets in the Moose Lake Access Management Plan;
 - Fort McKay’s use of traditional lands including but not limited to landscapes, water, access trails and navigation, wildlife, wetlands, vegetation, and Cultural Keystone Places (see Cuerrier et al. 2015);
 - Fort McKay First Nation Air Quality Permissible Levels (2018) and any environmental policies or bylaws;
 - To traplines, add Registered Fur Management Areas;
 - To cumulative impacts: where possible, use Oil Sands Monitoring data and other regional information to provide context for assessment predictions;
 - Cumulative existing impacts on Fort McKay’s rights and culture including links socio-economic and biophysical assessments;
 - Important wildlife areas or features; and
 - Habitat that is necessary for the survival or recovery of Species at Risk Schedule 1 listed wildlife species.
- For regional and cooperative efforts indicate how these efforts and opportunities for the project contribute to sustainability;
- Provide a Best Available Technology and Alternate Options Analysis to support the proposed project design and technologies for construction, operation, extraction, processing, tailings, remediation (treatment) and reclamation;
- For wastewater management include but not limited to, tailings and oil-sands contacted water and process water; and
- Describe how predicted impacts to environmental, health, social and economic effects, and impacts on Indigenous peoples and their rights will be monitored, assessed and mitigated during each project phase (site preparation, construction, operation, reclamation and closure).

PROJECT PURPOSE, NEED AND ALTERNATIVES CONSIDERED (s.4)

4.4 Alternatives Means of Carrying out the Project

The alternative means of carrying out the project including project component alternatives (including tailings management) influence the impacts of the project, mitigation options and the eventual re-establishment of a landscape that is suitable for Fort McKay's exercise of rights. Fort McKay recommends alternative means analysis include the following:

- A summary, including ranking, of the assessment of best available technologies and alternate options analysis for the oil sands sector to support the selected project design and technology proposed for:
 - Extraction and down-stream processing of bitumen within the region; and
 - Generation and storage of waste streams.
- Provide options analysis for:
 - Alternative tailings management options and technologies including dry-stacked tailings;
 - Creating an integrated tailings management plan with Base Plant to avoid construction of more dedicated disposal areas and another external tailings facility;
 - Provide information on using a pipeline to transfer fluid tailings into existing facilities instead of creating more land disturbance as currently proposed; and
 - Provide information on a terrestrial closure outcome, outcome including incorporation of wetlands naturally found in the northern boreal forest, instead of creation of a water-capped treated tailings landform (a terrestrial closure alternative is required for compliance with Directive 085).
- Fort McKay recommends that the alternatives assessment feeds into the rights assessment.

The TISG lists the project elements and components and the alternative assessment must address. Fort McKay recommends the following be added to the list:

- Project elements which have the potential to contribute to identified (existing) cumulative impacts at local, sub-regional and regional scales
- Remediation (or treatment) of contaminated materials² prior to use in reclamation, describe the following:
 - Inventory of mine wastes and contaminated materials;
 - Comparison to applicable environmental and human health quality standards
 - Proposed technologies to treat identified waste inventories to meet applicable quality standards for proposed closure/ reclamation outcomes;
 - Limitations to treat mine wastes to meet quality standards and reclamation; objectives due to available technologies and economic factors; and
- Tailings and process-affected water treatment options and performance objectives
- Closure drainage options

² Remediation (decontamination) should precede reclamation (restoration), the two are interconnected but separate activities. Example approaches include the EPEA Remediation Regulation. https://www.qp.alberta.ca/documents/Regs/2009_154.pdf and Alberta Environmental Site Assessment Standard <https://open.alberta.ca/dataset/3acc7cff-8c50-44e8-8a33-f4b710d9859a/resource/579321b7-5b66-4022-9796-31b1ad094635/download/environmentsiteassesssstandard-mar01-2016.pdf>

- Management of materials that may be a source of wind-blown dust;
- Best available control technologies economically and technologically achievable and/or best management practices to minimize air emission and ensure air quality management (See Fort McKay’s supplemental comments³)
- Mobile mining equipment management and air emissions minimization³;
- Incorporation of leading environmental technology for water conservation, energy reduction, energy recovery and reuse, area and point sources, as well as sources of fugitive air emissions;
- Incorporation of renewable energy for electric or thermal purposes; and
- Mobile mining equipment management and air emissions minimization.

In the list of information sources add the following:

- Research or monitoring studies previously conducted under provincial Environmental Protection and Enhancement Act (EPEA) and Oil Sands Conservation Act Approvals for existing operations and technologies, which will be relied on in the proposed project;
- Research or monitoring studies previously undertaken by the proponent or accessible through participation in the Canadian Oil Sands Innovation Alliance (COSIA), Alberta Innovates, National research Council of Canada (NRCAN), and academic institutions (including NSERC programs); and
- State of the Environment, including surface water, wetlands, terrestrial and biological, groundwater, air and cumulative effects, published by Oil Sands Monitoring (OSM).

DESCRIPTION OF ENGAGEMENT WITH INDIGENOUS GROUPS (s.6)

The TISG focus should be on collaboration and developing assessments together with Indigenous communities rather than on validating Suncor’s assessment. The wording in this section about engagement are mostly focused on providing information and although the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) is mentioned, the section falls short of the pledge of the substantive stewardship, governance and participatory rights recognized and guaranteed by UNDRIP. We have provided recommended wording below. We note that UNDRIP is not included in the reference list or defined in the list of Acronyms and that it should be added to these.

Fort McKay recommends the following changes (wording to be modified is indicated in italics):

- Replace the first sentence with: *engage with Indigenous groups and, with their guidance, utilize Indigenous knowledge to identify the potential impacts of the project on Indigenous peoples and Section 35 and Treaty Rights and to inform the impact assessment*
- Regarding validating impact assessment with the following in italics: ongoing information sharing and collaboration between the proponent and Indigenous groups *to develop* and validate conclusions and assessment findings and to the extent possible, *the process of developing conclusions and assessment findings* should be

³ Suncor Base Mine Extension Project Air, Odour, Acoustic, and Visual Assessment Supplementary Comments to IAAC Tailored Impact Statement Guidelines (by David Spink and Danlin Su, prepared for Fort McKay First Nation, March 17, 2021).

done separately for each Indigenous group
Indigenous Knowledge Considerations (s.6.1):
The requirements for Indigenous Knowledge are too weak. IK is not an ingredient. It is a knowledge system that needs to be considered on equitable footing alongside scientific knowledge. Terms such as, “include IK” undermine this notion. The TISG should be clarified to read <i>Indigenous knowledge be brought together on equitable footing with scientific or technical aspects to inform the impact assessment including the environmental, health, social, economic and rights assessments and best practices and mitigation.</i>
Analysis and response to questions, comments, and issues raised (s.6.3)
To the record of engagement Fort McKay recommends adding the following: <ul style="list-style-type: none"> • How Indigenous Knowledge; and Indigenous standards, thresholds [e.g. Fort McKay Air Quality Permissible Limits, Indigenous Water and Sediment Quality Criteria (IWSQCs)] and best practices, were brought together on equitable footing with other information to inform the project design, assessment and mitigation; and • In the list of how and where information from Indigenous groups was included and contributed to decisions about the project and assessment add the following: <ul style="list-style-type: none"> ○ Effects pathways and analyses; and ○ Tailings management and water treatment plans.
ASSESSMENT METHODOLOGY (s.7)
Baseline Methodology (s.7.1)
The baseline section indicates “pre-project baseline conditions” but does not define what this means. The TISG need to be clear on what the baseline(s) are, how they are defined spatially and temporally and terminology. From Fort McKay’s perspective both historical and current context are important context and basis for comparison of project impacts. Fort McKay recommends the following: <ul style="list-style-type: none"> • Pre-Treaty baseline - this would be for Fort McKay’s rights assessment and FMFN understands that it may not be possible for all biophysical components. • Pre-development baseline (early 1960s) <ul style="list-style-type: none"> ○ Note that some biophysical pre-development baseline information exists in the region – potential data sources include Teck Frontier Mine, Shell Jackpine Mine Expansion (2008) and Fort McKay Specific Assessment (2008); ○ Include town site of Fort McMurray in the pre-development scenario for the RSA (rationale: pre-1950s the population was less than 1000 people and areas around the town provided resources supporting subsistence living); and ○ Fort McKay requests a Pre-development baseline for all assessments. • Current case - which considers the current conditions and existing projects or activities. Fort McKay requests a current case for the air quality assessment. <p>With regard to baseline methodology add the following points:</p> <ul style="list-style-type: none"> • Provide a description of the information sources used to <i>determine pre-development and current baseline conditions</i>, including the sources of <i>all available information</i> and a justification of, <i>or rationale for, the information source selected for use in baseline condition analysis</i> and their adequacy. The justification should explain <i>and compare</i>

any limitations or uncertainty pertaining to the *information sources* available, such as for project-specific studies, field surveys, and the use of existing data and information;

- Provide detailed descriptions of statistical methods including descriptive and inferential statistical analyses, used to establish baseline conditions, including results of the data analysis to support the proposed baseline condition for environmental, health, social and economic components;
- Identify any thresholds relevant to understanding the current state of the biophysical resource and any change in the resource that has occurred over time.
- Indicate how the baseline data gaps identified can be addressed through additional future research, monitoring, and/or field studies, whether through the proponent's efforts as part of project operations or as strategic regional initiatives involving industry and government and Indigenous groups.

Selection of Valued Components (s.7.2)

Selection of Valued Components is integral to the impact statement because it focuses data collection, studies and assessments on the areas of key importance. Therefore, Fort McKay recommends that the VCs not be finalized until Suncor and the Agency have engaged with Fort McKay to discuss VCs in a fulsome way. Fort McKay is initiating development of its rights assessment methodology and the identification of VCs and impact pathways that Suncor assesses for biophysical, health, and social and economic aspects will interrelate with the rights assessment. It is important to ensure that impact analysis pathways are addressed.

Fort McKay offers a preliminary list of VCs below with the caveat that further discussion is needed on these VCs as well as on intermediate endpoints and indicators. We have briefly reviewed the lists in the TISG and in Suncor's Detailed Project Description (Tables E-1 and E-2) and have included most of these in our list. VCs that Fort McKay recommends that are different from or additional to the list provided in the TISG and/or Suncor's Detailed Project Description (Appendix E) or any comments we have are noted *in italics*.

- Air quality – *measurement indicators described in Fort McKay's supplemental comments*⁴
- *Odour - measurement indicators and assessment approach described in Fort McKay's odour assessment methodology*⁵
- *Dust*⁴
- Climate
- Noise and light
- Hydrogeology, including groundwater quality
- Surface water quality
 - *Surface water quality is a VC from Fort McKay's perspective in terms of exercise of rights, inherent value and use of water from, spring, muskeg, wetlands,*

⁴ Suncor Base Mine Extension Project Air, Odour, Acoustic, and Visual Assessment Supplementary Comments to IAAC Tailored Impact Statement Guidelines (by David Spink and Danlin Su, prepared for Fort McKay First Nation, March 17, 2021).

⁵ Guidance for Odour Impact Assessments and Odour Management for Proposed Oil Sands Projects on Fort McKay's Traditional Territories. Available from Fort McKay Sustainability Dept.

rivers or lakes as well as its linkages to fish and fish habitat, wildlife and vegetation, and health.

- *List of parameters for water and sediment and should include organics such as PAHs, naphthenic acids, hydrocarbons, phenols, etc.*
- *Hydrology – in addition to linkages to fish and fish habitat, wildlife and vegetation water is important for exercise of rights as noted under water quality. In addition to Suncor’s proposed measurement indicators add:*
 - *Surface water variability*
 - *Wetland parameters, extent, type, depth etc.*
- *Fish and Fish habitat*
 - *Potential species to be discussed*
 - *Potential measurement indicators include:*
 - *Changes in subsistence and harvesting (past, current and planned) locations*
 - *Changes in quality of traditional and current food source*
- *Terrain and soils*
- *Wildlife and birds (comments on Suncor’s propose list):*
 - *Aquatic mammal – Beaver should be selected as this VEC because it is a Cultural Keystone species. There are no historic population data on this species. There are methods for surveying and monitoring that can be applied. Also consider muskrat.*
 - *Black bear – this species is culturally important, common, and can be monitored with cameras.*
 - *Fisher – Fisher/marten are grouped because of winter track survey limitations. Cameras provide a new method of surveying and monitoring.*
 - *Moose – This species must be included because it is a Cultural Keystone species. Population estimates for the wildlife management unit exist but are dated. Populations are below historic levels.*
 - *Northern myotis (Species at Risk [SAR]). This species will be difficult to distinguish from Little Brown Myotis if surveys are limited to electronic recording. Live trapping is required.*
 - *White-tailed Deer – White-tailed deer is critical for understand indirect impacts to caribou. Populations are increasing because of habitat alteration and climate change. Monitoring should include cameras to distinguish white-tailed deer from mule deer.*
 - *Waterbirds – Waterbirds is too general of a category for a VC and represents a vast number of species with different ecological requirements. Fort McKay recommends considering yellow rail (SAR), horned grebe (SAR), and mallard (country food). Mitigation will require a thorough review of tailings pond deterrents.*
 - *Whooping crane (SAR) – This species fly over and potentially stopovers in the project area. This is a good VC. Population of this species is known, and some birds have GPS units attached for monitoring. Mitigation plans will require an evaluation of pond deterrents, powerlines, and other structures.*

- Boreal owl – *This species is easy to survey, is a resident, and reasonably abundant. Good representative of a carnivorous bird.*
- Common nighthawk (SAR) – *There are good habitat models available used for the Canadian Natural conservation area. Survey methods exist. There may be other insectivorous birds (e.g., swallows – see below).*
- Olive-sided flycatcher (SAR) – *This is a species is rare and efforts will needs to be made to get sufficient data validation data.*
- Rusty blackbird (SAR) – *Detectable with breeding bird surveys but limited data. This is a wetland meadow bird.*
- Canada Warbler (SAR) - *Good VEC. There are good habitat models available and data as well. This species is regularly detected during breeding bird surveys; survival and reproduction data may be available*
- Canadian toad – *Canadian toads would capture pond/lake edge habitat and associated sandy areas for winter hibernation (a unique required combination). There may be other amphibians to also consider such as boreal chorus frogs (although they may be too common to produce any meaningful habitat associations and population estimates) or wood frogs or western toad, which is also a SAR.*
- Wildlife and birds (additional recommendations from Fort McKay)
 - Caribou – *The TISG has identified caribou as VC and Fort McKay supports this. Indirect effects are likely because of deer/wolves/habitat connectivity and the proposed RSA overlaps caribou habitat.*
 - Gray Wolf- *This species should be assessed as part of caribou impacts. The wolf/deer/caribou is important in considering predator prey balance. There is a pack that occurs in the study area.*
 - Predator/Prey balance - *This should be discussed as a VC. This is important for caribou but also moose and beaver (Cultural Keystone species).*
 - Horned grebe – *requires wetlands, identified by health component, impact by tailings ponds.*
 - Yellow rail (SAR) *should be considered. ARUs will provide better data collection. Important wetland species.*
 - Pileated woodpecker – *large tree (old growth) and important as cavity builder for other species. Cavities may be protected under Migratory Bird Act*
 - Swallow species (SAR) – *There has been research on Tree swallows in the regions. Swallows may be better VC than common nighthawk*
- Indigenous Land and Resource Use & Rights
 - *Historical, current and future land and resource use;*
 - *List of metrics to be developed by Fort McKay, some considerations are:*
 - *Cost of accessing more distant sites for food harvesting*
 - *Cost of waiting for permission to access harvest sites*
 - *Cost of replacing traditionally harvested food with store purchased food*
 - *Changes in use of harvesting sites if there is displacement from one location to another i.e., overuse and crowding*

- *Changes in costs*
 - *Rights methodology to be developed by Fort McKay*
 - *Wildlife health and Fish health, Ecological health*
 - *Potential measurement indicator - Contaminant up-take in tissues; food chain magnification in food sources consumed by humans*
 - *Human health*
 - *In human health VC or community-well VC being consider safety/project design and linkages to risk mitigations (in Section 13.1 Potential Accidents and Malfunctions)*
 - *Consider linkages to wildlife, fish and ecological health and contaminant up-take in tissues and food chain magnification in food sources consumed by humans*
 - *Social determinants of health⁶*
 - *Biodiversity – Biodiversity is an important VC for Fort McKay. It should include*
 - *Landscape, ecosystem and species diversity using at minimum LARP BMF indicators, and*
 - *Biodiversity to maintain resources to exercise constitutionally protected rights to fish, hunt, trap and gather)*
 - *Vegetation (including forested and non-forested wetlands, old growth forest, traditional plant habitat including medicinal plants, key habitats associated with species at risk)*
 - *Vegetation communities (e.g. organic wetlands) and/or specific species to be discussed - Potentially species include but are not limited to blueberry, cranberry (spp.) cattails, mint, rat root. Berries are a key cultural species for Fort McKay.*
 - *Potential measurement indicators include:*
 - *Changes in subsistence and harvesting (past, current and planned) locations*
 - *Changes in quality of traditional and current food source*
 - *Sites important for current use of and resources for traditional purposes (hunting, trapping, fishing, and gathering);*
 - *Landscapes of interest;*
 - *Cultural and heritage resources;*
 - *Employment and Economy – come considerations for metrics include:*
 - *Specific employment and business opportunities for Indigenous communities*
 - *Training and education opportunities for Indigenous people*
 - *Cost of living for Fort McKay First Nation*
 - *Local and regional suppliers of goods and services*

⁶ Government of Canada. 2020. Social determinants of health and health inequalities Accessed at: <https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html>

- *Loss of traditional economy*
- *Loss of country foods*
- *Changes in population such as influx of non-local workforce*
- *Infrastructure and Services – this is currently included in with community well-being but could be VC*
 - *Changes in accommodation, housing, etc.*
 - *Changes in population and use of infrastructure and services*
 - *Use of local and regional transportation network, services such as health care, etc.*
 - *Use of utilities*
 - *Creation of a shadow population*
- *Community well-being (including both Indigenous and non-Indigenous communities). Some metrics for consideration include:*
 - *Egress or ingress in populations*
 - *Changes in MBM basic income line and population above or below the line*
 - *Suicide rates*
 - *Number and participation in community events*
 - *Changes in number of family on social support*
 - *Heritage and cultural transmission*
 - *Language*
 - *Community institutions such as sharing, and community cohesion*
 - *Sense of place*

Fort McKay recommends that Suncor update Appendix E (Environmental Impact Statement Proposed Approach and Methodology) of its Detailed Project Description, which relates to VCs, study areas and impact assessment methodology, once the TISG are finalized and Fort McKay and Suncor have consulted on these topics.

Spatial and temporal Boundaries (s.7.3)

Regarding temporal boundaries (s.7.3.1):

- The assessment cases these are laid out clearly in this section. The baseline section (s.7.1) should clearly define Pre-development and Baseline; its wording is currently unclear. Fort McKay requests also a Current Case for the air quality assessment
- VCs should be compared to the Pre-development and Baseline cases, and Current Case for air quality
- The change in land cover from pre-development scenario to present should be incorporated into the vegetation and wetlands VCs analysis using past EIAs with project development areas located in the RSA to describe the pre-development scenario.

Regarding spatial boundaries (s.7.3.2):

- Spatial boundaries should be informed by affected Indigenous communities anticipated boundaries of the project effects. Indigenous communities may experience impacts from projects well beyond the spatial extent of the project's footprint.

- Add the following: establish the spatial and temporal boundaries to assess the VCs by presenting the project location in relation to geospatial data and files published by;
 - Provincial government (Government of Alberta; branches, divisions and departments)
 - Provincial regulator (Alberta Energy Regulator and Alberta Geological Survey)
 - Oil Sands Monitoring Program
 - Federal government
 - Areas of concern identified by engaged Indigenous groups for VCs that are identified by, or relate directly to, Indigenous groups.
- Regarding Suncor’s proposed water study areas:
 - Figure E-3 in Appendix E of the Detailed Project Description implies by the boundary of the Aquatic Resources LSA is not watershed based. It should be since the watershed from the standpoint of fish and fish habitat is an entity.
- Spatial boundaries should be defined for social economic and cultural effects.

Effects Assessment Methodology (s.7.4)

- Include survey methods, sampling effort, timing and location of surveys to determine populations and the statistical tests to determine confidence limits.
- For estimates of abundance and distribution, these should be quantitative and methods used and rationale for the baseline data collection provided
- Discuss the degree of confidence associated with assumptions obtained from other jurisdictions or the literature (e.g. air emission factors), their relevance to the project given the climate in Alberta and operating conditions of the project, and how varying levels of uncertainty associated with these assumption may impact the effects assessment outcome;
- When ranking impact directionality i.e. positive or negative and if there are differences in interpretation of the direction of effects (positive or negative) present those differing views and the steps that Suncor has taken to resolve differences and create or enhance positive effects; and
- Take into account any thresholds relevant to evaluating change in the resource that has occurred over time.

Mitigation and Enhancement Measures (s.7.5)

- Describe the current mitigation practices, policies, and commitment being applied as part of standard practice within the existing operations, as well as their effectiveness as mitigation measures;
- Add the following (in italics) regarding mitigation measures:
 - Write mitigation measures as specific commitments, for each identified adverse *environmental, health (ecological and human), social and economic effect*, that clearly describe how *and when* the proponent intends to implement them and their desired outcomes. Measures are to be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. *Where appropriate, an implementation methodology and associated timelines should be linked to each mitigation measure and initiative. How each proposed mitigation measure and initiative*

compares to the mitigation measures and initiatives for existing operations should be provided, including how the proposed measures represent continuous improvement; and

- Describe any human socio-economic and health protection plan being prepared for the project and, if applicable, the adaptive management system through which plans will be delivered. The plan(s) must provide an overall perspective on how potentially adverse effects would be minimized and managed over time.

BIOPHYSICAL ENVIRONMENT (s.8)

Meteorological Environment (s.8.1)

Fort McKay requests the following be added:

- In the list of meteorological data include available evaporation data or provide appropriate estimates of evaporation;
- Provide an “envelope” of climate change scenarios in respect to temperature, precipitation and evaporation;
- Provide typical representative wind speed(s) and direction(s) at local, sub-regional and regional scales;
- Provide a summary of any upper level wind speed and direction data available from WBEA and ECCC meteorological monitoring in the region; and
- Estimate the concentration of secondary organic aerosols (SOAs)(as PM2.5) with an appropriate model and the appropriate meteorological inputs, using the quantified SOA precursor emissions.

Geology, Geochemistry and Geological Hazards (s.8.2)

- For characterization of geochemical composition of materials to be excavated, include NORMs (normally occurring radioactive materials)

Topography, Soil and Sediment (s.8.3)

- In the description of any erosion-sensitive soils include their erosion resistance properties and limit velocities;
- Regarding the suitability and availability of reclamation material take into account saline, sodic or lean oil sands potential of overburden to be used, if applicable; and
- Include mitigation measures for dust deposition on reclamation stock piles and reclamation areas that may inhibit understory growth.

Atmospheric, Acoustic and Visual Environment (s. 8.4)

Air emissions, their management, and their effects on the health and well-being of Fort McKay in our community, on Reserve and when exercising our rights is a key concern⁷. BMX is in close proximity to Fort McKay that has the potential for significant and direct air quality, noise and visibility impacts. This is of particular concern in light of the known poor air quality already affecting the community. Fort McKay has been consistently seeking comprehensive air, noise and visibility quality assessments as part of the project specific consultation process to meaningfully inform mitigation and management.

Fort McKay’s detailed comments and recommendations on air emissions are provided in a

⁷ AER & Alberta Health. Sept 2016. Recurrent Human Health Complaints Technical Information Synthesis Fort McKay Area.

stand-alone supplemental document attached to this submission: *Suncor Base Mine Extension Project Air, Odour, Acoustic, and Visual Assessment Supplementary Comments to IAAC Tailored Impact Statement Guidelines* (by David Spink and Danlin Su, prepared for Fort McKay First Nation, March 17, 2021). The document provides contextual information and comments on sustainability principles and regional air quality, assessment methodology, mine fleet emissions, and mitigation and enhancement measures and specific wording recommendations for the TISG for the following topics:

- atmospheric environment (including air quality, deposition, odours, dust, and greenhouse gases),
- acoustic environment (project noise sources), and
- the visual environment (including visibility, sky glow).

We also highlight a few items here:

- Fort McKay is pleased to see that the TISG requires the assessment to use Fort McKay's air quality permissible levels. We note that they are incorrectly titled in the TISG as Objectives, whereas the correct title is *Fort McKay's Ambient Air Quality Permissible Levels (2018)*.
- We request the use of the following to guide the odour assessment: *Guidance for Odour Impact Assessments and Odour Management for Proposed Oil Sands Projects on Fort McKay's Traditional Territories*.
- The above documents are available from the Fort McKay Sustainability Department.
- Prior to conducting air quality modeling refer to Health Canada's Guidance and Canadian Council of Ministers of the Environment Ecological Risk Assessment Guidance Document to ensure air modelling data meets requirements for undertaking the health impact assessment, human health risk assessment and ecological risk assessment.

Groundwater and Surface Water (s.8.5)

Rivers, streams, ponds and lakes are important for Fort McKay's exercise of rights including navigation, fishing, hunting and gathering. Groundwater is important to Fort McKay for its intrinsic value and links to wetland landscapes and plants, wildlife habitat and surface waters, all of which support Treaty rights to hunt, fish, trap and gathering. No new assessments are requested, the following sets out further details that Fort McKay is seeking in order for sufficient information to be able in order to identify effective project-specific information and corresponding mitigation measures. Requests are in keeping with Fort McKay's standard requests to industry and regulators for previous projects.

Baseline - Baseline characterization (s.8.5.1) we request the following be added:

- Characterize both pre-development (early 1960s) and current baseline conditions;
- For maps of surface and groundwater resources include springs;
- For descriptions of freeze-thaw and ice cover include ice thickness;
- For each watercourse provide sufficient information to meaningfully inform the impact assessment, project design and mitigation and closure drainage system including flow characteristics for a range of high and low flows, including long-cycle

drought and climate change scenarios;

- For hydrographs show the full range of seasonal and inter-annual variations, as well as seasonal baseflow, including for the Athabasca River below Fort McMurray (i.e. station number 07DA001) and immediately upstream of the Peace-Athabasca Delta (PAD) (i.e. station number 07DD001);
- For waterbodies affected by the project provide sediment composition, density and mass / volume and:
 - Develop sediment yield characterization (e.g. curves) for each watercourse;
 - Develop and describe erosion resistance capability for each watercourse;
 - Develop and describe erosion resistance capability and precipitation-runoff dynamics / response for each discrete landform type. Provide accuracy limits and, if modeled, supporting field data, calibration data, model validation and accuracy;
- For the required quantitative surface water balance for local and regional watersheds include the following: pore-water at mines, water storage reservoirs, tailings facilities, compensation lakes and evaporation from these surfaces;
- Regarding naphthenic acids Fort McKay's suggestion is to report on measured and measureable concentrations included in monitoring programs rather than labile and refractory fractions;
- Sufficient groundwater monitoring data (approximately three years for overall area) to meaningfully capture inter-annual and seasonal variations in hydrogeological characteristics to provide an overall picture of baseline groundwater monitoring to capture inter-annual and seasonal variations in hydrogeological characteristics. For monitoring well hydrographs identify their location, groundwater quality information, and monitoring frequency;
- Characterization of traditionally used and/or culturally valued fens, bogs, muskeg and springs;
- For surface water and water quality models include an explanation of model calibration, validation and model performance metrics used;
- For surface water data collection/monitoring:
 - Include rationale of site selection to ensure ongoing long term data collection
 - In addition to CCME Standards include the following criteria: Environmental Quality Guidelines for Alberta Surface Waters (Government of Alberta), Alberta Tier 1 and Tier 2 Soil Remediation Guidelines (Government of Alberta), Canadian Environmental Quality Guidelines (CCME), Guidelines for Canadian Drinking Water Quality (Health Canada), Indigenous Water and Sediment Quality Criteria (IWSQCs), Indigenous Terrestrial Quality Criteria (ITQCs); and
- Engage Fort McKay regarding groundwater model inputs, builds, calibration and results.

The effects assessment (s. 8.5.2) should include:

- Implications of seasonal and inter-annual variations in groundwater;
- Prepare hydrogeochemical plots such as Piper Plots with end members indicated;

- Impacts on traditionally used and/or culturally valued fens, bogs, muskeg and springs;
- Evaluation of effects of dewatering on groundwater aquifers and adjacent groundwater-supported wetlands, vegetation communities, and surface water;
- An assessment of cumulative effects on aquifers - groundwater management plan will reduce or eliminate the potential for regional cumulative effects;
- In the risk assessments complete assessments on the constituents that exceed guidelines but also on those that do not exceed guidelines because of the potential for additive effects;
- Potential for mercury methylation, sulfide and methane generation;
- Provide estimates of “long-cycle droughts” in the local area and descriptions of waterbody extent, depth and width under those conditions;
- Changes to the quantity or timing of surface flow, water levels, ice thickness or extent, sediment input and channel regime in watercourses and water levels in affected waterbodies of the local project area, during minimum, average and peak flows, including seasonal variability;
- Changes to the quantity or timing of surface flow, water levels, ice thickness or extent, sediment input and channel regime in watercourses and water levels in affected waterbodies of the LSA and of the RSA; and
- In assessing the changes in LSA watersheds and watercourses, discuss impacts to navigation and access to the land for traditional activities.

Water management, tailings and reclamation:

- Describe the timing and duration of all effluent streams;
- Information on water treatment options and performance objectives being proposed by Suncor;
- Provide modelling of a comprehensive suite of predicted closure water and sediment quality parameters (i.e., basic physicochemical, nutrient, metal and organic parameters) throughout the development of pit lakes until stability is achieved, including modelling of potential releases of contaminants into the water column, sediment re-suspension, and potential stratification). In addition, toxicity should not be modeled as a substance, since it is not a conserved quantity;
- Benchmark case studies of successfully established comparable reclaimed pit lake outcomes including area and depth, substrate (e.g. quarry, hard rock or oil facility), biota presence and diversity, human health safety studies and timelines to achieving successful outcomes;
- Regarding locations for predicting the timing of when water quality starts to meet Water Quality Guidelines or background concentrations, in addition to the project, LSA and RSA boundaries and predict this in final reclaimed landscape wetlands, waterbodies and watercourses;
- Input from Fort McKay that the presence and location of each pit lake would not hinder or dissuade navigation through or across the landscape or to areas upslope of the pit lakes;
- Present estimates of surface water runoff rates for a range of design storms to allow

for design and mitigation that demonstrates stability, safety and ability to manage flows on-site;

- For tailings management strategies add the following:
 - Measures to segregate and monitor streams with elevated solvents or radionuclides
 - For disposal sites, in addition to location include a description of ultimate post-closure / reclamation landform type; and
- Surface water flow and quality should be linked to and support the assessments of fish and fish habitat, riparian vegetation, birds and aquatic mammals.

Mitigation and enhancement measures:

- Describe water use minimization approaches that Suncor is proposing; and
- For surface water monitoring programs, in addition to CCME Standards include the criteria listed above under baseline.

Vegetation and Riparian, Wetland and Terrestrial Environments (s.8.6)

Fort McKay relies on wetlands and upland landscapes, habitats, traditional, medicinal, and culturally important plants to exercise its rights. It is important to have a fulsome assessment of potential impacts on vegetation, landscapes and biodiversity to identify appropriate project-specific mitigation, offsets, and for reclamation planning to re-establish landscapes and vegetation communities suitable for traditional use.

For baseline conditions (s. 8.6.1) add the following:

- Biodiversity – for the requirement to identify the biodiversity metrics examine biodiversity at species, ecosystem and landscape scale. For the landscape-level use indicators in the LARP draft Biodiversity Management Framework for the Regional Study Area at a minimum;
- For identifying ecosystems that are sensitive or vulnerable to disturbance, include ecosystems that are vulnerable to high salt concentration water, or saline sodic overburden or salts expressed from treated tailings deposit;
- For wetlands (s. 8.6.1.2)
 - Include collection of data for Indigenous values of wetlands and develop protocols for data collection with Fort McKay, include Fort McKay in the data collection activities for assessing Indigenous values of wetlands, wetland reclamation planning and offset considerations.
- Regarding the application of the Alberta Wetland Policy in the baseline and assessment:
 - For the Alberta Wetland Policy - Relative abundance value contributing to overall relative value under the Alberta Wetland Policy is determined based on the assumption that current abundance and historical loss determine the value assessment; areas of low current abundance and high historical loss are assigned a higher value, and areas of high abundance and low historical loss are assigned a lower value;
 - Given the current loss of wetlands from existing oil sands mines, the exemption of most oil sands mine disturbances from complying with the Alberta Wetlands

Policy, and the lack of reclamation planning to re-establish the conditions for peat-forming wetlands on the closure landscape in oil sands mines' life of mine closure plans, the relative abundance measure is irrelevant; and

- Incorporate the value of wetlands from an Indigenous perspective and existing disturbance when making proposals for wetland offsets.

For the effects assessment (s.8.6.2), add the following:

- Assess and quantify productive use for non-commercial timber including biomass burning for process, water or space heating or processing into marketable products;
- Identify any changes to vegetation, soil, sediment or water quality in wetlands and terrestrial habitats during operations, reclamation and closure phases by comparing to applicable guidelines, objectives or standards:
 - Environmental Quality Guidelines for Alberta Surface Waters (Government of Alberta), Alberta Tier 1 and Tier 2 Soil Remediation Guidelines (Government of Alberta), Canadian Environmental Quality Guidelines (CCME), Guidelines for Canadian Drinking Water Quality (Health Canada), Indigenous Water and Sediment Quality Criteria (IWSQCs), Indigenous Terrestrial Quality Criteria (ITQCs).
- Provide a summary of potential effects to vegetation, soil, sediment or water from project activities (including waste streams), which may require remediation/treatment to meet applicable standards (referenced above) and identified reclamation objectives.

For Mitigation and Enhancement measures (.s.8.6.3):

- Effects on riparian zones and vegetation affect fish habitat because during high flows, the riparian zones frequently become fish habitat; ensure linkages between assessment and mitigation for riparian zones and fish and fish habitat;
- Identify risks of future climate change or reclamation outcomes and include a climate change adaptation plan for revegetation planning (use reference Welham et al. 2015)⁸
- For the vegetation standards describe for all project phases and describe any integrated vegetation management including:
 - Criteria and circumstances of application of chemical, biological or mechanical control methods, as well as relevant regulations and potential adverse effects associated with control methods;
 - Methods to identify invasive species, avoid propagation and control them;
- The key objective of a groundwater management plan is to prevent negative effects to groundwater and surface water quality by managing, at the local scale, interactions between development activity and the environment. Develop a Groundwater Management Framework to define appropriate regional and site-specific compliance points to meet groundwater level and groundwater quality objectives in proposed

⁸ Welham, C. B. Seely, L. Frid, and C. Daniel. 2015. A Tool For Adaptation Decision-Making in Oil Sands Reclamation Under Risk of Climate Change. Prepared for the Reclamation Working Group of Cumulative Environmental Management Association

reclaimed landscapes and describe potential adaptive management measures. Include Fort McKay in the design and review of the Groundwater Management Framework;

- Hydrologic storm design during operations to prevent erosion and protect slope and surface stability design for on-site operational drainage or conveyance channels and structures to a protective standard; and
- Reclamation / post-closure design to prevent erosion and protect slope and surface stability for the long-term

Fish and Fish Habitat (s.8.7)

Healthy aquatic ecology, habitats and fish are a foundation for Fort McKay's exercise of rights. No new assessments are requested. We have provided more specifics so that the assessment will be sufficient to identify appropriate project-specific mitigation and management.

Baseline (s.3.5.1) – Add the following:

- For crossing types add culvert or bridge;
- For watercourses measure averages of depth, velocity and width at three or more cross sections along the section (up to 20-30 stream widths, depending on length of the section);
- For water bodies measure minimum and maximum depths. For mean depths obtain these by cross sectional depth measurements of at least 10 stations in two cross sections at right angles or by sonar coverage of the waterbody. Establish permanent stations at the deepest point in the waterbodies for repeat measures of water quality profiles;
- For fish sampling use recommendations of the two experimental fisheries protocols published by ASRD "Standard for sampling of small streams in Alberta" and "Sampling for small-bodied fish in Alberta" and Alberta FWIN gillnet sampling. Data collection to match requirements of Alberta FMIS data logging;
- For fish habitat suitability models refer to Golder 2008⁹;
- Describe the current (documenting cumulative effects) and potential use of the fish resources by Indigenous, or recreational fisheries and the implications on impacts to the rights of Fort McKay; and,
- In the description and map of aquatic habitat include the following:
 - Include plants, birds, invertebrates, amphibians and mammals and fish,
 - For fish habitat include spawning, rearing, and overwintering habitats, seasonal habitat use including migration and spawning routes and species distribution

Effects to fish and fish habitat (s. 8.7.2) assess the following:

- Update the references to the fisheries legislation to the *Fisheries Act* (2019) Sections 34.4(1) and 35.1 and the current policies¹⁰;

⁹ Fish species habitat suitability index models for the Alberta oil sands region. Version 2.0 October 2008 Prepared by: Golder Associates Ltd.

¹⁰ Fish and Fish Habitat Protection Policy Statement, Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act" DFO Ottawa (2019), Consultation Paper: Consideration of Cumulative Effects under the Fisheries Act", Fact Sheet: "Consideration of Cumulative Effects under the Fisheries Act". "Interim Policy for Establishing Fish Habitat Banks to Support the Administration of the

- For biodiversity habitat type: if it is not possible to estimate density from the catches use fish species catch densities per unit area or CPUE;
- For geomorphological changes consider sediment load;
- The biologically sensitive periods of all fish species should be assembled into a species periodicity table by week of the year that details spawning times, hatching, drifting, juveniles and adults etc.;
- The statement “take into account and include an examination of the correlation between construction periods and sensitive periods” reword to “schedule works in times when streams are least sensitive to disturbance”; and
- Regarding evaluating habitat losses describe in terms of habitat units as determined from use of the same habitat by different species and the quality (suitability) of that habitat for each species/life stage.

For Mitigation and Enhancement measures (s.8.6.3) for fish and fish habitat add the following:

- The assessment should follow the appropriate *Fisheries Act* (2019) sections and policies such as: Describe prevention or offsetting of the death of fish by other than fishing and harmful alteration, disruption or destruction of habitat as per the *Fisheries Act*;
- Regarding mitigation measures for all water crossings specify who would maintain, and plans to ensure it is financed for long term sustainability and upkeep including capital for sporadic major rehabilitation (e.g. at end of useful infrastructure lifespan or if storm events exceed design protection); and
- Offsetting plans, include complementary measures.

Birds, Migratory Birds and Their Habitat (s.8.8)

Healthy, abundant and diverse bird populations (such as ducks, geese, grouse) that are safe to consume and contribute to biodiversity, cultural and spiritual practices are integral to Fort McKay’s exercise of rights. It is important to have a fulsome assessment of birds and their habitat and populations to identify appropriate project-specific mitigation, conservation offsets and for reclamation planning to re-establish birds and their habitats and populations that support exercise of rights.

To the baseline conditions add (s.8.8.1):

- For the list of birds that are described in the baseline for both biodiversity considerations and assessment of impacts, consider the following in developing the list
 - Species listed in Schedule 1 of the federal SARA. A preliminary list of species at risk likely to use the Project area is provided in section 21.12. Each of these species must be discussed separately;
 - Species listed as at risk, may be at risk and sensitive in the General Status of

- Alberta Wild Species or under any other applicable provincial legislation;
- Species assessed by COSEWIC as extirpated, endangered, threatened or of special concern. It is recommended to refer to the most recent COSEWIC annual report for the list of assessed wildlife species posted on its website;
- species of importance to Indigenous peoples, notably pertaining to the practice of rights, considering traditional knowledge; and
- Species of other ecological, economic or human importance;
- Describe and quantify the existing bird biodiversity in the study areas and compare this to other areas in the boreal forest with similar habitat types based on publically available information. (Rationale: Placing these measurements into context in comparison to other areas with similar habitat types would make the assessment of the proposed Project-related impacts on biodiversity much clearer as it would improve our understanding of whether the diversity rankings or values are relatively high or low);
- Regarding maps of highest concentration of migratory birds sites, add nesting to the list of site types only for colonial nesting species;
- Provide maps showing the location of identified habitat and habitat features associated with the presence of those bird species that are likely to be affected;
- For federal species at risk identify and *map* critical habitat if that habitat has been defined by the regulators, or has been identified by Suncor during its assessment work; and
- For whooping crane provide a working link to the reference cited (Bidwell and Conkin 2019).

To effects (s.8.8.2) add the following:

- Define incidental impacts and add indirect impacts;
- To the list of habitat types add rearing and moulting;
- Regarding BCR species reference Region 6 – Boreal Taiga Plains;
- When describing short and long term changes to habitat and food sources provide maps;
- In the list critical periods for birds include nesting;
- If a temporary relocation hypothesis, is made provide support for the hypothesis prior to project construction (rather than during operations as the TISG states) because, in the event that the hypothesis was determined as inaccurate via testing during project operations, impacts would have been underestimated (greater than anticipated); and
- Describe potential adverse and positive effects of the project on bird species noted as important to Fort McKay, such as effects resulting from changes to important habitat areas, including grouse, ducks, and geese, and their eggs and nests that are not currently listed under the Species at Risk Act or provincial statutes. Address the following:
 - Availability of species for traditional use
 - Concerns and issues expressed by Indigenous communities including Fort McKay and the actions taken to address

- How Indigenous community input was incorporated into the Project design, effects assessment, mitigation, monitoring, and reclamation plan
- Input into the residual effects and significance determination.
- With regard to whooping crane (s.8.8.2.2) provide a citation and link to the protocols referenced (ECCC program initiated in 2019 with OSBTT).

Wildlife and Its Habitat (s. 8.9)

Healthy, abundant and diverse wildlife that is safe to consume and contribute to cultural and spiritual practices and provide opportunities to teach the next generation is integral to Fort McKay's exercise of rights. It is important to have a fulsome assessment of wildlife habitat and populations to identify appropriate project-specific mitigation, conservation offsets and for reclamation planning to re-establish landscapes and wildlife habitats and populations that support exercise of rights.

VCs: See list in Section 7.2

Baseline - To the baseline conditions (s.8.9.1) add the following:

- To the list of wildlife resources add bats;
- Regarding biodiversity of wildlife species add the following list for consideration:
 - Species listed in Schedule 1 of the federal SARA. A preliminary list of species at risk likely to use the Project area is provided in section 21.12 Additional Guidance for Biophysical Components. Each of these species must be discussed separately;
 - Species listed as at risk, may be at risk and sensitive in the General Status of Alberta Wild Species or under any other applicable provincial legislation;
 - Species assessed by COSEWIC as extirpated, endangered, threatened or of special concern. It is recommended to refer to the most recent COSEWIC annual report for the list of assessed wildlife species posted on its website;
 - Species of importance to Indigenous peoples, notably pertaining to the practice of rights, considering traditional knowledge; and
 - Species of other ecological, economic or human importance;
- Describe and quantify the existing wildlife biodiversity in the study areas and compare this to other areas in the boreal forest with similar habitat types and across a range of development levels;
- For estimates of abundance and distribution, these should be quantitative and methods used and rationale for the baseline data collection includes;
- For Sensitive locations include Key Wildlife and Biodiversity Zones;
- Habitat models - Understanding the accuracy of wildlife habitat models aids in understanding how changes to the landscape might affect any given wildlife species, influences the level of confidence one has in the impact predictions, and provides insight into the interpretation of future monitoring data. Therefore we request the following be added:
 - Describe and demonstrate the validation of any habitat models used to map wildlife resources. If collected field data are insufficient, additional surveys

should be completed or alternative, external sources of data should be used to provide a quantitative validation of the habitat models developed for the proposed Project.

For effects to wildlife (s. 8.9.2) add the following:

- Define incidental impacts and add indirect impacts;
- For caribou evaluate whether caribou have potential to interact with the project during sensitive periods associated with caribou life stages, such as calving, overwintering, and any seasonal movements;
- Regarding bioaccumulation of contaminants in wildlife include input from Fort McKay in developing the list of species;
- Compare predicted effects to wildlife biodiversity measures for the Project area to other areas in the boreal forest with similar habitat types and across a range of development levels (Rationale: this would improve our understanding of whether the diversity rankings or values are relatively high or low for similar habitats in the boreal forest or in the presence/absence of industrial developments.); and
- Reclamation - Discuss expected timelines for establishment and recovery of vegetative communities and wildlife habitat and biodiversity, and anticipated re-colonization by wildlife indicator species. Provide an outline for estimated key milestone dates for reclamation, including targets for vegetative communities and wildlife habitat and biodiversity and how progress to achieve these targets will be measured.

To mitigation and enhancement (8.9.3)

- The anticipated effectiveness of mitigation measures, including deterrent systems, must be supported with scientific evidence or tested through study and monitoring within the Project area as the project proceeds; and
- Provide details of the monitoring program that will address uncertainties in the assessment for boreal caribou and the effectiveness of proposed mitigation measures where scientific evidence supporting their effectiveness is not currently available it be determined that the Project is predicted to have an effect on boreal caribou.

In Appendix 2 (s. 21.12) Additional Guidance for Biophysical Components add the following:

- The Guidance under the heading Birds and Their Habitat in Appendix 2 (s. 21.12) about scientifically defensible predictions, sampling protocols, baseline data of at least 2 years, design sampling effort for monitoring year etc. is relevant to all wildlife and should be included under the Wildlife heading of this section as well;
- In consultation with Fort McKay, define cultural landscape features and define protocols for identifying cultural landscape features including the participation of Fort McKay Indigenous knowledge holders in the data collection; and
- There should be some cross-referencing between fish inhabitants of water bodies and streams with fish eating birds and mammals.

Biodiversity – new section is necessary

Biodiverse landscapes, vegetation communities, wildlife and aquatic biota are essential to

supporting Fort McKay rights. Sufficient detail is required in the baseline and assessment at different spatial scales (landscape, ecosystems and subunits, and species) to understand the impacts, determine appropriate mitigation and offsets, and for re-establishing biodiversity in reclamation.

Fort McKay recommends that the Agency add a new section on *Biodiversity* to the TISG and subsequent Impact Statement. This is consistent with the AER EIA ToR, which has biodiversity requirements. Include the following:

- In the characterization of terrestrial and aquatic biodiversity metrics include three levels of biodiversity:
 - Species (past and existing),
 - Ecosystem, and
 - Landscape level conditions.
- Relative abundance of species in ecosite phase and wetland class; and
- Input from Fort McKay in the indicator selection.

HUMAN HEALTH CONDITIONS (s.9) and Human Health Baseline (s.21.8)

To the human health baseline (s.9.1) add the following:

- In preparing community health profiles consider pre-development - Current human health at Fort McKay has deteriorated from the pre-development condition. That should be documented as best as the information allows;
- Identify each community (indigenous and non-indigenous) which may be affected by project related activities;
- Identify baseline health condition for historical and current prevalence, incidence and trends for physical, mental and social determinants in Indigenous and non-indigenous sub-groups in the Wood Buffalo Health Region and Alberta:
 - Identify data sources;
 - Provincial (including regional) health statistics reports and data
 - Indigenous community knowledge
 - Key baseline references – see footnotes: Wood Buffalo health data summary report¹¹, Alberta Health Database¹², Other Alberta Health references¹³ and Alberta Congenital Anomaly Surveillance Report¹⁴, academic research
 - Provide a summary of identified data;

¹¹ Wood Buffalo health data summary report: <https://open.alberta.ca/dataset/62df29fc-7d98-4893-b6ce-1d03def3740e/resource/eb2ad230-b15f-480f-852f-95e0fadcd361/download/phc-profile-wood-buffalo-2017.pdf>

¹² Alberta Health database: http://www.ahw.gov.ab.ca/IHDA_Retrieval/selectCategory.do

¹³ Interactive Health Data Application (IHDA), Primary Care Network (PCN) profiles, Administrative Health Data, AHS ACPLF/PHSI: Cancer Community Prevention & Screening Dashboard, Alberta Environmental Public Health Information Network (AEPHIN)

¹⁴ Alberta Congenital Anomaly Surveillance Report: <https://open.alberta.ca/dataset/f8b42b59-ffc6-4b34-9156-27d832bb781c/resource/8bc10915-2fa5-4ccd-8522-a70a132f3feb/download/congenital-anomalies-report-11-2017.pdf>

- Propose methods for statistical analysis of available data
- Identify any vulnerable groups or susceptible populations (including within Indigenous communities) in the local and regional study areas;
- Identify uncertainties and limitations of proposed methods and available data
- Where possible, identify increased or decreased prevalence, incidence and trends for physical, mental and social determinants in Indigenous peoples, which are correlated with historical and/ or oil sands sector development in the Wood Buffalo Region
- In collaboration with Indigenous groups including Fort McKay:
 - Propose indicators of social health and well-being (including cultural), which are measurable and actionable, and will be assessed;
 - Propose indicators of traditional food and water use and security, which are measurable and actionable, and will be assessed; and
 - Describe the level of food security and food sovereignty within local and Indigenous communities, as reported by Indigenous groups. Refer to the Public Health Agency of Canada’s website on food security.

To the effects assessment (s.9.2), add the following:

- Collaborate with Indigenous communities on health assessment;
- Incorporate Indigenous understandings of what “health” comprises, do not focus solely on the medical approach; requires an appreciation of different world-views about health; and
- Clearly describe the selected indicators of physical, mental and social health.

To the biophysical effects section (s.9.2.1) add the following:

- Adhere to, and provide concordance with, published federal and provincial human health risk assessment guidance (Appendix 1);
- Describe the type, magnitude, extent, duration, frequency, and reversibility of effects associated with project activities; and
- Summarize findings of the assessment for each identified indicator including the change in status from proposed mitigation or management activity.

Social Determinants of Health section (s.9.2.2)

Fort McKay recommends that this section include reference to the federal guidance for Health Impact Assessment ¹⁵ and international guidance and, where appropriate these be used to describe requirements in the TISG. The following list are items to consider for a meaningful assessment:

- Define methods and indicate concordance with *The Canadian Handbook on Health*

¹⁵ *Canadian Handbook on Health Impact Assessment* (Volumes 1 to 4). 2004. Health Canada. Accessible at: <https://www.canada.ca/en/indigenous-services-canada/services/first-nations-inuit-health/reports-publications/health-promotion/canadian-handbook-health-impact-assessment-health-canada-2004.html>.

Impact Assessment Chapter 5 'Aboriginal Health and Traditional Knowledge;

- Identify any vulnerable groups or susceptible populations in the local and regional study areas, based on results of the baseline health condition assessment and describe how this affected assessment methods and results;
- Provide a summary of social determinants of health identified by engaged Indigenous groups and public groups and identify indicators, which were used to assess health impacts. In cases where identified social determinants were not assessed, provide supporting rationale for the exclusion;
- Describe factors and propose indicators for the holistic interpretation of health by linking the complex interrelationships between social, economic, political and cultural health determinants with the natural environment, such as the following examples:
 - Effects on health care services
 - Effects on income, socio-economic status and employment
 - Effects on municipal revenues and local industries
 - Migration and re-settlement
 - Effects on social and community health including effects on culture and way of life
 - Effects on services (e.g., education, social support networks, etc.)
 - Effects on psychological well-being (e.g., stress, anxiety, nuisance, discomfort)
- Propose criteria for assessing impact significance such as the following examples (from Table 2.4 from Canada's Health Impact Guidance):
 - Magnitude
 - Geographical limits
 - Duration and frequency
 - Cumulative impact
 - Socio-economic importance
 - Risk (probability)
 - Affected groups
 - Local sensitivity
 - Reversibility
 - Economic costs
 - Institutional capacity
- Provide a summary of the identified adverse and positive effects for identified indicators of social health for each project related activity and phase.

For the mitigation and enhancement section (9.3), add the following.

- When potential effects on human health exist due to exposure to a threshold contaminant, describe mitigation measures aimed at reducing residual effects to as low a level as reasonably possible;
- When potential effects on social determinants of health are identified (e.g. avoidance of traditional foods, displacement, loss of culture), describe mitigation measures aimed at reducing residual effects to as low a level as reasonably possible.

SOCIAL CONDITIONS (s.10)

Fort McKay intends to work collaboratively with Suncor on the socio-economic assessment, and recommend the below modifications be made to the TISG in order to reflect best practices in socio-economic assessment. A comprehensive assessment of social conditions will be an important component of a rights impact assessment.

The following list are potential items for consideration:

- Add new labour needs / changes. This is a long-term project and labour needs and skills will change. Will there be differences from present day situations.
- Validate forecasts of previous oil sands EIAs with actual outcomes to provide “certainty envelope” of forecasts;
- There is a lack of monitoring of social and cultural impacts. This section should discuss the kinds of data available and its sources and, if needed, potential studies to address the lack of information
- Regarding land and resource use (10.2), ensure that the discussion is distinguished between Indigenous residents and outsiders, the non-Indigenous local populations. Effects on recreational users do not capture effects on Indigenous groups – i.e., hunting, fishing, aesthetic enjoyment is not often considered recreation by Indigenous groups, rather part of survival, culture, way of life. Fort McKay recommends adding:
 - Describe predicted effects on Indigenous rights based activities (e.g. hunting, fishing, plant gathering), including, for example, effects to:
 - Access to, and quality and quantity of resources, including terrestrial, riparian, and wetland areas; and
 - Overall experience when undertaking Indigenous rights based activities, including effects of noise, viewsapes and artificial light
- Make the following additions (in italics):
 - Describe how potential avoidance of land near project components by Indigenous peoples due to perceived and observed changes in environmental quality, and tranquility, *personal and community safety*, and *access (gates, firearm restrictions, changes to roads and trails)* was considered in assessing potential effects to Indigenous peoples (including on diet, and health and *wellbeing, community cohesiveness, and knowledge transfer*).
- For effects to navigation (s.10.3.2):
 - Provide references for available Indigenous or aboriginal flow requirements which have been previously published by Indigenous communities in addition to the standards in LARP SW Quantity Management Framework;
 - Describe project components that will remove, alter or be constructed in, on, under, over, through or across navigable waterways as part of the project and include areas these will cut off and associated timelines; and
 - Describe how Indigenous groups were consulted regarding navigation and how issues were addressed.
- For community well-being (s.10.3.3) items such as:
 - Cost of living, housing, how will the project change people’s place in relation to poverty line;
 - Effects of vandalism on traditional lands; and

- Access to country foods including observed and documented quality.

ECONOMIC CONDITIONS (s.11)

Fort McKay intends to work collaboratively with Suncor on the social and economics assessment, and recommend the below modifications be made to the TISG in order to reflect best practices in socio-economic assessment. The economics assessment will be important information for the rights impact assessment.

Fort McKay notes that the Economics section is structured differently from other sections. Some items are missing from the baseline but included in mitigation and some items identified in effects are excluded from mitigation. For example currently, mitigation is only focused on 11.2.1 (training) and 11.2.2 (employment) and not on about 11.2.3 (contracting and procurement) and 11.2.4 (economics). We recommend that the section revised to confirm that every effect is evaluated and mitigation suggested.

Regarding baseline conditions (s.11.1), a meaningful assessment could include:

- Describe and consider existing impact to Indigenous people’s economic activities;
- In addition to jobs provide an overview of procurement/businesses; and
- Training and education are indicated in the mitigation and enhancement measures but not in the baseline, add to the baseline.

Regarding effects to economic conditions (s.11.2), a meaningful assessment could include :

- Validate economic and workforce forecasts of previous oil sands EIAs with actual outcomes to provide “certainty envelope” of forecasts;
- Regarding effects the wording says *describe*; change to say *evaluate*
- Add new labour needs and changes. This is a long-term project and labour needs and skills will change. Discuss potential differences from present day situations;
- Discuss the what kind of employment has resulted for Indigenous people from Suncor’s present operations and the factors that affect the employability of local Indigenous people at all levels of company operations; and
- Provide an analysis of expected Royalties to be paid and actual historical amounts realized by the Crown.

To mitigation and enhancement (s.11.3) add the following:

- We recommend additions (*in italics*) to the following bullet:
 - Proposed differentiated mitigation measures, if applicable, so that adverse effects do not fall disproportionately on Indigenous peoples and vulnerable subgroups (*including vulnerable subgroups within Indigenous communities*), and they are not disadvantaged *and have an adequate sharing* of any positive effects resulting from the project. These mitigation measures should be developed in collaboration with the potentially affected communities and subgroups; and
- Describe how the project will minimize contribution to industrial / oil and gas liabilities in Alberta and regionally.

INDIGENOUS PEOPLES (s.12)

Indigenous physical & cultural heritage and structures, sites or things of significance (s.12.1)

Pre-development baseline – For rights, heritage and culture, Fort McKay recommends two pre-development baselines for culture and rights as necessary context:

- Pre-Treaty (~1900) - Impacts to heritage and cultural transmission pre-date industrial development. The fur trade, the treaty process, early 20th century bitumen exploration, and other 20th century policies have all affected these conditions. Treaty is recommended as a pre-development baseline as a point at which Canada / the Crown's role became more significant.
- Pre-industrial development (~1960s) – This pre-development baseline is in line with the pre-development baseline for biophysical parameters and their assessment will be integral input to the rights assessment.

Link to the Provincial ToR – Fort McKay notes that the Provincial ToR only Alberta's legal requirements under the *Historical Resources Act*, and are a subordinate component of the requirements of the IAA. All work conducted in compliance with Alberta's Requirements must also meet the requirements of the current TISG, particularly in regards to the involvement of Indigenous peoples and effects on Indigenous peoples and their rights. Fort McKay requests one integrated historic resources study and assessment that meets the needs of the Province, the TISG and Fort McKay.

To the baseline section (s.13.1.1) add the following:

- Non-indigenous occupation of the region, including industrial development, is inextricable from the history of indigenous communities in the area and should be addressed;
- Ensure mitigation measures for known sites are identified, and address community needs and concerns;
- Describe best practices that will be employed for field studies including the following:
 - Screening of all shovel tests and archaeological excavations with maximum 6 mm mesh size;
 - Systematic site assessment at maximum 5 m spacing;
 - Radiocarbon dating of a sample of any recovered organic materials;
 - Recording all field data with sub-meter precision GPS; and
 - Use of 6 mm mesh size for screening.
- In the list of heritage and structures, sites, and things of significance for Indigenous group, include historic trails and travel corridors (over-land and water based); and
- Collect adequate data and conduct adequate analysis to apply Gender Based Analysis Plus (GBA+) to interpretations and evaluations of physical and cultural heritage and to structures, sites or things of historical, archaeological, paleontological or architectural significance

To the effects section (s.13.1.2) add the following:

- Describe how Indigenous Knowledge and input from Indigenous communities,

including Fort McKay informed:

- Strategies,
 - Site interpretation,
 - Site evaluation, and
 - Significance determination.
- Changes to the relationship between sites of physical and cultural heritage and their surrounding environment;
 - Take into account effects on social conditions, including culture transmission, mental health and community well-being, resulting from effects to physical and cultural heritage and historical connection to land (this is added to clarify some of the pathways by which impacts on heritage may impact Treaty rights); and
 - Describe how Indigenous groups will be notified of findings of historical resources, add participate in the management of chance finds.

Effects to current use of lands and resources for traditional purposes (s. 13.2)

To the baseline section (s.13.2.1) add the following:

- Trails;
- Regarding use of waterways add entry and exit/landing sites for watercraft; and
- For waterways and waterbodies including springs, wetlands, and shallow groundwater used as drinking water sources and aesthetic properties (taste, colour, clarity, temperature, odour) of those waters.

To the effects section (s. 13.2.2) add the following:

- In the following statement: quality, quantity, and distribution of resources available for harvesting, other than for subsistence (e.g. species of cultural importance, traditional and medicinal plants); please delete the phrase “other than for subsistence”;
- Resources for traditional purposes including water;
- Impacts to access of traditional lands and access to and from the community and Reserves;
- Describe potential effects on the transmission of *Indigenous knowledge, language, community institutions such as sharing, and community cohesion* linked to activities potentially affected by the project; and
- Take into account expectations pertaining to the preservation of landscapes, including nighttime landscapes and, if applicable, regulatory requirements *and best practices* in place concerning light pollution effects (*the proponent needs to work with communities to ensure that any standards that are applied are protective of traditional uses and purposes, human health*).

Health, Social and Economic Conditions of Indigenous Peoples (s.12.4)

The health, social and economic conditions section of the TISG indicates that this assessment must take into account requirements from the “above sections”. By this we assume all the other sections on Indigenous peoples (s.12.1, 12,2,12.3, 12,5) as well as applicable parts of health (s.9), social (s.10) and economic (s.11). Fort McKay plans to work collaboratively with Suncor to identify the key components of these assessment, methodologies, impact pathways

and linkages between these components, effects assessments and proposed mitigation.

In addition to the items listed that are required to be addressed in the Impact Statement, Fort McKay recommends adding the following:

- Regarding information on boom and bust cycles include any data available on the impact of boom and bust in this specific region. If sufficient information is not available there could be detailed modeling based on other communities in Canada and elsewhere where there has been large-scale mining in Indigenous lands (e.g., U.S., Australia). Boom and bust cycle information should include into the reclamation and closure phases; and
- Regarding country foods, in addition to contamination, availability and use, consider the issue of food security.

Rights of Indigenous peoples (s.12.4)

Fort McKay plans to lead the right assessment and intends to collaborate with Suncor and the Agency in the development of a rights assessment methodology and completion of the rights assessment including identification of potential mitigation and / or accommodation measures.

Restrictions to exercise of rights may already exist prior to the Baseline Case, which includes existing and approved development. Using existing and approved development as a baseline does not appreciate prior impacts to rights. Fort McKay recommends pre-Treaty (~1900) and pre-development (early 1960s) rights baselines – see description in s. 12.1.

- The first point about rights should recognize that there are other rights than just those listed. Fort McKay requests the following modification (changes in italics): identify and describe the *Treaty rights* and Aboriginal rights, *and other rights (UNDRIP, human rights)* of Indigenous peoples potentially affected by the project, including historic, regional, and community context, *including information on how rights have already been affected.*
- Information about landscape should be expanded to include: landscape, *social and cultural conditions that support* the Indigenous group's exercise of rights (e.g. large, intact and diverse landscapes; areas of solitude; connection to landscape; *sense of place, knowledge, language etc.*);
- The following statement is limiting since impacts on rights have the potential to go beyond direct linkages to resources, access and experience: describe the impact on the rights of Indigenous peoples, taking into account the concept of the link between resources, access and experience. The statement should either removed or broadened
- Given the goal of IAA (2019) is to foster sustainability, Fort McKay recommends that consideration of sustainability as defined by Indigenous groups be added to the list.
- Mitigation for rights impacts should address predicted climate change considerations for VCs and incorporate climate change adaptation into reclamation planning.

Mitigation and Enhancement Measures (s. 12.5)

- Identify if measures for which the proponent or other parties would be responsible;

<ul style="list-style-type: none"> • Change cooperation to <i>collaboration</i> with Indigenous peoples instead of cooperation (include perspectives of the potentially impacted Indigenous groups on the effectiveness of particular mitigation measures on such impacts); • Describe the measures that would enhance or support the exercise or practice of rights within <i>and outside the</i> project area • Describe accommodation, mitigation and complementary measures for impacts to previously known heritage and structures, sites, and things of significance, or those identified in the course of impact assessment and other field studies. The impact statement must include perspectives of the potentially impacted Indigenous groups on the effectiveness of particular mitigation measures on such impacts.
OTHER EFFECTS (s.13)
Potential Accidents or Malfunctions (s.13.1)
<p>To the Operational Risk Assessment section (s. 13.1.1)</p> <ul style="list-style-type: none"> • When identifying hazards at each project phase add component across the life-cycle including input and fuel supply (natural gas and diluents), • Take into account the lifespan, <i>design basis, age and current condition</i> of different project components. • Describe the costs and liabilities of the Project with supporting analysis comparing historic oil sands predictions and realities, including unfunded reclamation liability throughout the project life; • Describe the nature, frequency, duration and quantity of each type of interface with Highway 63. Discuss measures to avoid, minimize, contain and respond to incidents from the interface including fluid/pipeline release incidents, gaseous release and physical equipment incidents. Discuss environmental protection measures and bypass / egress plans for emergency and routine traffic flows between Fort McMurray and communities and mine sites to the north of the project. Discuss local and regional engagement of these measures and contingencies; • Modeling and information on operational risks should be provided as input to the human health risk assessment, health impact assessment and ecological risk assessment; • Risk of fire linked to the project including those associated with process plants and also stockpiles of coke or sulphur materials; • Risk of toxic or irritant release (ammonia based, sulphur based, etc.) linked to the project; and • Risk of flooding from the Athabasca River or tailings pond. <p>To the Avoidance and Mitigation Measures section (s. 13.1.2)</p> <ul style="list-style-type: none"> • Engineering, safety and risk reduction standards, criteria and approaches to be used including spacing, fire protection, prevention of leaks of toxic chemicals, active fire suppression and explosion/overpressure minimization and mitigation measures.
Effects of the Environment on the Project (s.13.2)
<ul style="list-style-type: none"> • Include a climate change adaptation plan for closure and reclamation;

<ul style="list-style-type: none"> • Climate change scenarios should be based on the IPCC projections that use the latest Earth System Models with the most complete representation of forcings, Representative Concentration Pathway (RCP) scenarios and output; and • The resilience assessment should consider multiple scenarios and different probability patterns [e.g. 5-year flood vs. 100-year flood vs <i>probable maximum flood (PMF)</i>¹⁶]
<p>RESIDUAL EFFECTS (s.14)</p>
<p>To the list of criteria to consider for residual effects, add the following:</p> <ul style="list-style-type: none"> • The sensitivity and importance of affected wetlands and their functions for Indigenous peoples; and • The sensitivity and importance of affected biodiversity (all scales) supporting opportunities to exercise rights to hunt, trap and fish and its functions for Fort McKay.
<p>CUMULATIVE EFFECTS ASSESSMENT (s.15)</p>
<ul style="list-style-type: none"> • Identify the VCs, <i>or their indicators</i>, that will be subject to the cumulative effects assessment; • Regarding the sources of cumulative effects: <ul style="list-style-type: none"> ○ Effects of Base Mine and adjacent mines should be specifically considered as part of this process <ul style="list-style-type: none"> ▪ Predicted and actual effects from those other projects are reported and considered; and ▪ Describe the effectiveness of any mitigation employed based on information from follow-up and monitoring programs. Specific lessons learned from those other long-standing projects would be especially valuable. ○ In the list of projects to be considered in the cumulative effects, see the following additions (in italics) <ul style="list-style-type: none"> ▪ past, existing and future oil sands mine projects; ▪ past, existing and future infrastructure projects; and ▪ past, existing and future projects and physical activities contributing to the fragmentation of the territory ▪ <i>past, existing and future expansion of the town site of Fort McMurray</i> ▪ <i>past, existing and future natural disturbance (i.e., wildfire, flooding)</i> • In the list of cumulative effects raised during the planning phase that must be considered add the following to the list: <ul style="list-style-type: none"> ▪ In cumulative effects related to fragmentation, include both direct and indirect habitat loss; ▪ Direct and indirect mortality of birds and migratory birds; ▪ Regional wetlands losses and transformation of the regional landscape to 80/20 upland/wetland from 50/50 upland/wetland;

¹⁶ Based on cumulative probability, protection based on planning infrastructure for a 5 year flood over a 25 year project life has a 64% likelihood of being exceeded / failing; planning infrastructure for a 100 year flood over the same timeframe has a 22% likelihood of being exceeded / failing. For large value assets with potentially large commercial and environmental impacts, these are high levels of risk.

- Loss of trails, waterways and cultural landscapes supporting opportunities to exercise constitutionally protected rights to hunt, trap and fish;
 - Cumulative effects related to ecological grief;
 - Effects to water quantity and quality in the Athabasca River
 - Regarding groundwater, address how administration of a groundwater management plan will reduce or eliminate the potential for regional cumulative effects;
 - Effects on heritage and structures, sites, and things of significance at the subregional and regional scale, including effects on the potential to understand and transmit culture and historical knowledge (rationale: added to address cumulative impacts as a result of limited mitigation of impacts to Indigenous heritage values to date, particularly in the west Athabasca subregion); and
 - Cumulative economic effects.
- In the development of follow-up programs determine the effectiveness with scientific evidence and/or testing through study and monitoring as the project proceeds.

FOLLOW-UP PROGRAMS (s.16)

For the follow-up section Fort McKay recommends the following:

In the list of factors to be considered in the design of follow-up programs:

- Add the likelihood of viability of new or unproven techniques and technologies; and
- Change the word “suggestions” from Indigenous groups to “collaboration” with Indigenous groups
- Inclusion of Fort McKay in the implementation and delivery of reclamation monitoring programs to assess the effectiveness of reclamation practices in achieving the re-establishment of capability for traditional land uses on reclaimed landscapes

In the follow-up framework (s.16.1) include the following:

- Note where provincial and federal monitoring programs may provide components of the framework and instances where proponent initiatives are required. The oil sands monitoring program (OSM) should be referenced and specific limitations noted;
- Monitoring of any adaptive management measure implemented through the course of the project to evaluate whether the new mitigation is effective;
- For the mechanism for disseminating the results of follow up programs, include a schedule and input from Indigenous groups into adaptive management; and
- Recommended follow-up programs include (*effect of concern*, objectives, parameters, timelines, and *targets*).

In the follow-up monitoring program (s.16.2) include the following:

- Monitoring of social and cultural impacts and also of impacts to rights;
 - Description of methodology for environmental, health, social, *cultural* and economic issues (including Indigenous health, social and economic issues and

Indigenous rights),

- Integrated Environmental Health Monitoring (IEHM).
- Identification of regional monitoring
- Measuring the effectiveness of mitigation, which includes reclamation, requires that both the baseline and the future effects can be quantified. The effectiveness of mitigation measures can only be determined by a monitoring approach that is based on testable or answerable questions, and includes adequate sampling and statistical procedures.
 - To the extent possible, the Impact Statement (IS) should present data that may be used for a baseline or benchmark in setting targets, thereby providing the foundation needed in the future to demonstrate the effectiveness of mitigation measures;
 - Where such data for bench marks and targets is not presented, a schedule and a process by which such data will be provided and used in the development of follow-up and monitoring targets should be provided. The targets are to be used in defining the expected success of mitigation. As not all indicators or data are conducive to measurement using targets, the IS should clearly indicate where qualitative and quantitative goals are used in place of targets;
 - Thresholds to trigger adaptive management in effects and mitigation effectiveness monitoring.
- Regarding air quality monitoring emissions include for mine fleet emissions the onboard and in-use mine fleet emission monitoring that will be conducted on an ongoing basis to determine and track mine fleet emissions throughout the life of the BMX project.

Appendix 1 – Reference documents

Fort McKay recommends the reference list also include:

- Reference to the International Impact Assessment Association (IAIA) publications iaia.org. There is a series of best practices and Fastips, for example in IK and social impact assessment¹⁷.
- Include and refer to UNDRIP and the Universal Declaration on Human Rights¹⁸
- Human health references – see footnote¹⁹:

¹⁷ For example, IAIA has published “Respecting Indigenous Peoples and Traditional Knowledge.” Also, there are now “International Principles for SIA” by Frank Vanclay and “Social Impact Assessment: Guidance for assessing and managing the social impacts of projects.”, Human Health: Ensuring a High Level of Protection,” “Health International Best Practice Principles,” and Fastips #8, “Health Impact Assessment.”

¹⁸ https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf ; <https://www.un.org/en/about-us/universal-declaration-of-human-rights>

¹⁹ *Canadian Tissue Residue Guidelines for the Protection of Environmental and Human Health*. Canadian Council of Ministers of the Environment. Available at <https://www.ccme.ca/en/resources/index.html#>

Health Canada. 2010. Federal Contaminated Sites Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors, Version 2.0. September 2010. Contaminated Sites Division, Safe Environments Directorate.

- Ecological Risk Assessment²⁰
- Soil and reclamation materials quality²¹
- Water quality guidelines²²

Compensation and Offset Plans (s. 21.10)

Fort McKay recommends the following be added:

- Offsetting plans require consultation and engagement to gather indigenous knowledge and input from indigenous communities on the plan options;
- Describe how the proposed measures align with Indigenous rights, interests and “current use of lands”;
- Compensation plans for species at risk should document any current or past species at risk mitigation and results and effectiveness of mitigation measures.
 - Ensure that in addition to wildlife and fish and rare plant species are considered i.e., from other Suncor facilities, what rare plant species mitigation measures have been implemented and what is the effectiveness of these measures. Provide data to support information.
- Regarding offsetting in general (e.g. wildlife);
- Note if proposed offsets include activities on-site or only offset activities off-site ;
- Typical hierarchy includes 4 steps:
 - (1) Avoid
 - (2) Minimize

Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada Supplemental Guidance: Checklist for Peer Review of Detailed Human Health Risk Assessments (HHRA). September 2010.

Health Canada. 2012. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0. September 2010, revised 2012. Contaminated Sites Division, Safe Environments Directorate.

Health Canada. 2013. Federal Contaminated Site Risk Assessment in Canada, Interim Guidance on Human Health Risk Assessment for Short-term Exposure to Carcinogens at Contaminated Sites. Contaminated Sites Division, Safe Environments Directorate.

Alberta Health, Government of Alberta. 2019. Guidance on Human Health Risk Assessment for Environmental Impact Assessment in Alberta, Version 2.0 ISBN: 978-1-4601-4359-9, <https://open.alberta.ca/publications/9781460143599ReviewStandards>.

²⁰ *Ecological Risk Assessment Guidance Document*. Canadian Council of Ministers of the Environment. 2020. Available at: *Canadian Tissue Residue Guidelines for the Protection of Environmental and Human Health*. Canadian Council of Ministers of the Environment. Available at <https://www.ccme.ca/en/resources/index.html#>

²¹ *Alberta Tier 1 and 2 Soil and Groundwater Remediation Guidelines*. 2019. Government of Alberta. Accessible at: *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*. Canadian Council of Ministers of the Environment. Available at <https://www.ccme.ca/en/resources/index.html#>
Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act. Ontario Ministry of the Environment, Conservation and Parks.

²² *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. Canadian Council of Ministers of the Environment. Available at *Environmental Quality Guidelines for Alberta Surface Waters*. 2018. Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta. Accessible at: *Canadian Tissue Residue Guidelines for the Protection of Environmental and Human Health*. Canadian Council of Ministers of the Environment. Available at <https://www.ccme.ca/en/resources/index.html#>

Guidelines for Canadian Drinking Water Quality. 2020. Health Canada. Accessible at: <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html>

- (3) Remediate²³, and
- (4) Offset
- Regarding fish:
 - Follow the “hierarchy of measures” prescribed in the “Fish and Fish Habitat Protection Policy Statement”
 - First avoid HADD,
 - Second mitigate effects, and
 - Finally that which cannot be avoided or mitigated is to be offset by enhancement or restoration of habitats or by creation of appropriate aquatic habitat.
 - Note if habitat banks are proposed.
 - Consider complementary measures with regard to fisheries offsetting and
 - For fish habitat, this is prescribed by DFO in an Authorization in consultation with a proponent and other interested parties. The latest version of the regulations surrounding authorizations may be found in “Authorizations Concerning Fish and Fish Habitat Protection Regulations” (SOR/2019-286).
- Potential conservation offsets should include consideration of Indigenous rights and the possibility of meeting multiple objectives (e.g. wetlands, traditional use, wildlife).

²³ The third step requires that biodiversity loss is then remediated within the footprint of the development, which could entail actions such as reseeded affected land or developing a breeding program for affected species during and after project completion.” (Arlidge et al. 2018)
 Arlidge, W.N.S., J.W. Bull, P.F.E. Addison, M.J. Burgass, D. Gianuca, T.M. Gorham, C. Jacob, N. Shumway, S.P. Sinclair, J.E.M. Watson, C. Wilcox, and E.J. Milner-Gulland. A global mitigation hierarchy for nature conservation. *BioScience* 68(5): 336-347

Suncor Base Mine Extension Project Air, Odour, Acoustic, and Visual Assessment Supplementary Comments to IAAC Tailored Impact Statement Guidelines

Prepared by Danlin Su, P.Eng. and David Spink, P.Eng., March 17, 2021

1. INTRODUCTION

Fort McKay is a First Nation Community located in the center of the mineable oil sands area. Its Traditional Territory has numerous existing, and planned, oil sands mining and in situ oil sands projects. As such, Fort McKay is significantly adversely affected and impacted by oil sands development. One of these adverse impacts is on air quality.

As Indigenous people, Fort McKay considers air to have intrinsic importance and value. Therefore for Fort McKay's people and their Traditional Territory to be healthy, requires that the environment, which includes the air, be clean. This translates to a priority on the application of the principles of "polluter pays", "pollution prevention", "keeping clean areas clean" and "continuous improvement" when managing air emissions - all of which align with Impact Assessment Act's principles for sustainability.

Fort McKay has suggested several air-related additions to the draft February 26, 2021 Tailored Impact Statement Guidelines (TISG) issued by the Impact Assessment Agency of Canada (IAAC). This document provides the detailed context and rationale for certain of the suggested changes, and also some general comments that provide further context to the suggested changes.

2. SUSTAINABILITY PRINCIPLES AND REGIONAL AIR QUALITY

A key purpose to the Impact Assessment Act (IAA) is to foster sustainability, which is defined in the Act as *"the ability to protect the environment, contribute to the social and economic well-being of the people of Canada and preserve their health in a manner that benefits the present and future generations."* As a mandate, the Act states that *"the Government of Canada, the Minister, the Agency and federal authorities, in the administration of this Act, must exercise their powers in a manner that fosters sustainability, respects the Government's commitments with respect to the rights of the Indigenous peoples of Canada and applies the precautionary principle."*

The concept of sustainability under the implementation of the IAA considers four guiding principles (IAAC, 2021):

- 1) Consider the interconnectedness and interdependence of human-ecological systems;
- 2) Consider the well-being of present and future generations;
- 3) Consider positive effects and reduce adverse effects of a designated project; and
- 4) Apply the precautionary principle and consider uncertainty and risk of irreversible harm.

The importance of air quality and clean air in association with quality of life is well recognized. The World Health Organization (WHO, 2000) considers clean air to be *"a basic requirement for human health and wellbeing."* The impacts of oil sands activities on air quality in the Athabasca Oil Sands Region (AOSR) have been well documented by the Royal Society of Canada (Gossel, 2010). The Alberta Energy Regulator and Alberta Health conducted an assessment related to air quality and odour complaints from

the community of Fort McKay which noted that: *“This initial and screening level review found that some substances were present in the air in concentrations that exceeded odour and health thresholds, and that there is a potential that ongoing exposure to certain substances may impact human health.”* (Alberta Energy Regulator and Alberta Health, 2016). A recent air quality analysis by Environment and Climate Change Canada (ECCC) using air quality data collected at an ECCC air quality monitoring station located in Fort McKay found that the community experiences air pollution episodes almost 50% of the time and that the air can contain mixtures of pollutants (Wren, et al., 2020).

These studies and findings, and many other similar studies and findings, clearly indicate that Fort McKay is as a community that is disproportionately impacted by oil sands development air emissions and the associated negative quality of life issues created by these impacts, such as odours, dust, noise, light pollution, and reduced air quality. Fort McKay therefore wants to ensure that that sustainability guiding principles #1 and #2 are applied rigorously in the assessment and management of all air-related impacts associated with the proposed BMX project.

In considering the BMX project’s impacts to air quality, dust, and odour, as well as the acoustic and visual environments, the key sustainability questions that the FMFN seeks to understand through the Impact Statement prepared based on the TISG are:

- What are all the air emissions from the project?
- How will the air emissions behave in the environment and how will they impact our physical surroundings and our health?
- What are the sensory impacts to our physical surroundings in terms of odour, sound, and visibility?
- Are the air and sensory changes and impacts presented in a way that is representative, meaningful, and easily understood?
- How confident can we be in the reliability of the predicted impacts based on present knowledge?
- Have all the options to minimize project impacts been considered and are the best available technologies and management practices being proposed? If not, why not? Since the BMX project will sustain Suncor’s Base Plant with bitumen resource for 25 years, what measures will be in place to ensure that the mitigation measures put in place, after the project is approved and operational, are regularly assessed, and modified as needed, consistent with the principle of *“continuous improvement?”*
- Since this project will be sustaining Suncor’s current upgrading operations, what assessments and measures are being taken to ensure that Suncor’s Base Plant’s air emissions are also being managed in a sustainable and environmentally responsible manner?

3. ASSESSMENT METHODOLOGY

3.1. Scope of Analysis

3.1.1. Air Contaminants Assessed

In the document *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality* (2016), Health Canada considers the health risks from contaminants of potential concern

(COPCs) to include diesel particulate matter (PM) as a separate contaminant from total PM, PM_{2.5}, and PM₁₀. Diesel engine exhaust, which consists of diesel PM and gaseous emissions from diesel engines, is classified by the International Agency for Research on Cancer (IARC) as “carcinogenic to humans” with linkage to increased risk of lung cancer (California Air Resources Board, 2021). Since mine fleet for the BMX project will be a major source of diesel engine emissions, the impact of diesel particulate matter should be assessed independently. While TISG Section 21.12 requires that tailpipe emissions be considered, diesel PM should be specifically identified as a contaminant to be assessed in the Impact Statement.

Recommendation 1:

Section 8.4.1.1. Baseline conditions

Under bullet:

provide the results of a baseline survey of ambient air quality, in particular near key receptors by identifying and quantifying emission sources for the following contaminants:

Add sub-bullet:

diesel particulate matter,

3.1.2. Acid Deposition

According to the Suncor’s *Base Mine Extension – Detailed Project Description Summary* dated July 2020, all bitumen processing and upgrading subsequent to primary extraction of bitumen froth will occur at the Base Plant. Mining activities (particularly mine fleet) are therefore the major source of NO_x emissions for the BMX project and should be considered in acid deposition assessment. Acid deposition model predictions should be compared between pre-project, current, and post-project assessment scenarios (further discussed in Section 3.2 of this document).

Recommendation 2:

Section 8.4.1.2. Changes to the atmospheric environment

Under sub-heading Acid Deposition:

Revise bullet to:

conduct model simulations to predict acidifying deposition using emissions of NO_x and SO₂ from processing facilities and mining activities that are part of the Project. Compare acidifying deposition predictions for the Project to those associated with the current Base Mine operations as well as other development scenarios listed in Section 7.3.1 Temporal Boundaries;

3.2. Temporal Boundaries

In order for FMFN and the regulatory agencies to fully and meaningfully understand the potential impacts from the BMX project, the establishment of baseline information is crucial. Since members of the FMFN have inhabited the area for generations, the perspective of “baseline” is associated with pre-development as well as existing conditions. The need to capture past impacts through the establishment of a pre-development benchmark is significant since, over time, every new project gradually but

continually adds to regional emissions, resulting in each future project's relative contribution being gradually diminished as a result of cumulative growth in the region.

Since air dispersion modelling and related air quality impacts represent predicted cases that can only be validated in the future, a "current" modelling scenario needs to be conducted. Such a scenario allows the use of current measured emission data and the model predictions, which can be compared to current air quality and pollutant deposition data. This modelling scenario provides an indication of modelling uncertainties and helps in the interpretation and use of the predictions from the three future scenarios i.e. Base case (existing plus approved), Application (base case + project) and Planned Development case (application case + planned projects). Another problem with the base case is that some projects that have an approval and are included in the base case have not been constructed and may never be constructed (e.g. the Syncrude Aurora South mine received an approval in the late 1990s and has been included in all base case assessments since then and is currently not scheduled to go into operation until the 2030s). A "current" development case also allows a "real-world" assessment of how air quality has changed from the "pre-development" case to today.

Recommendation 3:

Section 7.1. Baseline methodology

Add bullet:

Pre-project baseline conditions should include both a pre-regional development baseline and a current operations baseline;

Section 21.12. Additional guidance for biophysical components, Atmospheric environment.

Revise sub-bullet to:

conduct modelling for all relevant temporal scenarios (see section 7.3.1 Temporal Boundaries), including: the pre-regional development case, current operations case (all existing emission sources), base case (i.e. all existing emission sources plus projects already approved and under construction), a project-alone scenario (recommended in order to represent emissions from the project only), the application case, and the planned development case; and

Recommendation 4:

Section 7.3.1 Temporal Boundaries

Under paragraph:

The proponent has identified four typical development scenarios in the Detailed Project Description, Appendix E, as follows:

Add bullet:

Current Case, which considers the current conditions and existing project or activities;

Under paragraph:

In defining the assessment scenarios, the Impact Statement must:

Revise bullet to:

*clearly identify and describe effects from the project for all VCs, such that effects discussed in a project-only case or an application case due to the project **are presented in a meaningful context (i.e. relative to the pre-development and current scenarios) that can easily be understood, and not only expressed relative to the baseline case.***

3.3. Degree of Confidence

Air dispersion modelling is an essential tool used in environmental impact assessments (EIAs) to assess possible air quality impacts resulting from existing, proposed, and/or planned projects. It is therefore a necessary tool to predict how sustainable a project is, or a group of projects will be, in terms of air quality impacts, and a critical tool for regional cumulative air quality management.

While the acceptable approach to model potential air quality impacts in Alberta is outlined in the Air Quality Model Guideline (Alberta Government, 2013) to ensure a consistency in modelling methodology, there are a number of issues that need to be addressed through collaborative efforts by industry and government agencies in order to ensure that air dispersion modelling continues to be an effective decision making tool. At a project impact assessment level, the use of best possible input data, such as emission estimates and assumptions, particularly information that has been ground-truthed through operational records, local studies, and/or regional monitoring efforts should be given preference over emission factors taken from literature or other jurisdictions that may or may not be relevant to the unique climate in Alberta and operational characteristics of projects in the AOSR. Such data, as they become available, should be progressively incorporated and applied to air dispersion modelling and impact assessments in the region to improve the degree of confidence on modelling outputs and in turn, provide better quality input for decision making under regional environmental management frameworks.

Given the number and sizes of operating and prospective oil sands projects that are in the AOSR, any uncertainties associated with emission estimates can have the potential to compound into substantial regional underestimating of cumulative emissions and associated air quality impacts. Some examples of limitations, uncertainties, and data gaps associated with oil sands air emissions include:

- Mine fleet emissions (discussed in Section 4.1 of this document);
- Type and quantities of odorant emission from exposed mine and tailings pond surfaces (both of which are associated with the BMX project);
- Secondary organic aerosols (as required to be assessed under the draft TISG Section 8.4.1.2); and
- Fugitive dust emissions (discussed in Section 3.5 of this document).

Fort McKay, being a community located in proximity to a number of major oil sands surface mining and upgrading facilities, experiences first-hand the impact of air emissions (e.g. odour episodes). Despite these types of clear and well documented impacts, regulatory approvals continue to be issued for new projects and regulatory approvals for existing facilities continued to be renewed with no to minimum

additional air emission mitigation measures. This is, in part, the result of project applications and EIAs, indicating that project impacts are not significant and residual impacts are being appropriately managed. Naturally, this raises questions about the degree of confidence that can be placed in past air quality assessments that resulted in what are now existing facilities that are having significant air quality impacts.

While recognizing that the current understanding of some air emissions is limited, the FMFN expects the project Impact Statement to include and demonstrate that the best available information is incorporated into the project assessment and that the “*precautionary principle*” is applied when there is a high degree of uncertainty related to project and regional air emission estimates, consistent with IAA’s mandate and the sustainability guiding principles.

Finally, as part of follow-up and adaptive management programs for the BMX project, data gaps and data uncertainties should be further monitored and assessed in order to contribute to a progressive building of understanding and knowledge which can be applied in future air quality assessments for Suncor and other projects in the AOSR.

Recommendation 5:

Section 7.1 Baseline methodology

Revise bullet to:

provide a description of the information sources used to determine pre-development and current baseline conditions, including the sources of all available information and a justification of, or rationale for the information source selected for use in baseline condition analysis and their adequacy. The justification should explain and compare any limitations or uncertainty pertaining to the information sources available, such as for project-specific studies, field surveys, and the use of existing data and information;

Add bullet:

indicate how the baseline data gaps identified can be addressed through additional future research, monitoring, and/or field studies, whether through the proponent’s efforts as part of project operations or as strategic regional initiatives involving industry and government;

Recommendation 6:

Section 7.4. Effects assessment methodology

Add bullet:

discuss the degree of confidence associated with assumptions obtained from other jurisdictions or the literature (e.g. air emission factors), their relevance to the project given the climate in Alberta and operating conditions of the project, and how varying levels of uncertainty associated with these assumption may impact the effects assessment outcome;

Recommendation 7:

Section 8.4.1.2. Changes to the atmospheric environment

Under bullet:

assess the uncertainty in the modeled air pollutant concentrations using relevant range of model inputs. All sources of uncertainty should be taken into account, including:

Revise sub-bullet to:

*uncertainty in estimates of source emissions (from sources attributable to the project, and externally). Uncertainty in source estimates should take into account any **field measurements or studies acquired through existing Base Plant operations, regional studies conducted through Wood Buffalo Environmental Association (WBEA) or the Oil Sands Monitoring Program (OSMP), and other published studies which have shown apparent discrepancies between reported and observed emissions,***

Recommendation 8:

8.10.2. Effects to climate change

Add bullets:

provide a discussion on the level of uncertainty associated with GHG sources (including biogenic sources) and emission factors, and how these uncertainties would affect the degree of confidence in the assessment outcome;

provide a methodology through which GHG sources and emission factors will be monitored, measured, and verified in future operational efforts and/or strategic regional initiatives;

3.4. Air Dispersion Modelling Results Presentation

Recommendation 9:

Section 8.4.1.2. Changes to the atmospheric environment

Revise bullet to:

*provide maps of isopleths illustrating the predicted **ground level concentrations** for the modelling scenarios, using an appropriate scale to visualize the extent of dispersion and sensitive receptors;*

Under bullet:

compare the predicted air quality results with applicable regional, provincial and federal standards for ambient air quality and community-based air quality and odour guidelines.

Add sub-bullet:

*The assessment against CAAQS should be compared against the **yellow, orange, and red management thresholds, along with maps of isopleths illustrating the areas with predicted ground level concentrations exceeding each respective management thresholds;***

3.5. Dust

The methods used by oil sands project proponents to estimate fugitive PM emissions are based on emission factors and the applicability of these factors in an oil sands context has not been verified. Recent research on the wind erosion potential of certain potential oil sands fugitive emission sources (Wang, et al., 2015) provides some field measurement-based wind erosion PM₁₀ and PM_{2.5} emission factors that may provide more relevant and reliable dust emission estimates and in EIAs these factors should be used to the extent possible.

A very recent paper on oil sands emissions (Zhang, et al., 2018) indicates that anthropogenic fugitive dust emissions account for 65% of total PM_{2.5} emissions from the AOSR mines. The study compared different emission data sources and found the variation in reported values was up to 10-fold for PM_{2.5}. Further, the study found that ECCC aircraft measurements of PM_{2.5} emissions covering a 2 month period (August-September 2013) were 1.5 to 5 times higher than base case annual reported oil sands mining project PM_{2.5} emissions. Current EIAs are therefore likely very significantly underestimating oil sands mining PM_{2.5} emissions and therefore both project and cumulative fugitive dust emission impacts. Impact assessments need to use the latest monitoring information to estimate fugitive dust emissions and the use of emission factors needs to be justified and the uncertainties associated with such factors clearly outlined.

Recommended changes to the TISG associated with emission estimates uncertainties are discussed in Section 3.3 of this document.

3.6. Odour

The draft TISG contains some requirements for the consideration of odour in Suncor's assessment of air quality related impacts from the BMX project. To date, there is no standard approach or guidance from government agencies as to how odour assessments should be conducted. While oil sands project EIAs typically give odour at least some level of consideration, the conclusions generally indicate that oil sands emissions have no or minimal potential to result in offsite odours, which is contrary to the experience of Fort McKay residents as documented in the Alberta Energy Regulator and Alberta Health report (2016) *Recurrent Human Health Complaints Technical Information Synthesis: Fort McKay Area*. This discrepancy between EIA conclusions and actual experiences of receptors would indicate that more guidance with respect to odour assessments is required to ensure that such assessments are comprehensive and conducted in a systematic manner that addresses, at the very minimum, the following common deficiencies associated with typical assessments found in project EIAs:

- The use of odour thresholds for odorants that are extremely high and which aren't based on standardized or reproducible odour threshold determination methods;
- Using 1-hour averaging period predictions as an indicator of the potential for odours when odours are detected almost immediately by the human nose and therefore averaging periods in the order of minutes are more appropriate for predicting the possible presence of odours;
- Not recognizing that odour thresholds are the concentration at which one-half the population would not be expected to detect an odour which conversely means that one-half the population would detect an odour at this concentration;

- Assessing only a limited number of odorants and making assumptions regarding the emission rate of these odorants that may be low (note: there is extremely limited characterization and quantification of odorant emissions in the AOSR); and
- Treating odorant response as odorant specific and that there is no additive effective between odorants, which is not likely the case.

Recommendation 10:

Section 8.4.1.1. Baseline conditions

Revise bullet to:

provide dispersion modelling of a baseline assessment of odours at key receptor points, including in Fort MacKay and Fort McMurray.

Recommendation 11:

Section 8.4.1.2. Changes to the atmospheric environment

Add bullet:

provide air dispersion modelling of assessment of odours at key receptor points, including in Fort MacKay and Fort McMurray. The assessment should be comprehensive and consider the wide range of odorous compounds emitted by the project, their respective odour thresholds, the additive nature of odorous compounds, as well as the typical magnitude and duration of odour events currently experienced at key receptor points;

Add bullet:

*consult and consider odour impact assessment guidance considerations outlined in the document *Guidance for Odour Impact Assessments and Odour Management for Proposed Oil Sands Projects on Fort McKay's Traditional Territories* (available from the Fort McKay Sustainability Department).*

3.7. Acoustic Assessment

In addition to sound energy levels and their frequency, other aspects of sound characteristics should be considered in the Impact Statement. The Health Canada *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise* provides further guidance on noise characteristics such as tonal and impulsive noise, low-frequency noise, and perceptibility, which are characteristics associated with potential operational noise sources that would have an impact on human well-beings if they are detected at the receptor points.

Recommendation 12:

Section 8.4.2.2. Changes to the acoustic environment

Add bullet:

provide a list of all noise sources;

Revise 2nd bullet to:

*quantify sound levels at appropriate distances from any project facilities and/or activities and describe for each sound source the timing, frequency, and duration of sound events and their characteristics, including the frequency spectrum, **tonality, and perceptibility**;*

Revise 6th bullet to:

*where there is public concern associated with an increase in sound levels during construction **and operations**, provide a vibration and sound impact assessment including an overview of concerns and an assessment of the change in percent highly annoyed (see Health Canada guidance on Noise); and*

3.8. Visual Assessment

While lighting is necessary to maintain safety and security and to sustain daily operations at project facilities, misdirected, excessive, inefficient, or unnecessary lighting can cause light spillage which serves as a constant reminder to Fort McKay residents and other local land users of the oil sands activities in proximity to their home and Traditional Territory. Excessive light spillage can also affect wildlife behavior or movement patterns and diminish the contrast between the dark sky and celestial sources of light, making it harder to see the stars (Virtual Museum of Canada, 2021). The Commission Internationale de l'Éclairage's *Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations* (CIE, 2003) outlines the considerations for assessing impacts of outdoor lighting on a number of receptor types, such as nearby residents, adjacent roader users, sightseers, and astronomical observations. At a minimum, the impact of BMX project lighting on Indigenous groups as well as the natural environment as a result of sky glow and spill light should be considered in the Impact Statement.

Recommendation 13:

Section 8.4.3.1. Baseline conditions

Add bullets:

consider visibility of the existing and proposed project components (i.e. lighting, sky glow, dust, flares, stack plumes, infrastructures, etc.) from key receptor points, including but not limited to Fort McKay and Fort McMurray, as well as traditional land use locations identified by Indigenous stakeholders;

delineate the zone(s) of influence within which receptors (Indigenous groups, land users, and wildlife) may be impacted by changes in the visual environmental and night-time light levels, and identify the zone(s) of influence and receptor viewpoints on a map.

Section 8.4.3.2. Changes to the visual environment

Revise sub-bullet to:

*quantify light levels at appropriate distances from any project **components and at key receptor points within the defined zone(s) of influence**, including the **source**, timing (e.g. night hours), frequency, duration, **intensity**, distribution and character of light emissions;*

4. MINE FLEET EMISSIONS

4.1. Mine Fleet Emission Rates

Oil sands surface mining operations, and the large mine fleets associated with these operations, are a significant source of regional NO_x emissions with uncertainty regarding the exact magnitude of these emissions (Wang, et al., 2015; ECCO and AEP, 2016; Zhang, et al., 2018). Estimates of the relative significance of oil sands mine fleet NO_x emissions are that they represent approximately 37% of the total anthropogenic NO_x emissions in the AOSR (Vijayaraghavan, et al., 2016) and approximately 60% of the oil sands related NO_x North of Fort McMurray (Davidson & Spink, 2017). Mine fleets are also a significant source of diesel particulate emissions (Zhang, et al., 2018), which, as discussed in Section 3.1.1 of this document, should be considered in the Impact Statement independent of other particulate matters.

It can be difficult to illustrate mine fleet emissions in an easily understood regional context. Based on the mining rate proposed for the Suncor BMX project, and a mine fleet NO_x emission rate reflecting current requirements, the BMX Project mine fleet would emit approximately 12 tonnes per day of NO_x. This level of NO_x emissions can be translated into passenger vehicle equivalents using the following information:

- the current Canadian “On-Road Vehicle and Engine Emission Regulations” (Government of Canada 2017) for passenger and light light-duty trucks fleets requires a NO_x emission rate of less than 0.07 grams NO_x per mile, and
- based on this allowed grams NO_x per mile emission rate, 1 passenger vehicle travelling at 30 mph continuously for 1 day would emit 50.4 grams NO_x per day.

It would therefore take ~240,000 passenger vehicle going 30 mph for 24 hours to emit 12 tonnes per day of NO_x i.e. $(12 \text{ t/d} \times 1,000,000 \text{ g/t}) / 50.4 \text{ g/d/passenger vehicle}$. This highlights the significance of the BMX project’s mine fleet as a source of NO_x emissions.

Mine fleet emission rates are estimated using a USEPA NONROAD model ([NONROAD2008a Installation and Updates | MOVES and Other Mobile Source Emissions Models | US EPA](#)) which translates factory based engine tested emission limit compliance values to actual in-operation/use (real world) emission rates. Therefore the estimated emissions from mine fleets are a “calculated” as opposed to “measured” value. The first actual onboard and in-use emission testing of oil sands mining was undertaken by the Wood Buffalo Environmental Association (WBEA) and some of the results from this work were published by Wang, et al. (2015). Their paper noted that: “*A comparison of emissions with those reported by oil sands facilities showed large variations, both among the facilities and between the reported emissions and the real-world measurements.*” In general, the NO_x emissions being reported for the large heavy haulers that were tested were lower than what was measured. For particulate matter, the values being reported were much higher than the actual measured emissions.

In a recent review of a project (Syncrude, 2018), Fort McKay became aware of some subsequent on-board emission testing that found a Tier 2 heavy hauler to have higher NO_x emissions than a Tier 1 heavy hauler, when Tier 2 heavy hauler vehicles should have NO_x emissions ~30% lower than Tier 1 heavy hauler vehicles. While these findings were based on a very limited number of tests, they highlight the uncertainty that currently exists regarding the real-world emissions from mine fleets.

This is a very important issue because without accurate mine fleet emission data it is impossible to accurately predict the environmental and health impact associated with this emission source. It is also impossible to determine the mine fleet emission parameters that should be a priority for possible further management. For example, the Wang, et al. (2015) work would indicate that particulate emissions are less than expected but NOx emissions are higher, which would translate to a focus on reducing NOx emissions. A follow-up mine fleet emission monitoring program to verify mine fleet emissions, supplemented by an adaptive management program to ensure continuous improvement with respect to mine fleet emissions management, is crucial to regional air quality management in terms of NO₂ and PM_{2.5} levels.

Recommendation 14:

Section 8.4.1.3. Mitigation and enhancement measures

Add bullet:

provide a description of methodology to measure and verify the efficiency of contaminant emission reduction measures;

Recommendation 15:

Section 8.4.1.2 Changes to the atmospheric environment

Change the 2nd bullet to:

provide a detailed methodology and assumptions used to estimate emissions of air pollutants at all phases *and for mine fleet emission estimates, indicate how all available onboard and in-use testing of emissions from heavy haulers was used in estimating mine fleet emissions and the uncertainty range associated with the mine fleet emission estimate;*

Recommendation 16:

Section 16.2 Follow-up program monitoring

Under paragraph:

As also required by AB TOR 2.11C (Annex I), Describe the Suncor's current and proposed monitoring programs with respect to:

Revise bullet to:

air emissions, including fugitive emissions *and for mine fleet emissions the onboard and in-use mine fleet emission monitoring that will be conducted on an ongoing basis to determine and track mine fleet emissions throughout the life of the BMX project;*

In addition to potential discrepancies between actual mine fleet emissions and emission rates derived from emission factors based on engine tiers, another component that contributes to uncertainty associated with mine fleet emissions from a project is the gross operating hours for each unit and the number of units that fall under each engine tier within the project's fleet. As with general assumptions, emission factors, and adjustment factors used in estimating mine fleet emissions, a breakdown of the number and type of mine fleet units, along with their respective gross operating hours, should be included in the Impact Statement.

Recommendation 17:

Section 21.12. Additional guidance for biophysical components

Revise sub-bullet to:

*For the mine fleet: include **the number and vehicle descriptions for all mine fleet and assumptions with activity data such as a breakdown of annual gross operating hours by fleet unit.***

4.2. Potential Environmental and Health Impacts

NO_x emissions, and the subsequent secondary atmospheric reactions associated with these emissions, have a number of potential environmental health and environmental impacts which include: direct effects on vegetation; acidification and nitrogen fertilization; increased ozone formation; secondary particulate formation; and cardiopulmonary, cardiovascular and respiratory health effects (USEPA, 2016; Health Canada, 2016; USEPA, 2020; Health Canada, 2019). Diesel particulate emissions can also have significant environmental and health implications (Health Canada, 2015; Jonson, et al., 2017).

Mine fleet emissions in the oil sands region therefore represent a significant source of air pollutants with the potential to cause adverse environmental and health effects. Health Canada (2016) notes that *"Nitrogen oxides (NO_x) are emitted predominantly from combustion sources. Most emissions of NO_x are as nitric oxide (which is rapidly converted to NO₂), along with lesser quantities of NO₂ itself."* In 2017, Canadian Ambient Air Quality Standards (CAAQS) for NO₂ were established (Government of Canada, 2017) and became effective immediately and air quality relative to the NO₂ CAAQS to be first assessed in 2021 based on 2018, 2019 and 2020 air quality data. The Fort McKay Sustainability Department (FMSD) has conducted a preliminary assessment of air quality in Fort McKay relative to these NO₂ CAAQS which indicates that Fort McKay will be in the CAAQS "orange" management level which will require development of a comprehensive air zone management plan to improve air quality (CCME, 2019).

4.3. Mitigation Measures

4.3.1. Current Mine Fleet Emission Control Requirements

Canada's current exhaust emission requirements for off-road compression ignition engines (i.e. diesel engines) are specified in the *"Off-road Compression-Ignition (Mobile and Stationary) and Large Spark-Ignition Engine Emission Regulations: SOR/2020-258"* (<https://gazette.gc.ca/rp-pr/p2/2020/2020-12-23/html/sor-dors258-eng.html>). The emission limits in this regulation are based on emission limits set by the USEPA in 2004 (USEPA, 2004) in order to harmonize requirements between the US and Canada. Unfortunately, the emissions limits for mobile units with engine sizes greater than 750 hp do not reflect best available emission controls and it is units in this size range (particularly heavy haul trucks) that are

responsible for most of the oil sands mine fleet emissions. The following is an explanation of why this is the case.

In setting NOx limits for >750 hp mobile units (heavy haul truck used in oil sands mining generally fall into a 3,500-4,000 hp range category) the USEPA noted (2004) that:

“We note that the magnitude of NOx reductions determined in the final rule analysis is somewhat less than what was reported in the proposal’s preamble and RIA, especially in the later years when the fleet has mostly turned over to Tier 4 designs. The greater part of this is due to the fact that we have deferred setting a long-term NOx standard for mobile machinery over 750 horsepower to a later action. When this future action is completed, we would expect roughly equivalent reductions between the proposal and the overall final program, though there are some other effects reflected in the differing NOx reductions as well, due to updated modeling assumptions and the adjusted NOx standards levels for engines over 750 horsepower.”

The USEPA (2004) also noted that:

“The long-term NOx standard for engines not used in generator sets (mobile machinery) will be addressed in a future action (we are currently considering such an action in the 2007 time frame).”

This action has not occurred with the result that less than stringent NOx emissions are being applied to NOx emissions from heavy haulers.

4.3.2. Possible Options to Reduce Mine Fleet Emissions

There appear to be several possible options available to reduce oil sands mine fleet emissions which Fort McKay has identified in its review of previous oil sands mining project, though none of which have received any serious analysis or consideration by project proponents in previous EIAs.

Two options that are related to initiatives currently being undertaken by Natural Resources Canada in its evaluation of options to reduce emissions associated with gasoline and diesel fuelled vehicles include:

- Use of alternate vehicle fuels: compressed natural gas (CNG), liquid natural gas (LNG) and/or hydrogen fuel; and
- The use of electric vehicles in mining applications.

Another option relates to a study commissioned by Environment Canada (2008). The study report outlines possible retrofits to existing mine fleet vehicles to reduce NOx emissions and diesel particulate emissions. Retrofits may also have the potential to enhance the emission controls on new vehicles.

Lastly, another option for reducing mine fleet emissions is to accelerate the replacement of older higher emitting vehicle with newer, lower emitting vehicles while prioritizing the usage (i.e. gross operating hours) of newer units.

With respect to the use of alternate vehicle fuels an option that has been tested and studied is the replacement of a portion of the diesel fuel used by heavy haulers with LNG. A study on the use of natural gas as a fuel for mine haul trucks was commissioned by NRCan (InterGroup Consultants Ltd., 2017). This study would indicate that, in addition to potential delivered fuel cost savings, the use of LNG in heavy haulers would reduce heavy hauler emissions. The following table taken from the report

provides estimates of the range of possible emission reductions associated with the use LNG and indicates that GHG, NOx and particulate matter emissions would be reduced substantially.

Table 3-1: Potential GHG and Air Pollutant Reductions: LNG Vs Diesel in Mine Haul Trucks

Contaminant	FortisBC. 2014 ⁴³	Caterpillar 2012 Study ⁴⁴	Hatch Presentation ⁴⁵	CMI ⁴⁶
GHG	-29.9%			-20 to - 35%
NOx	-30.9%	-40%	Up to -97%	
SOx	-73.7%		-100%	
Particulate Matter	-50.2%	-60%	-89%	
CO2		-20%	-50%	
CO			-91%	
Volatile Organic Hydrocarbon (VOCs)			-50%	

From: (InterGroup Consultants Ltd., 2017)

Overall, the InterGroup Consultants Ltd. (2017) report would indicate that LNG use in heavy haulers in oil sands mining applications is feasible, although transition/conversion disruptions, reliable mine haul unit performance, and LNG supply development are factors that might affect or inhibit LNG use in heavy haulers. The report noted that carbon pricing can affect the economics of LNG use and in this regard a signal regarding the need for mine fleet NOx reductions, which are needed to improve regional air quality, could also provide an additional incentive for oil sands operators to consider fuel switching. The limitations identified are challenges that can be overcome as there is increased uptake of this option by industry due to an increase in resources dedicated to technology research and development, infrastructure, and management and implementation.

Recommendation 18:

Section 4.4 Alternative means of carrying out the project

Revise bullet to:

best available control technologies *economically and technologically achievable and/or best management practices* to minimize air emission and ensure air quality management (see section 2.7 of Annex I) for *area and point sources, as well as sources of fugitive air emissions*;

Add bullet:

mobile mining equipment management and air emissions minimization;

Recommendation 19:

Section 7.5 Mitigation and enhancement measures

Add the following as a subsection:

Mine Fleet Emissions

The Impact Statement should identify possible options for reducing mine fleet emissions from the “business as usual” case such as the following best practice options:

- Use of alternate vehicle fuels: compressed natural gas (CNG), liquid natural gas (LNG) and/or hydrogen fuel;*
- The transition to electric vehicles;*
- The use of retrofit and/or add-on emission controls on existing and new vehicles;*
- Accelerated introduction of new lower emitting mine fleet vehicles;*
- The use of autonomous mine fleet equipment; and*
- Alternate mining plans that reduce haul distances and the gross operating hours of the mine fleet per barrel of bitumen ore.*

For each of these options, and any other mine fleet emission reduction options identified by Suncor, the Impact Statement should include an outline of how Suncor plans to evaluate each option and its cost-effectiveness in terms of reducing mine fleet GHG and criteria air contaminant emissions including diesel particulate matter. This plan should include aspirational goals for mine fleet reduction goals throughout the life of the BMX project and the specific evaluations that will be undertaken to evaluate each of the options identified. The option evaluation plans in the Impact Statement should, indicate how the evaluation will be conducted, key resources that will be consulted, the methodology to be used, and the factors that will be considered in the assessment of the feasibility of each option, the schedule for evaluation of each option and when and how the results of each option evaluation will be reported to regulators and the Indigenous stakeholders impacted by the mine fleet emissions.

In the evaluation of mine fleet emission reduction options, information from the following sources should be consulted:

- the management practices presented in the document Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities;*
- Natural Resources Canada’s “Green Mining Innovation” and “Energy Efficiency” initiatives; and*
- the Environment and Climate Change Canada Report: “Evaluation Of Vehicle Emissions Reduction Options for the Oil Sands Mining Fleet Final Report: March, 2008”.*

Note: These plans should address both mine fleet criteria air contaminant emissions and GHG emissions and therefore this requirement also addresses the mine fleet related Climate Change mitigation and enhancement measures requirement outlined in Section 8.10.3.

Recommendation 20:

Section 8.4.1.3. Mitigation and enhancement measures

Revise first bullet to:

provide a description of all the methods and practices to be deployed to reduce and control emissions, including options to reduce flaring (e.g. control equipment, heat or gas recovery system) and options to reduce mine fleet emissions. If the best available technologies are not selected in the project design, the proponent must provide a rationale to justify the technologies selected;

Revise last bullet to:

consult and consider best management practices presented in the document Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities for dust suppression and fugitive dust minimization during mining operations, as well as for emission reduction measures associated with vehicle and equipment engines.

4.4. Context Summary

The mine fleet emissions from the Suncor BMX project represent a significant ongoing source of air pollutant emissions from Suncor's operations. Regional mine fleet emissions in combination with other NOx emission sources are almost certainly going to trigger, under the CAAQS, the requirement to develop a comprehensive air zone management plan to improve air quality through better NOx emission management. Current emission requirements for mine fleets do not reflect best available emission control technologies or strategies. These two factors need to be considered and addressed in the BMX project Impact Statement.

Since Fort McKay community members will live with the air quality impacts associated with the Suncor BMX project mine fleet emissions, and since this project is not scheduled to start mining activities until 2031, Fort McKay considers that there is time for Suncor to conduct a detailed assessment of a number of what appear to be possible mine fleet emission reduction options before project commencement. It is therefore Fort McKay's request that the TISGs require that Suncor's Impact Statement for BMX outline in detail how it will undertake such an assessment. In this regard that Fort McKay would note that the current approach to this issue by Alberta is to require a plan to ensure that new mine fleet vehicles meet current "Canadian Environmental Protection Act Off-Road Compression-Ignition Engine Emission Regulations and/or Guidelines", which by and large pertains to operational planning for fleet management (i.e. business as usual) and does not reflect a serious evaluation of options to proactively minimize mine fleet emissions.

As discussed in Section 4.1, there is also a need for systematic, ongoing and rigorous onboard in-use testing of mine fleet unit emissions in order to verify the mine fleet emissions estimates used in the impact statement and to accurately link emissions to impacts as well as to assess the effectiveness of any mine fleet emission mitigations that are proposed.

5. OTHER MITIGATION AND ENHANCEMENT MEASURES

In line with sustainability guiding principles #3 and #4, FMFN expects that adverse impacts be minimized through the use of best available technology economically achievable (BATEA) and best management practices.

In terms of both BATEA and best practices for managing air and sensory impacts, it is important that all technologically and economically feasible options be considered in the Impact Assessment. There are no defined “*best practices*” for oil sands operations in the region, nor should there be, as each project’s operation is unique. The determination of “*best practices*” involves a specific evaluation process where all available alternatives are considered and the rationale for selecting the proposed option(s) is explained. Understanding the existing technology and practices applied to mitigate project impacts offers a benchmark for comparison for the selection of BATEA and best management practices, although these existing measure should not, by default, be considered “*best practices*”.

The BMX project involves the extension of surface mining and tailings management footprint for Suncor where upgrading efforts remain at Base Plant, thus the mine fleet is a major source of air emissions for the project. Mine fleet emissions and mitigation measures are discussed in Section 4 of this document.

Recommendation 21:

Section 4.4 Alternative means of carrying out the project

Revise bullets to:

management of excavated materials, including potentially acid-generating or leachable materials, as well as materials that may be a source of wind-blown dust;

best available control technologies economically and technologically achievable and/or best management practices to minimize air emission and ensure air quality management (see section 2.7 of Annex I) for area and point sources, as well as sources of fugitive air emissions;

Add bullet:

mobile mining equipment management and air emissions minimization;

Recommendation 22:

Section 7.5. Mitigation and enhancement measures

In the first paragraph, revise statement to:

Every impact assessment conducted under the Act must identify all measures that are technically and economically feasible that would mitigate the project’s adverse environmental, health, social and economic effects.

Under the 3rd paragraph, add bullet:

describe the current mitigation practices, policies, and commitment being applied as part of standard practice within the existing operations, as well as their effectiveness as mitigation measures;

Revise bullet to:

describe the standard mitigation practices, policies and commitments that constitute proven technically and economically feasible mitigation measures and that are to be applied within the project design, and whether such practices differ from the existing 'business as usual' practices;

Revise bullet to:

provide an assessment of the anticipated effectiveness of all technically and economically feasible mitigation measures and describe all relevant uncertainties.

Revise bullet to:

write mitigation measures as specific commitments that clearly describe how and when the proponent intends to implement them and their desired outcomes. Measures are to be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. Where appropriate, an implementation methodology and associated timelines should be linked to each mitigation measure and initiative. How each proposed mitigation measure and initiative compares to the mitigation measures and initiatives for existing operations should be provided, including how the proposed measures represent continuous improvement;

Revise bullet to:

identify other technically and economically feasible mitigation measures that were considered but are not proposed for implementation, and explain why they were rejected. Justify any trade-offs between cost savings and effectiveness of the various forms of mitigation measures through a systematic and data driven decision making process that shows the rationale for the selection of the preferred technically and economically feasible mitigation measures;

Add bullet:

describe how the effectiveness of the chosen mitigation measures will be measured, monitored, and if possible, improved over the course of the project life;

Recommendation 23:

Section 8.4.1.3 Mitigation and enhancement measures

provide a description of existing and planned measures to reduce odours and dust, including a description of improvements to existing infrastructure, equipment and operational practices as applicable, supplemented with quantitative data or records that demonstrate the efficiency of existing mitigation measures;

Recommendation 24:

Section 8.4.1.3. Mitigation and enhancement measures

Revise bullet to:

consult and consider best management practices presented in the document Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities for dust suppression and fugitive dust minimization during mining operations, as well as for emission reduction measures associated with vehicle and equipment engines; and

Add bullets:

consult and consider best management practices presented in the document Good Practices Guide for Odour Management in Alberta; and

consult and consider odourant emissions monitoring and community engagement recommendations presented in the document Guidance for Odour Impact Assessments and Odour Management for Proposed Oil Sands Projects on Fort McKay's Traditional Territories (available from the Fort McKay Sustainability Department) .

It is acknowledged that sufficient lighting is required to ensure safety and security and support day-to-day operations at oil sands facilities. However, facility and operational lighting should be designed and selected to reduce spill-over light and sky glow. Where appropriate, design principles such as those outlined in the Canada Green Building Council LEED guidelines for exterior lighting, as well as recommended limits for light technical parameters to reduce light pollution effects such as those contained in the *Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations* (CIE, 2003), should be applied. The proposed mitigation and enhancement measures should also consider the location of the luminaires and lighting and apply the appropriate technical limits for the associated zoning or type of surrounding lighting environment.

Recommendation 25:

Section 8.4.3.3. Mitigation and enhancement measures

Add section:

Consult and consider design principles and light technical parameters to minimize spill-over light and sky glow as outlined in the following documents:

- *Canada Green Building Council LEED guidelines; and*
- *Commission Internationale de l'Éclairage's Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (CIE, 2003)*

The proposed mitigation measures should consider the background environment and demonstrate that the appropriate technical limits (i.e. illuminance value, Upward Light Ratio, etc.) are applied to the luminaires and lighting used.

6. REFERENCES

- Alberta Energy Regulator and Alberta Health. (2016). *Recurrent Human Health Complaints Technical Information Synthesis: Fort McKay Area*. Calgary: Alberta Energy Regulator. Retrieved November 6, 2016, from http://aer.ca/documents/reports/FortMcKay_FINAL.pdf
- Alberta Energy Regulator, Alberta Health. (2016). *Recurrent Human Health Complaint Technical Information Synthesis - Fort McKay Area*. Retrieved from https://static.aer.ca/prd/documents/reports/FortMcKay_FINAL.pdf
- Alberta Government. (2013). *Air Quality Model Guideline*.
- California Air Resources Board. (2021). *Summary: Diesel Particulate Matter Health Impacts*. Retrieved 03 11, 2021, from <https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts>
- CCME. (2019). *Guidance Document on Air Zone Management*. Winnipeg: Canadian Council of Ministers of the Environment.
- CIE. (2003). *Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations*. Commission Internationale de l'Éclairage .
- Davidson, C., & Spink, D. (2017). Alternate approaches for assessing impacts of oil sands development on air quality: A case study using the First Nation Community of Fort McKay. *Journal of the Air and Waste Management Association*. doi:DOI: 10.1080/10962247.2017.1377648
- ECCC and AEP. (2016). *Joint Oil Sands Monitoring Program Emissions Inventory Compilation Report*. Edmonton: Alberta Environment and Parks. Retrieved from <http://aep.alberta.ca/air/reports-data/air-emissions-inventory.aspx>
- Environment Canada. (2008). *Evaluation of Vehicle Emissions Reduction Options for the Oil Sands Mining Fleet*. Retrieved from https://www.mjbradley.com/sites/default/files/Oil%20Sands%20Retrofit%20Feasibility%20Study%20Mar08_0.pdf
- Gossel, P. H. (2010). *Royal Society of Canada Expert Panel, 2010. Environmental and Health Impacts of Canada's Oil Sands Industry*. Ottawa: Royal Society of Canada.
- Government of Canada. (2017, December 9). *Canada Gazette Vol. 151 No. 49 Canadian Ambient Air Quality Standards for nitrogen dioxide*. Retrieved September 26, 2018, from Government of Canada: <http://www.gazette.gc.ca/rp-pr/p1/2017/index-eng.html>
- Health Canada. (2015). *Human Health Risk Assessment for Diesel Exhaust*. Ottawa: Health Canada. Retrieved from <http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/exhaust-diesel-gaz-echappement/index-eng.php>
- Health Canada. (2016). *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality*.
- Health Canada. (2016). *Health Risk Assessment for Ambient Nitrogen Dioxide (NO₂)*. Ottawa: Health Canada. Retrieved from <https://www.canada.ca/en/health->

canada/services/publications/healthy-living/human-health-risk-assessment-ambient-nitrogen-dioxide.html

Health Canada. (2019). *Health Impacts of Air Pollution in Canada*. Ottawa: Health Canada. Retrieved from <https://www.canada.ca/en/health-canada/services/air-quality/health-effects-indoor-air-pollution.html>

IAAC. (2021). *Guidance: Considering the Extent to which a Project Contributes to Sustainability*. Retrieved 03 11, 2021, from <https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/guidance-considering.html>

InterGroup Consultants Ltd. (2017). *Natural Gas as a Fuel for Mine Haul Trucks*. Ottawa: Natural Resource Canada. Retrieved from http://cngva.org/wp-content/uploads/2017/12/Natural-Gas-as-a-Fuel-for-Mine-Haul-Trucks_Final.pdf

Jonson, J. E., Borken-Kleefeld, J., Simpson, D., Nyiri, A., Posch, M., & Heyes, C. (2017). Impact of excess NO_x emissions from diesel cars on air quality, public health and eutrophication in Europe. *Environmental Research Letters*.

Syncrude. (2018). *Mildred Lake Extension Project, Proceeding ID 361, Information Request 1 - Fort McKay First Nation, November 2018*.

USEPA. (2004, June 29). Federal Register / Vol. 69, No. 124 / Tuesday, June 29, 2004 / Rules and Regulations. *Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel*. Retrieved from <http://www.gpo.gov/fdsys/pkg/FR-2004-06-29/pdf/04-11293.pdf>

USEPA. (2016). *Integrated Science Assessment for Oxides of Nitrogen –Health Criteria*. Research Triangle Park, North Carolina: USEPA. Retrieved from <https://www.epa.gov/isa>

USEPA. (2020). *Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter-Ecological Criteria*. Research Triangle Park, North Carolina: USEPA. Retrieved from www.epa.gov/isa

Vijayaraghavan, K., Cho, S., Morris, R., Spink, D., Jung, J., Pauls, R., & Duffett, K. (2016). Photochemical model evaluation of the ground-level ozone impacts on ambient air quality and vegetation health in the Alberta oil sands region: Using present and future scenarios. *Atmospheric Environment*, 209-218.

Virtual Museum of Canada. (2021, 03 12). *Light Pollution*. Retrieved from Canada under the stars: https://astro-canada.ca/la_pollution_lumineuse-light_pollution-eng

Wang, X., Chow, J. C., Kohl, S. D., Percy, K. E., Legge, A. H., & Watson, J. G. (2015). Characterization of PM_{2.5} and PM₁₀ fugitive dust source profiles in the Athabasca Oil Sands Region. *Journal of Air and Waste Management Association*, 1421-1433.

Wang, X., Chow, J. C., Percy, K. E., Legge, A. H., Watson, J. G., & Kohl, S. D. (2015). Real-world emission factors for Caterpillar 797B heavy haulers during mining operations. *Particuology*. doi:<http://dx.doi.org/10.1016/j.partic.2015.07.001>

WHO. (2000). *WHO Air Quality Guidelines for Europe (2nd Edition)*.

- Wren, S. N., Mihele, C. M., Lu, G., Ziang, Z., Wen, D., Hayden, K., . . . Brook, J. R. (2020). Improving Insights on Air Pollutant Mixtures and Their Origins by Enhancing Local Monitoring in an Area of Intensive Resource Development. *Environmental Science & Technology* .
- Xing, Z., & Du, K. (2017). Particulate Matter Emissions over the Oil Sands Regions in Alberta, Canada. *Environmental reviews*, 432-443.
- Zhang, J., Moran, M. D., Zheng, Q., Makar, P. A., Baratzadeh, P., Marson, G., . . . Li, S.-M. (2018). Emissions preparation and analysis for multiscale air quality modeling over the Athabasca Oil Sands Region of Alberta, Canada. *Atmospheric Chemistry and Physics*, 10459-10481.