Public Comments

Devon Canada Corporation
Pike 2 Project

October 2018

AEP Environmental Assessment

From: Roy Auger <rauger@blmetis.ca>
Sent: Thursday, October 04, 2018 2:48 PM
To: AEREnvironmental Assessment
Subject: Pike 2 PTOR
Attachments: Pike 2 -PTOR.docx

Hello,

Please find attached letter referencing the Pike 2 Devon Canada Project. Please advise should there be further requirements and or clarifications.

Thank you,

Roy

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Roy Auger
Buffalo Lake Metis Settlement
Consultation Officer/Director of Emergency Management
(780) 689-2170 (p)
(780) 689-2024 (f)

BUFFALO LAKE MÉTIS SETTLEMENT
BOX 16 CASLAN, AB. T0A 0R0 (780) 689-2170 FAX (780) 689-2024

Director, Environmental Assessment
Authorizations Branch
Alberta Energy Regulator
Suite 1000, 250-5th Street SW
Calgary, AB
T2P 0R4

October 4th, 2018

Re: Pike 2 Project – Devon Canada Corporation - PTOR

On behalf of the Buffalo Lake Metis Settlement we would like to suggest/comment of the following items as it pertains to the PTOR:

- 2 – Project Description – The project as described to be included, however, it should be noted that there is no explanation or indication if there will be an extension on the project, such the one that is occurring with Jackfish West on the Jackfish properties. (possibly addressed in 3.10 [G])
- 3.5.1 – Baseline Information – Traditionally used species – Indigenous only?
- 3.5.2 – Impact Assessment – In speaking of changes and losses, there is a particular concern regarding BLMS members and cultural loss aspect. This would also include the access to and from the areas. There is concern in relation to access, where once there was, now no longer exists, due to security and signage (e.g. – No trespassing etc...) Trails and access routes that were previously used by members, were subsequently upgraded for industry users and maintained by them, however access is limited or denied by the lease holders.
- 3.9. – Terrains and Soils – Dust control is mentioned in 2.6. Water Management, however, there should be indication if another method of dust control (e.g. Calcium) is used and addressed in discussions.

Most concerns can be addressed in Section 5 – TEK and land use, however, it should be noted that the Alberta Government will be moving to a newer model (to be known as Indigenous Knowledge Policy) and should be referred to in this EIA as a subsequent obligation whilst the monitoring, mitigation and reclamation occurs.

Also of note; it is of the understanding that Devon Canada Corporation has completed 5 other EIA's in relation to or within close proximity to this project, having these previous EIA's and the subsequent results of such reporting (traffic, emissions etc..), would be beneficial to include on this EIA (if possible). Particular attention to the Air Emissions, Water and Waste Managements, as well as the Environmental assessments of those projects.

Thank you for your consideration.

(Not signed to avoid delay)

Roy Auger
BLMS Consultation

AEP Environmental Assessment

From: Stacey Mouille-Malbeuf <environment@cpirc.ca>
Sent: Thursday, September 06, 2018 10:56 AM
To: AEREnvironmental Assessment
Cc: Shaun Janvier; Chris Heavy Shield; John Alook; Palmer, Jane
Subject: CPDFN review of Devon Pike 2 Proposed Terms of Reference
Attachments: Devon Pike 2 PToR Cover Letter CPDFN 060918.pdf; Pike 2 Project Proposed Terms of Reference CPDFN comments.docx

Attention: Director, Environmental Assessment Authorizations Branch, Alberta Energy Regulator

On behalf of the Chipewyan Prairie Dene First Nation, please accept the attached cover letter and review of the Proposed Terms of Reference for Devon Canada Corporations proposed Pike 2 project.

Sincerely,

Stacey Mouille-Malbeuf
Environmental Coordinator
Chipewyan Prairie Industry Relations Corporation
T: 780-623-3830 C: 780-404-6226
E: environment@cpirc.ca

Chipewyan Prairie Industry Relations Corporation

#10 66444 Highway 36
PO Box 1020, Lac La Biche, AB, T0A 2C0
Phone: (780) 623-3830 Fax: (780) 623-2505

September 6, 2018

Director, Environmental Assessment
Authorizations Branch
Alberta Energy Regulator
Suite 1000, 250-5th Street SW
Calgary, AB T2P 0R4
E-mail:AEREnvironmental.Assessment@aer.ca

RE: Chipewyan Prairie Dene First Nation Review of Devon Canada Corporation (Devon) Pike 2 Project Proposed Terms of Reference

Dear Sir/Madam:

The Chipewyan Prairie Industry Relations Corporation (CPIRC), representing the Chipewyan Prairie Dene First Nation (CPDFN) is submitting the attached review of the Proposed Terms of Reference for Devon's proposed Pike 2 Project for your consideration. For ease of review, we are providing our input using track changes in Microsoft Word.

The proposed Devon Pike 2 Project is of interest and concern to CPDFN, as it lies wholly within CPDFN's traditional territory, will adversely impact a traditional use area, and will adversely impact the Treaty and Aboriginal Rights of the members of the Chipewyan Prairie Dene First Nation protected under Section 35 (1) of the Constitution Act of 1982. We look forward to working with Devon as well as the regulators as the Project moves through the regulatory process. Please contact me directly at 780-404-6226 should you have any questions or wish to discuss our review further.

Sincerely,

Stacey Mouille-Malbeuf
Environmental Coordinator
Chipewyan Prairie Industry Relations Corporation

Cc: Shaun Janvier, Director, CPIRC director@cpirc.ca;
Chris Heavy Shield, Consultation Manager, CPIRC chris.heavyshield@cpirc.ca;

John Alook, Regulatory and Consultation Coordinator, CPIRC john.alook@cpirc.ca
Jane Palmer, Aboriginal Relations Advisor, Devon jane.palmer@dvn.com

PROPOSED TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR DEVON CANADA CORPORATION'S PROPOSED

PIKE 2 PROJECT

Approximately 40 km Southeast of Conklin, Alberta

ISSUED BY: **Devon Canada Corporation**

DATE: **August 20, 2018**

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PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for Devon Canada Corporation (Devon), Indigenous communities and appropriate stakeholders the information required by government agencies for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Pike 2 Project (the Project).

Devon is proposing a new in situ oil sands project in the Southern Athabasca Oil Sands region. The Project is a 50/50 joint venture with BP Canada Energy Group ULC and will be operated by Devon. To recover bitumen resources from the McMurray formation, Devon's well-established Steam Assisted Gravity Drainage (SAGD) technology, along with diluent co-injection and cogeneration will be employed.

The Project will include a central processing facility (CPF), well pads, source water and disposal well sites, pipelines, roads and power lines. The Project is expected to produce up to 70,000 barrels per day (bpd) of bitumen. Pending regulatory approval, Pike 2 will be constructed over a two-year period with initial production projected for 2025. The Pike 2 CPF will have a full production life of approximately 30 years.

The Project is located approximately 40 km southeast of Conklin, Alberta, in portions of Townships 73 and 74, Ranges 4, 5 and 6, west of the 4th Meridian, in Lac La Biche County.

SCOPE OF THE EIA REPORT

Devon shall prepare and submit an EIA report that examines the direct, indirect, and cumulative environmental, cultural heritage, and socio- economic effects of the Project.

The EIA report shall be prepared considering all applicable provincial and federal legislation, codes of practice, guidelines, standards, policies and directives, including constitutionally protected Aboriginal and Treaty rights.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations, and the *Canadian Environmental Assessment Act* if applicable. The EIA report will form part of Devon's application to the Alberta Energy Regulator (AER). An EIA report summary will also be included as part of the AER Application.

Devon shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* published by Alberta Environment and Parks (the Guide) and these Terms of Reference when preparing the Environmental Impact Assessment report. In any case where there is a difference in requirements between the Guide and these Terms of Reference, the Terms of Reference shall take precedence.

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT AND INDIGENOUS CONSULTATION

[A] Describe the concerns and issues expressed by the public and the commitments that will be made to address those concerns and issues, including how public input was incorporated into the Project development, impact mitigation and monitoring.

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[B] Describe the concerns and issues expressed by Indigenous communities and the actions taken to address those concerns and issues, including how Indigenous community input was incorporated into the Project, EIA development, mitigation, monitoring and reclamation. Describe consultation undertaken with Indigenous communities and groups with respect to addressing impacts to Treaty and Aboriginal Rights, cultural heritage, Traditional Ecological Knowledge and Traditional Land Use and Occupancy.

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[C] Describe plans to maintain the public engagement and Indigenous consultation process following completion of the EIA report and throughout the life of the project to ensure that the public and Indigenous peoples will have an appropriate forum for expressing their views to ensure that Indigenous peoples concerns will be addressed during the ongoing development, operation and reclamation of the Project.

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2 PROJECT DESCRIPTION

2.1 Overview

[A] Provide a brief project description in sufficient detail to provide context for the EIA, including:

a) proponent information;
b) proposed extraction and bitumen processing technology;
c) amount and source of energy required for the Project;
d) the amount and source of diluent required for extraction and transportation over the life of the Project:
e) water supply and disposal requirements, including process water and potable water requirements;
f) proposed method to transport product to markets; and
g) development plan and schedule.

[B] Provide maps and/or drawings of the Project components and activities including:

a) existing infrastructure, leases and clearings, including exploration clearings;
b) proposed central processing/treatment and field facilities;
c) other buildings and infrastructure (e.g., pipelines, utilities and camp(s));
d) temporary structures;
e) transportation and access routes;
f) on-site hydrocarbon storage;
g) containment structures such as retention ponds and storage ponds (e.g., lime sludge, stormwater runoff, boiler blow-down);
h) water wells/intakes, pipelines, and storage structures;
i) sources of aggregate resources, borrow material and other construction material and locations of any stockpiles that will be developed; and
j) waste storage area and disposal sites.

[C] Discuss the implications of a delay in proceeding with the Project, or any phase of the Project, or not going ahead with the Project.

[D] Describe the benefits of the Project, including jobs created, local training, employment and business opportunities, and royalties and taxes generated that accrue to:

a) Devon;

b) local and regional communities, including Indigenous communities;
c) the local authority;
d) Alberta; and
e) Canada.

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[E] Describe how cultural heritage, traditional environmental knowledge and traditional land use and occupancy influenced the evaluation of project planning and alternatives.

[F] Provide the adaptive management approach that will be implemented throughout the life of the Project. Include how monitoring, mitigation and evaluation were incorporated.

2.2 Constraints

[A] Discuss the process and criteria used to identify constraints to development, and how the Project has been designed to accommodate those constraints. Include the following:
a) any applicable *Alberta Land Stewardship Act* Regional Plan, including the draft Biodiversity Management Framework;
b) how this Project aligns with the *Comprehensive Regional Infrastructure Sustainability Plan for the Athabasca Oil Sands Area*;
c) any applicable Alberta Ambient Air Quality Objectives;
d) land use policies and resource management initiatives that pertain to the Project;
e) provincial and federal climate change policies and legislation;
f) Indigenous traditional land, water, wildlife and vegetation use;
g) campgrounds and recreational sites;
h) historic resources sites;
i) all known traplines and registered fur management areas;
j) the environmental setting;
k) cumulative environmental impacts in the region;
l) cumulative social impacts in the region;
m) cumulative cultural heritage impacts in the region;
n) results of project-specific and regional monitoring;
o) potential for new or additional technology to increase resource recovery at later times; and
p) potential for changes in the regulatory regime.

[B] Provide a detailed assessment of the selection criteria used, options considered, and rationale for selecting:
a) location of facilities and infrastructure (including linear infrastructure); and
b) thermal energy and electric power required for the Project.

[C] Provide a list of facilities for which locations and access will be determined later. Describe the selection criteria that will be used to determine the specific location of these facilities. For facilities built by a third party, describe how Devon would participate in the process to ensure constraints are considered.

2.3 Regional and Cooperative Efforts

[A] Discuss Devon's involvement in regional and cooperative efforts to address

environmental, cultural heritage, and socio-economic issues associated with regional development.

[B] Describe opportunities and commitments for sharing existing or planned infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.

2.4 Transportation Infrastructure

[A] Prepare a Traffic Impact Assessment as per Alberta Transportation's *Traffic Impact Assessment Guideline (http://www.transportation.alberta.ca/613.htm)*. If there are any previous Traffic Impact Assessment studies that have been carried out for the Project or adjacent Projects using the same access, review, updateand validate the findings and recommendations.

[B] Describe background traffic and consider the cumulative effects of traffic impacts due to other existing and planned developments using the same highways and accesses.

[C] Discuss anticipated changes to highway traffic (e.g., type, volume) due to the Project.

[D] Assess potential traffic impacts for all stages of the Project (e.g., construction, operation, maintenance, expansion, shutdown).

[E] Determine any necessary improvements and methods to mitigate traffic impacts.

[F] Describe and map the locations of any new road or intersection construction, or any improvements to existing roads or intersections, related to the development of the Project, from the boundary of the Project Area up to and including the highway access points, and

a) discuss the alternatives and the rationale for selection for the preferred alternative;
b) discuss compatibility of the preferred alternative to Alberta Transportation's immediate and future plans;
c) describe the impacts to local communities of the changes in transportation and infrastructure;
d) describe consultation with, and input by Aboriginal communities regarding access management and selection of alternatives; and
e) provide a proposed schedule for the work.

[G] Provide an access management plan for the Project in consideration of Aboriginal peoples' access to their traditional lands within and around the Project area for the exercise of rights and traditional use; and the management and restrictions of non-Aboriginal peoples' access to areas within and around the Project area.

[H] Describe any infrastructure or activity that could have a potential impact on existing roads (e.g., pipelines or utilities crossing provincial highways, any facilities in close proximity of the highways, any smoke, dust, noise, light or precipitation generated by the Project that could impact the highway and road users).

[I] Provide a summary of any discussions with Alberta Transportation in regards to the Project and its traffic impacts.

[J] Indicate where Crown land dispositions may be needed for roads or infrastructure required for the Project.

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2.5 Air Emissions Management

[A] Discuss the selection criteria used, options considered, and rationale for selecting control technologies to minimize air emission and ensure air quality management.

[B] Provide emission profiles (type, composition, rate and source) for the Project's operating and construction emissions including point and non-point sources and fugitive emissions. Consider both normal and upset conditions. Discuss:

a) odorous and visible emissions from the proposed facilities;
b) annual and total greenhouse gas emissions during all stages of the Project. Identify the primary sources and provide detailed calculations;
c) the intensity of greenhouse gas emissions per unit of bitumen produced;
d) the Project's contribution to total provincial and national greenhouse gas emissions on an annual basis;
e) describe the Project's greenhouse gas emissions relative to the provincial greenhouse gas emission limit for oil sands developments;
f) the greenhouse gas management plans for the Project;
g) amount and nature of Criteria and Trace Air Contaminants emissions including volatile organic compounds, polycyclic aromatic compounds, and reduced Sulphur compound emissions;
h) the amount and nature of acidifying and eutrophying emissions, probable deposition patterns and rates;
i) the applicable emission standards and limits for the emission sources;
j) control technologies used to minimize emissions, and the rationale for selection based on consideration of best available control strategies or technologies economically achievable;
k) emergency flaring scenarios (e.g., frequency and duration) and proposed measures to ensure flaring events are minimized;
l) upset condition scenarios (e.g., frequency and duration) and proposed measures to ensure upset conditions are minimized;
m) gas collection and conservation, and the applicability of vapour recovery technology;
n) applicability of sulphur recovery, acid gas re-injection or flue gas desulphurization to reduce sulphur emissions; and
o) fugitive emissions control technology to detect, measure and control emissions and odours from equipment leaks.

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2.6 Water Management

2.6.1 Water Supply

[A] Describe the water supply requirements for the Project, including:

a) the design factors considered, criteria used, options considered and rationale for selection of water supply sources(s);
b) the expected water balance during all stages of the Project. Discuss assumptions made or methods chosen to arrive at the water balances;
c) the process water, potable water, and non-potable water requirements and sources for construction (including, but not limited to, road construction, winter road construction, lease construction, production well drilling and dust suppression), camp(s) and plant site, start-up, normal and emergency operating situations, decommissioning and reclamation. Identify the volume of water to be withdrawn from each source, considering plans for wastewater reuse;

d) the location of sources/intakes and associated infrastructure (e.g., pipelines for water supply);
e) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented;
f) the expected cumulative effects on water losses/gains resulting from the Project operations;
g) contingency plans in the event of restrictions on the Project's water supply source (e.g., due to license conditions, source volume limitations, climate change or cumulative impact water deficits);
h) potable water treatment systems for all stages of the Project;
i) type and quantity of potable water treatment chemicals used;
j) measures for ensuring efficient use of water including alternatives to reduce the consumption of non-saline water such as water use minimization, recycling, conservation, and technological improvements.
k) measures and plans for third party policies and monitoring to ensure source water and access are not impacted during water collection (e.g., erosion, equipment leaks and malfunctions)

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2.6.2 Surface Water

[A] Describe the surface water management strategy for all stages of the Project, including:
a) design factors considered; and
b) permanent or temporary alterations or realignments of watercourses and other waterbodies.

[B] Describe and map all roadway, pipeline, powerline and any other utility crossings of watercourses, wetlands or other waterbodies.

[C] Describe the placement of infrastructure (including processing facilities, well pads, roads and borrow pits) in relation to water bodies and watercourses.

[D] Describe consultation with and input by Aboriginal communities and how cultural heritage, traditional environmental knowledge and traditional land use and occupancy influenced the placement of infrastructure in relation to water bodies and watercourses

[E] Describe how the Alberta Wetland Policy was considered in the assessment of impacts, including, but not limited to:
a) avoidance, minimization, or replacement of wetlands in accordance with the Alberta Wetland Mitigation Directive;
b) temporary and permanent alterations (direct and indirect) to wetlands classified under the Alberta Wetland Classification System;
c) any expected changes in wetland class, and causes for this change; and
d) consideration of cumulative effects in the watershed to wetlands.

2.6.3 Wastewater Management

[A] Describe the wastewater management strategy, including:
a) the criteria used, options considered and rationale for the selection of wastewater

treatment and wastewater disposal;

b) the source, quantity and composition of each wastewater stream from each component of the proposed operation (e.g., bitumen extraction and associated facilities) for all project conditions, including normal, start-up, worst-case and upset conditions;

c) the proposed disposal locations and methods for each wastewater stream;
d) geologic formations for the disposal of wastewaters;
e) design of facilities that will collect, treat, store and release wastewater streams and evaluation utilizing facilities that represent best management or treatment practices;
f) type and quantity of chemicals used in wastewater treatment;
g) sewage treatment and disposal, and
h) consultation with and input from Aboriginal communities regarding disposal locations.

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2.7 Waste Management

[A] Discuss the selection criteria used, options considered, and rationale for project-related waste disposal both on and off-site. Discuss consultation with and input by Aboriginal communities regarding consideration of off-site disposal.

[B] Characterize and quantify the anticipated dangerous goods, and hazardous, non-hazardous, and recyclable wastes generated by the Project, and describe:
a) the composition and volume of specific waste streams and discuss how each stream will be managed;
b) how the disposal sites and sumps will be constructed; and
c) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project.

2.8 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for the Project. Describe and map as applicable:
a) current and post-development anticipated land use and how equivalent land capability will be achieved;
b) anticipated timeframes for completion of reclamation stages and release of lands back to the Crown including an outline of the key milestone dates for reclamation and how progress to achieve these targets will be measured;
c) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;
d) a revegetation plan for the Project Area;
e) reclamation material salvage, storage areas and handling procedures;
f) existing and final reclaimed site drainage plans.

[B] Provide the expected timelines for establishment and recovery of vegetative communities and wildlife habitat.

[C] Describe how Devon will implement the use of progressive reclamation in project design and reclamation planning.

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[D] Discuss uncertainties related to the conceptual reclamation plan.

[E] Describe how Aboriginal communities will be included in conservation and reclamation planning and activities, including how traditional ecological knowledge and land use will be considered and incorporated.

3 ENVIRONMENTAL ASSESSMENT

3.1 Assessment Cases

[A] In addition to the assessment scenarios set out in the Alberta Government Guidance to Preparing Environmental Assessment Reports in Alberta, assess the following scenarios:

- pre-development case (mid-1960s) to serve as the baseline case upon which all other cases, including the application case, are compared; and
- current case.

[B] Cumulative Effects Case

assess effects of past, present and future developments and activities that might interact with the effects of proposed project considering: i) existing, approved and reasonably foreseeable anthropogenic and natural events (eg. forest fires, climate change); and ii) a time horizon that exposes any transient and residual permanent impacts.

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3.2 Air Quality, Climate and Noise

3.2.1 Baseline Information

[A] Discuss the baseline climatic and air quality conditions including:

a) the type and frequency of meteorological conditions that may result in poor air quality;
b) potential receptors, current regional and local air quality issues and trends (e.g., odours, exceedances of Ambient Air Quality Objectives); and
c) appropriate ambient air quality parameters.

3.2.2 Impact Assessment

[A] Identify components of the Project that will affect air quality, and:
a) describe the potential for reduced air quality (including odours and visibility) resulting from the Project and discuss any implications of the expected air quality for environmental protection, quality of life (e.g. odours), exercise of Aboriginal peoples' s.35 rights and traditional land use, and public health;
b) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's Directive 60 *Odour Management Protocol;*
c) estimate ground-level concentrations of appropriate air quality parameters, including odorants and ozone;
d) discuss any expected changes to particulate deposition, nitrogen deposition or acidic deposition patterns;
e) provide the expected gas-to-oil ratio, the expected concentration of sulphur in the produced gas and the requested sulphur dioxide emission limit. Show calculations for the sulphur dioxide limit including the basis for the expected parameters, factors and assumptions used;
f) identify areas that are predicted to exceed Potential Acid Input critical loading criteria;
g) discuss interactive effects that may occur resulting from co-exposure of a receptor to all emissions; and
h) identify nitrogen disposition, rates and patterns
i) describe air quality impacts resulting from the Project, and their implications for other environmental resources.

[B] Identify stages or elements of the Project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events. Discuss the potential impacts over the life of the Project and adaptive management options that could address related climate change impacts.

[C] Summarize the results of the noise assessment conducted for the AER, and:
a) identify the nearest receptor used in the assessment;
b) describe the estimated impacts of noise on wildlife and aquatic resources;
c) describe the estimated impacts of noise on Aboriginal peoples exercise of s.35 rights and traditional land use and occupancy sites (eg. cabins), and quality of life, and
d) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's *Directive 38: Noise Control*.

[D] Estimate the impacts of any pure tonal sound sources (e.g. vehicle back up beepers) or any intermittent noise sources (e.g. steam venting) from the Project on areas in the vicinity that are used by Aboriginal peoples.

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3.3 Hydrogeology

3.3.1 Baseline Information

[A] Provide an overview of the existing geologic and hydrogeologic setting from the ground surface down to, and including, the oil producing zones and disposal zones, and:

a) present regional and Project Area geology to illustrate depth, thickness and spatial extent of lithology, stratigraphic units and structural features; and

b) present regional and Project Area hydrogeology describing:

i) the major aquifers, aquitards and aquicludes (Quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities. Include maps and cross sections,
ii) the chemistry of groundwater aquifers including baseline concentrations of major ions, metals and hydrocarbon indicators,
iii) the potential discharge zones, potential recharge zones and sources, areas of groundwater-surface water interaction and areas of Quaternary aquifer-bedrock groundwater interaction,
iv) water well development and groundwater use, including an inventory of groundwater users,
v) the recharge potential for Quaternary aquifers,
vi) potential hydraulic connection between bitumen production zones, deep disposal formations and other aquifers resulting from project operations,
vii) the characterization of formations chosen for deep well disposal, including chemical compatibility and containment potential, injection capacity, hydrodynamic flow regime, and water quality assessments, and
viii) the locations of major facilities associated with the Project including facilities for waste storage, treatment and disposal (e.g., deep well disposal) and describe site-specific aquifer and shallow groundwater conditions beneath these proposed facilities. Provide supporting geological information.

3.3.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the Project.

[B] Describe and assess the nature and significance of the potential project impacts on groundwater with respect to:
a) inter-relationship between groundwater and surface water in terms of both groundwater and surface water quantity and quality;
b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands, and consequently Aboriginal peoples exercise of s.35 rights and traditional land use;
c) changes in groundwater quality, quantity and flow;
d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
e) potential implications of seasonal variations and climate change; and
f) groundwater withdrawal for project operations, including any expected alterations in the groundwater flow regime during and following project operations.

3.4 Hydrology

3.4.1 Baseline Information

[A] Describe and map the surface hydrology in the Project Area.

[B] Describe any culturally important surface water bodies to Aboriginal peoples, or surface water bodies that could potentially be used by Aboriginal peoples to support the exercise

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of their s.35 rights and traditional land use, including for use for domestic purposes (eg. drinking water)

[C] Identify any surface water users who have existing approvals, permits or licenses that may be impacted by the project.

3.4.2 Impact Assessment

[A] Describe and assess the extent of hydrological changes that will result from disturbances to groundwater and surface water movement, and:

a) include an assessment of potential ground heave/subsidence and the potential impact on surface water flows, including potential changes in stream slope;
b) include changes to the quantity of surface flow, water levels and channel regime in watercourses (during minimum, average and peak flows) and water levels in waterbodies;
c) identify all temporary and permanent alterations, channel realignments, disturbances or surface water withdrawals;
d) discuss the effect of these changes on hydrology (e.g., timing, volume, peak and minimum flow rates, river regime and water levels), including the significance of effects for downstream watercourses;
e) discuss the anticipated rate, volume, and timing of storm releases to local surface waters, and
f) identify any potential erosion problems in or adjacent to watercourses resulting from the Project.

[B] Describe impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.

[C] Describe the impacts on Aboriginal peoples' exercise of s.35 rights and traditional use

[D] Discuss the impact of low flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

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3.5 Surface Water Quality

3.5.1 Baseline Information

[A] Describe the baseline water quality of watercourses and waterbodies and their seasonal variations. Include a description of temporal (seasonal and interannual) and spatial variability. Consider appropriate water quality parameters.

3.5.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project on surface water quality including but not limited to;

a) an assessment of potential impacts from thermal plumes and changes in thermally mobilized constituents;
b) potential impacts from aerial deposition and sedimentation arising from Project related activities;
c) potential impacts from acidifying and eutrophying components of aerial deposition arising from Project related activities;
d) an assessment of potential impacts to water quality due to alteration of water levels within the Project area.
e) Describe the effects if any, of water withdrawals considered, including cumulative

effects on fish, fish habitat or other aquatic resources.

f) Describe how waterbodies, streams or watersheds of importance to Aboriginal communities were identified and addressed in the assessment.

g)

3.6 Aquatic Ecology

3.6.1 Baseline Information

[A] Describe and map the fish, fish habitat (e.g., aquatic and benthic invertebrates) of the lentic and lotic ecosystems, including intermittent and ephemeral water bodies. Describe the species composition, distribution, relative abundance, movements and general life history parameters, including their use and potential use of habitats. Provide the methods used and rationale for the baseline data collection.

[B] Describe any species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);
b) b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';
c) listed in Schedule 1 of the federal *Species at Risk Act*;
d) listed as "at risk" by COSEWIC; and
e) traditionally used species.

[C] Describe and map fish habitat including critical or sensitive areas such as spawning, rearing, and over-wintering habitats, seasonal habitat use including migration and spawning routes as well as habitat disturbances that are related to proposed, existing and approved projects overlain on surface hydrology.

[D] Describe the current and potential traditional use and cultural importance of the fish resources by Indigenous or recreational fisheries.

[E]

3.6.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to fish, fish habitat, aquatic and benthic invertebrates and key indicators, including, but not limited to:

a) habitat loss and alteration;
b) potential water quality and quantity changes;
c) potential impacts on riparian areas that could affect aquatic resources and productivity;
d) changes to benthic invertebrate communities;
e) increased fishing pressures in the region that could arise from the increased human activity and improved access from the Project;
f) increased habitat fragmentation;
g) acidification and/or eutrophication;
h) groundwater-surface water interactions;
i) potential for thermal plumes to affect aquatic habitat; and
j) potential for ground heave/subsidence and impacts to aquatic habitat, and
k) potential effects on Aboriginal people's exercise of s.35 rights and traditional use.

[B] Discuss the rationale for the selection of the key indicators.

[C] Identify proposed plans to offset any loss in productivity as a result of the Project. Indicate how environmental protection plans address applicable provincial and federal

policies on fish habitat.

3.7 Vegetation

3.7.1 Baseline Information

[A] Describe and map the vegetation communities, wetlands, rare plants, old growth forests, and communities of limited distribution. Describe the occurrence, relative abundance and distribution of all plant species providing methods used and rationale for the baseline data collection.

[B] Describe any species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);
b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';
c) listed in Schedule 1 of the federal *Species at Risk Act*;
d) listed as "at risk" by COSEWIC; and
e) traditionally used and culturally important species.

[C] Describe and quantify the current extent of habitat fragmentation.

[D] Identify key vegetation indicators used to assess the Project impacts. Discuss the rationale for the indicator's selection.

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3.7.2 Impact Assessment

[A] Identify the vegetation and wetland communities that will be disturbed by all stages of the Project and identify the traditional and culturally important species and consequential vegetation and wetland communities that will be impacted

[B] Describe and assess the potential impacts of the Project on vegetation communities and key indicators, including, but not limited to:

a) both temporary (include timeframe) and permanent impacts;
b) the potential for introduction and colonization of weeds and non-native invasive species;
c) potential increased fragmentation and loss of upland, riparian and wetland habitats; and
d) implications of vegetation changes for other environmental resources (e.g., terrestrial and aquatic habitat diversity and quantity, water quality and quantity, erosion potential).
e) Implications of changes to Aboriginal peoples' exercise of their s.35 rights and traditional uses.

[C] Discuss the rationale for the selection of the key indicators.

3.8 Wildlife

3.8.1 Baseline Information

[A] Describe and map the wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species relative abundance, distribution and their use and

potential use of habitat, providing methods used and rationale for the baseline data collection.

[B] Describe any species that are:

a) listed as “at Risk, May be at Risk and Sensitive” in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);

b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';
c) listed in Schedule 1 of the federal *Species at Risk Act*;
d) listed as "at risk" by COSEWIC; and
e) traditionally used and culturally important species.

[C] Describe and map existing wildlife habitat and habitat disturbance including exploration activities. Identify habitat disturbances that are related to existing and approved projects.

[D] Discuss use of traditional ecological knowledge and traditional land use information in baseline field studies.

[E] Identify the key wildlife and habitat indicators used to assess project impacts. Describe rationale for their selection.

3.8.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to wildlife and wildlife habitats and key indicators, including, but not limited to:
a) how the Project will affect wildlife relative abundance, mortality, movement patterns, and distribution for all stages of the Project;
b) how improved or altered access may affect wildlife, including potential obstruction of daily and seasonal movements, increased human-wildlife incidents and increased hunting pressures;
c) the spatial and temporal changes to habitat availability and function;
d) how increased habitat fragmentation may affect wildlife. Consider edge effects, the availability of core habitat and the influence of linear features and infrastructure on wildlife movements and predator-prey relationships;
e) potential effects on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health;
f) potential effects on wildlife from Devon's proposed and planned exploration, seismic and core hole activities, including monitoring/4D seismic;
g) the resilience and recovery capabilities of wildlife populations and habitats from disturbance, in particular with regard to listed species, and traditionally used and culturally important species; and
h) the effects and their implications on Aboriginal peoples' exercise of s.35 rights and traditional land use including availability and quantity of traditional use species.

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[B] Discuss the rationale for the selection of the key indicators.

3.9 Biodiversity

3.9.1 Baseline Information

[A] Describe and map the existing biodiversity, including any unique features in the Local Study Area.

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3.9.2 Identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline biodiversity. Discuss the rationale for their selection.Impact

Assessment

[A] Describe and assess the potential impacts of the Project to biodiversity including, but not limited to:

a) the biodiversity metrics, biotic and abiotic indicators selected;
b) the effects of fragmentation on biodiversity potential;
c) the contribution of the Project to any anticipated changes in regional biodiversity and the potential impact to local and regional ecosystems; and
d) effects during construction, operations and post-reclamation and the significance of these changes in a local and regional context.

3.10 Terrain and Soils

3.10.1 Baseline Information

[A] Describe and map the terrain and soils conditions in the Project Area.

[B] Describe and map soil types in the areas that are predicted to exceed Potential Acid Input critical loading criteria.

3.10.2 Impact Assessment

[A] Describe project activities and other related issues that could affect soil quality (e.g., compaction, contaminants) and:

a) indicate the amount (ha) of surface disturbance from plant, field (e.g., pads, pipelines, access roads), aggregate and borrow sites, camps, drilling waste disposal and other infrastructure-related construction and operational activities;
b) discuss the relevance of any changes for the local and regional landscapes, biodiversity, productivity, ecological integrity, aesthetics and future use resulting from disturbance from all stages of the Project;
c) identify the potential acidification impact on soils and discuss the significance of predicted impacts by acidifying emissions; and
d) describe potential sources of soil contamination.

[B] Discuss:

a) the environmental effects of proposed drilling methods on the landscape and surficial and bedrock geology;
b) the potential for changes in the ground surface during steaming and recovery operations (e.g., ground heave and/or subsidence) and their environmental implications; and
c) the potential impacts caused by the mulching and storage of woody debris considering, but not limited to, vulnerability to fire, degradation of soil quality, increased footprint.

3.11 Land Use and Management

3.11.1 Baseline Information

[A] Describe and map the current land uses in the Project Area, including all Crown land dispositions and Crown Reservations (Holding Reservation, Protective Notation, Consultative Notation) and Aboriginal land uses .

[B] Indicate where Crown land dispositions may be needed for roads or other infrastructure for the Project.

[C] Identify and map unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant sites and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).

[D] Identify and map federally and provincially identified critical habitat for listed wildlife species.

[E] Describe and map anticipated land clearing activities, showing the timing of the

activities.

[F] Describe the status of timber harvesting arrangements, including species and timing.

[G] Describe existing access control measures.

[H] Identify land use activities for which locations will be determined at a later date. Discuss the approach that will be used to locate future activities on the landscape.

3.11.2 Impact Assessment

[A] Identify the potential impacts of the Project on land uses, including:

a) unique sites or special features;
b) Aboriginal peoples' use of the lands for the exercise of s.35 rights and traditional land use including cultural heritage areas, ceremonial and sacred locations and transportation routes;
c) traplines and registered fur management areas;
d) changes in public access arising from linear development, including secondary effects related to increased hunter, angler and other recreational access;
e) aggregate reserves that may be located on land under Devon's control and reserves in the region;
f) development and reclamation on commercial forest harvesting and fire management in the Project Area;
g) the amount of commercial and non-commercial forest land base that will be disturbed by the Project, including the Timber Productivity Ratings for the Project Area. Compare the baseline and reclaimed percentages and distribution of all forested communities in the Project Area;
h) how the Project impacts Annual Allowable Cuts and quotas within the Forest Management Agreement area;
i) the operation of any agricultural crown land and provincial grazing reserves;
j) anticipated changes (type and extent) to the topography, elevation and drainage patterns within the Project Area; and
k) access control for public, regional recreational activities, Indigenous land use and other land uses during and after development activities.

[B] Describe how Integrated Land Management has been used (e.g., sharing of infrastructure, access requirements).

[C] Provide a fire control plan highlighting:

a) measures taken to ensure continued access for firefighters to adjacent wildland areas;
b) forest fire prevention, detection, reporting, and suppression measures, including proposed fire equipment;
c) measures for determining the clearing width of power line rights-of-way; and
d) required mitigation measures based on the *FireSmart Field Guide for the Upstream Oil and Gas Industry*.

4 HISTORIC RESOURCES

4.1 Baseline Information

[A] Provide a brief overview of the regional historical resources setting including a discussion of the relevant archaeological, historic and palaeontological records.

[B] Describe and map known historic resources sites in the Project Area, considering:

a) site type and assigned Historic Resources Values; and
b) existing site specific *Historical Resources Act* requirements.

[C] Provide an overview of previous Historical Resources Impact Assessments that have been conducted within the Project Area, including:
a) a description of the spatial extent of previous assessment relative to the Project Area, noting any assessment gap areas; and
b) a summary of *Historical Resources Act* requirements and/or clearances that have been issued for the Project to date.

[D] Identify locations within the Project Area that are likely to contain previously unrecorded historic resources, such as traditionally utilized and culturally important areas. Describe the methods used to identify these areas, including consultation with and traditional land use studies completed by Aboriginal communities regarding Aboriginal traditional land use, traditional ecological knowledge, and culturally important areas.

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4.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect historic resources at all stages of the Project.

[B] Describe the nature and magnitude of the potential project impacts on historical resources, considering:
a) effects on historic resources site integrity; and
b) implications for the interpretation of the archaeological, historic and palaeontological records.

[C] Describe the use of traditional land use and traditional environmental knowledge information and participation of local Aboriginal communities in the historical resource impact assessment completed for the Project.

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5 ABORIGINAL AND TREATY SECTION 35 RIGHTS, TRADITIONAL ECOLOGICAL KNOWLEDGE, LAND USE AND CULTURAL HERITAGE IMPACTS

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Baseline Information

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[A] Provide pre-development (mid 1960's) baseline of traditional land use and cultural heritage, including:
a) a map and description of Traditional Land Use areas including fishing, hunting, trapping and nutritional, medicinal or cultural plant harvesting by affected Indigenous peoples (if the Indigenous community or group is willing to have these locations disclosed);
b) a map or description of cabin sites, camping or occupancy locations, spiritual sites, cultural locations, gravesites and other traditional use sites (if the Indigenous community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns; and

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[B] Identify key indicators used to assess Project impacts on Aboriginal peoples' exercise of s.35 rights, cultural heritage and traditional land use. Discuss rationale for their selection.

[C] Discuss incorporation of traditional land use and traditional ecological knowledge information and baseline data collection.

Impact Assessment

a) Provide an assessment of:

i) The availability of vegetation, fish and wildlife species for food, traditional, medicinal and cultural purposes in the identified traditional land use areas considering all direct and indirect project related impacts,

ii) access to traditional lands within, through and around the Project Area during all stages of the Project,

iii) cultural heritage impacts on Aboriginal people, and

b) Describe the additive impact the project will have on the regional cumulative impacts to Aboriginal and Treaty Section 35 rights, Traditional land use and cultural heritage.

c) Describe Indigenous perspectives on land reclamation, and how they will be incorporated into reclamation planning.;

[D] Describe how Traditional Ecological Knowledge and Traditional Land Use information was incorporated into all stages of the Project, including EIA development, construction, operation, conservation and reclamation, monitoring and mitigation.

[E] Determine the impacts of the Project on traditional, medicinal and cultural purposes and identify possible mitigation strategies.

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6 PUBLIC HEALTH AND SAFETY

6.1 Public Health and Quality of Life

[A] Describe aspects of the Project that may have implications for public health and quality of life or the delivery of regional health services. Determine quantitatively whether there may be implications for public health arising from the Project.

[B] Document any health and quality of life concerns raised by stakeholders during consultation on the Project.

[C] Document any health and quality of life concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project, specifically on their traditional lifestyle. Include an Indigenous receptor type in the assessment.

[D] Describe the potential health and quality of life impacts resulting from higher regional traffic volumes and the increased risk of accidental leaks and spills.

6.2 Public Safety

[A] Describe aspects of the Project that may have implications for public safety. Specifically:

a) describe the emergency response plan including public notification protocol and safety procedures to minimize adverse environmental effects, including emergency reporting procedures for spill containment and management;
b) document any safety concerns raised by stakeholders during consultation on the Project;
c) describe the spill response plans and assessment approach that would address spills, including pipeline spills, flow-to-surface events, and well head blow outs, including the potential associated residual effects;
d) describe how local residents will be contacted during an emergency and the type of information that will be communicated to them;
e) describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual aid programs and municipal emergency response agencies; and
f) describe the potential safety impacts resulting from higher regional traffic volumes.

7 SOCIO-ECONOMIC ASSESSMENT

7.1 Baseline Information

[A] Describe the existing socio-economic conditions in the region and in the communities in the region.

[B] Describe factors that may affect existing socio-economic conditions including:

a) population changes;
b) workforce requirements for all stages of the Project, including a description of when peak activity periods will occur;
c) planned accommodations for the workforce for all stages of the Project. Discuss the rationale for their selection and the alternatives considered;

d) Devon's policies and programs regarding the use of local, regional and Alberta goods and services;
e) the project schedule and periods of peak employment and production;
f) the overall engineering and contracting plan for the Project; and
g) the impacts of the 2016 Fort McMurray wildfire.

[C] In consultation with aboriginal communities, provide community-specific socio-economic baseline information commensurate with that of Fort McMurray and including cultural and lifestyle information unique to those communities.

[D]

7.2 Impact Assessment

[A] Describe the effects of construction and operation of the Project on:
a) housing;
b) availability and quality of health care services;
c) local and regional infrastructure and community services;
d) recreational activities;
e) exercise of Aboriginal and Treaty Section 35 rights, traditional land use, social and cultural heritage interactions

[B] Describe the socio-economic effects of any new or existing camp(s) required for the Project and identify:
a) its location and the rationale for selecting this location;
b) the number of workers it is intended to house;
c) whether the camp will service the Project only or other clients;
d) the length of time the camp will be in service;
e) describe the services that will be provided in the camp (e.g., security, recreation and leisure, medical services), including a description of the impacts on Municipal or other external services; and
f) outline the emergency services and evacuation plan that will be in place.

[C] Discuss opportunities to work with First Nation and Métis communities and groups, other local residents and businesses regarding employment, training needs and other economic development opportunities arising from the Project.

[D] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages. Indicate the percentage of expenditures expected to occur in the region, including within and associated with local Aboriginal Communities, Alberta, Canada outside of Alberta, and outside of Canada.

8 MITIGATION MEASURES

[A] Discuss mitigation measures planned to avoid, minimize or eliminate the potential impacts for all stages of the Project.

[B] Identify the mitigation objectives for each associated impact and describe those mitigation measures that will be implemented. Provide rationale for their selection, including a discussion on the effectiveness of the proposed mitigation.

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[C] Assess the risks of mitigation ineffectiveness or failure.

9 RESIDUAL IMPACTS

[A] Describe the residual impacts of the Project following implementation of Devon's mitigation measures and Devon's plans to manage those residual impacts. Provide contingency plans for ineffective or partially effective mitigation performance.

10 MONITORING

[A] Describe Devon's current and proposed monitoring programs, including:

a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans and the validity of the impacts predicted in the environmental assessments. Discuss how Devon will address any project impacts identified through the monitoring program;
b) how Devon will contribute to current and proposed regional monitoring programs;
c) monitoring performed in conjunction with other stakeholders, including Indigenous communities and groups;
d) new monitoring initiatives that may be required as a result of the Project;
e) regional monitoring that will be undertaken to assist in managing environmental effects and improve environmental protection strategies;
f) how monitoring data will be disseminated to the public, Indigenous communities or other interested parties;
g) how the results of monitoring programs and publicly available monitoring information will be integrated with Devon's environmental management system, and;.
h) how Aboriginal communities will be involved in monitoring programs (e.g community based monitoring programs).

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AEP Environmental Assessment

From: Adi Isaac Adiele <aadiele@fortmckaymetis.com>
Sent: Thursday, October 04, 2018 11:15 AM
To: AEREnvironmental Assessment
Cc: greg.brady@dvn.com; ELJ Eddison Lee-Johnson; Sanil Sivarajan
Subject: Devon Pike 2 Terms of Reference submission
Attachments: Pike2-ProposedTOR-Aug20-2018_FMMCA input.doc; Pike2-ProposedTOR-Aug20-2018 _FMMCA input.pdf

Importance: High

Director, Environmental Assessment
Authorizations Branch
Alberta Energy Regulator
Suite 1000, 250-5th Street SW
Calgary, Alberta T2P 0R4

RE: Devon Pike 2 Terms of Reference

Please find attached the Word and PDF version of Fort McKay Metis input into the Pike 2 Terms of Reference.

Do not hesitate to contact me if you have any question.

Best Regards,

Adi Isaac Adiele, P.Geol.

Senior Environmental & Regulatory Coordinator

McKay Metis Sustainability Centre (MMSC)

Fort McKay Métis Community Association

Email: aadiele@fortmckaymetis.com

Mobile:1- 403-397-1015 - Preferred

P.O. Box 5000, Fort McMurray, AB T9H 3G4

PROPOSED TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR DEVON CANADA CORPORATION'S PROPOSED

PIKE 2 PROJECT

Approximately 40 km Southeast of Conklin, Alberta

ISSUED BY: **Devon Canada Corporation**

DATE: **August 20, 2018**

TABLE OF CONTENTS

PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for Devon Canada Corporation (Devon), Indigenous communities and appropriate stakeholders the information required by government agencies for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Pike 2 Project (the Project).

Devon is proposing a new in situ oil sands project in the Southern Athabasca Oil Sands region. The Project is a 50/50 joint venture with BP Canada Energy Group ULC and will be operated by Devon. To recover bitumen resources from the McMurray formation, Devon's well-established Steam Assisted Gravity Drainage (SAGD) technology, along with diluent co-injection and cogeneration will be employed.

The Project will include a central processing facility (CPF), well pads, source water and disposal well sites, pipelines, roads and power lines. The Project is expected to produce up to 70,000 barrels per day (bpd) of bitumen. Pending regulatory approval, Pike 2 will be constructed over a two-year period with initial production projected for 2025. The Pike 2 CPF will have a full production life of approximately 30 years.

The Project is located approximately 40 km southeast of Conklin, Alberta, in portions of Townships 73 and 74, Ranges 4, 5 and 6, west of the 4th Meridian, in Lac La Biche County.

SCOPE OF THE EIA REPORT

Devon shall prepare and submit an EIA report that examines the direct, induced and cumulative environmental and socio-economic effects of the Project.

The EIA report shall be prepared considering all applicable provincial and federal legislation, codes of practice, guidelines, standards, policies and directives as well as federal and provincial climate change obligations and commitments.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations, and the *Canadian Environmental Assessment Act*, or *Impact Assessment Act,* if applicable. The EIA report will form part of Devon's application to the Alberta Energy Regulator (AER). An EIA report summary will also be included as part of the AER Application.

Devon shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* published by Alberta Environment and Parks (the Guide) and these Terms of Reference when preparing the Environmental Impact Assessment report. In any case where there is a difference in requirements between the Guide and these Terms of Reference, the Terms of Reference shall take precedence.

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT AND INDIGENOUS CONSULTATION

[A] Describe the concerns and issues expressed by the public and the actions taken to address those concerns and issues, including how public input was ~~incorporated~~

integrated into the Project development, impact management, mitigation and monitoring.

[B] Describe the concerns and issues expressed by Indigenous communities and the actions taken to address those concerns and issues, including how Indigenous community input was ~~incorporated~~ integrated into the Project, EIA development, management, mitigation, monitoring and reclamation. Describe consultation undertaken with Indigenous communities and groups with respect to Traditional Ecological Knowledge and Traditional Use of land, water, wildlife and vegetation and resources contained therein. Describe consultation undertaken with Indigenous communities and groups with respect to cultural practices in and around the Project area.

~~[B]~~[C] Discuss Devon's Indigenous consultation for the Project with respect to Devon's approved Consultation Plan(s) including how it was informed by potentially affected Indigenous communities.

[D] Describe plans to maintain the public engagement and Indigenous consultation process following completion of the EIA report to ensure that the public and Indigenous peoples will have an appropriate forum for expressing their views on the ongoing development, operation and reclamation of the Project. Describe how these views will be integrated into Project planning and adaptive management.

~~[C]~~[E] Provide a description, from Devon's perspective, of the effectiveness of the Indigenous consultation process to date and going forward.

2 PROJECT DESCRIPTION

2.1 Overview

[A] Provide a brief project description in sufficient detail to provide context for the EIA, including:

a) proponent information;
b) proposed extraction and bitumen processing technology;
c) amount and source of energy required for the Project;
d) the amount and source of diluent required for extraction and transportation over the life of the Project:
e) water supply and disposal requirements, including process water and potable water requirements;
f) proposed method to transport product to markets; and
g) development plan and schedule, including to reclamation certification.

[B] Provide maps and/or drawings of the Project components and activities including:

a) existing infrastructure, leases and clearings, including exploration clearings;
b) proposed central processing/treatment and field facilities;
c) other buildings and infrastructure (e.g., pipelines, utilities and camp(s));
d) temporary structures;
e) transportation and access routes;
f) on-site hydrocarbon storage;

g) containment structures such as retention ponds and storage ponds (e.g., lime sludge, stormwater runoff, boiler blow-down);
h) water wells/intakes, pipelines, and storage structures;
i) sources of aggregate resources, borrow material and other construction material and locations of any stockpiles that will be developed; and
j) waste storage area and disposal sites.

[C] Discuss alternative means of carrying out the Project which are technically and economically feasible and rationale for the preferred means including the extent to which it employs Best Available Technology Economically Achievable (BATEA).

[D] Discuss how environmental, socio-economic, traditional use, cultural and traditional environmental knowledge criteria informed and influenced the evaluation of alternatives and the selection of the proposed Project components.

[E] Discuss the implications of a delay in proceeding with the Project, or any phase of the Project, or not going ahead with the Project.

~~[C]~~[F] Discuss the extent to which the Project contributes to sustainability.

~~[D]~~[G] Describe the benefits of the Project, including jobs created, local training, employment and business opportunities, and royalties and taxes generated that accrue to:
a) Devon;
b) local and regional communities, including Indigenous communities;
c) the local authority;
d) Alberta; and
e) Canada.

~~[E]~~[H] Provide the adaptive management approach that will be implemented throughout the life of the Project. Include how monitoring, mitigation and evaluation were incorporated.

2.2 Constraints

[A] Discuss the process and criteria used to identify constraints to development, and how the Project has been designed to accommodate those constraints. Include the following:
a) any applicable *Alberta Land Stewardship Act* Regional Plan, including the draft Biodiversity Management Framework;
b) how this Project aligns with the *Comprehensive Regional Infrastructure Sustainability Plan for the Athabasca Oil Sands Area*;
c) any applicable Alberta Ambient Air Quality Objectives;
d) land use policies and resource management initiatives that pertain to the Project;
e) provincial and federal climate change commitments, obligations, policies and legislation;
f) Indigenous traditional land, water, wildlife and vegetation use and resources contained therein, including the potential to adversely affect Treaty and Aboriginal rights;
~~f)~~g) Indigenous cultural values and use;
~~g)~~h) campgrounds and recreational sites;

~~h)~~i) historic resources sites;
~~i)~~j) all known traplines and registered fur management areas;
~~j)~~k) the environmental setting;
~~k)~~l) cumulative environmental impacts in the region;
~~l)~~m) cumulative social and health impacts in the region;
~~m)~~n) results of project-specific and regional monitoring;
~~n)~~o) potential for new or additional technology to increase resource recovery at later times; and
~~o)~~p) potential for changes in the regulatory regime.

[B] Provide a detailed assessment of the selection criteria used, including energy and water efficiencies, options considered, and rationale for selecting:

a) location of facilities and infrastructure (including linear infrastructure such as pipelines, roads and utilities); ~~and~~
b) thermal energy and electric power required for the Project;~~.~~
c) water supply sources;
d) wastewater treatment, wastewater management and wastewater disposal;
e) air emissions and air quality management systems, including the environmental, health and cumulative effects management considerations behind the selections and how the selections reflect best energy efficiency practices and best available emission control technologies; and
~~b)~~f) waste disposal.

[C] Provide a list of facilities for which locations and access will be determined later. Describe the selection criteria that will be used to determine the specific location of these facilities. For facilities built by a third party, describe how Devon would participate in the process to ensure constraints are considered and how stakeholders and Indigenous communities will be consulted for input.

[D] Discuss the use of constraints mapping for the siting of facilities, wellpads and associated infrastructure. Report on involvement or input of Indigenous communities in the constraints mapping process.

~~[C]~~

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2.3 Regional and Cooperative Efforts

[A] Discuss Devon's involvement in regional and cooperative efforts to address environmental and socio-economic issues associated with regional development.

[B] Describe opportunities for sharing existing or planned infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.

[C] In the assessment, reference regional multi-stakeholder monitoring programs (e.g. WBEA, OSM Program), management frameworks and guidelines including those in draft or under revision (e.g. draft LARP BMF) as well as provincial cooperative efforts (e.g. ABMI) and cooperative industry efforts (e.g. COSIA programs and initiatives). In particular, discuss Devon's involvement (with regard to participation and funding) in

regional and cooperative efforts that address environmental and socio-economic issues associated with regional development including but not limited to:

a) Devon's direct participation in any regional forums, and rationale for not participating in particular forums;
b) potential cooperative ventures Devon has initiated, could initiate or could develop with other operators and other resource users;
c) how Devon will work to develop and implement such cooperative opportunities;
d) how Devon would design and implement research programs; and
e) how regional environmental management initiatives will be incorporated into Devon's management practices.

~~[B]~~

2.4 Transportation Infrastructure

[A] Prepare a Traffic Impact Assessment as per Alberta Transportation's *Traffic Impact Assessment Guideline (http://www.transportation.alberta.ca/613.htm)*. If there are any previous Traffic Impact Assessment studies that have been carried out for the Project or adjacent Projects using the same access, review and validate the findings and recommendations.

[B] Describe background traffic and consider the cumulative effects of traffic impacts due to other existing and planned developments using the same highways and accesses.

[C] Discuss anticipated changes to highway traffic (e.g., type, volume) due to the Project.

[D] Assess potential traffic impacts for all stages of the Project (e.g., construction, operation, maintenance, expansion, shutdown).

[E] Determine any necessary improvements and methods to mitigate traffic impacts.

~~[E]~~[F] Provide an Access Management Plan for the Project and project area. Discuss how the plan was informed by neighboring operators, land users and Indigenous communities. Describe how access will be managed with regard to public access, access by staff and contractors and access by Indigenous communities for traditional and cultural purposes.

~~[F]~~[G] Describe and map the locations of any new access, road or intersection construction, or any improvements to existing roads or intersections, related to the development of the Project, from the boundary of the Project Area up to and including the highway access points, and

a) discuss the alternatives and the rationale for selection for the preferred alternative;
b) discuss compatibility of the preferred alternative to Alberta Transportation's immediate and future plans;
c) describe the impacts to local communities of the changes in transportation and infrastructure including safety considerations;
~~c)~~d) provide a consultation summary with Indigenous communities, trapline users and RFMA holders regarding selection of alternatives and access management; and
~~d)~~e) provide a proposed schedule for the work.

[H] Describe any infrastructure or activity that could have a potential impact on existing roads (e.g., pipelines or utilities crossing provincial highways, any facilities in close proximity of the highways, any smoke, dust, noise, light or precipitation generated by the Project that could impact the highway and road users).

[A] Identify the type, volume, location and availability of construction and reclamation materials for all road construction and/or road improvement work, related to the development of the Project, within and outside of the Project area.

~~[G]~~

~~[H]~~[B] Provide a summary of any discussions with Alberta Transportation in regards to the Project and its traffic impacts.

~~[I]~~[C] Indicate where Crown land dispositions may be needed for roads or infrastructure required for the Project.

2.5 Air Emissions Management

[A] Discuss the selection criteria used, options considered, and rationale for selecting control technologies to minimize air emission and ensure air quality management. Discuss how these technologies represent BATEA and how best management practices will be employed.

[B] Provide emission profiles (type, composition, rate and source) for the Project's operating and construction emissions including point and non-point sources and fugitive emissions. Consider both normal and upset conditions. Discuss:

a) odorous and visible emissions from the proposed facilities;
b) annual and total greenhouse gas emissions during all stages of the Project. Identify the primary sources and provide detailed calculations;
c) the intensity of greenhouse gas emissions per unit of bitumen produced;
d) the Project's contribution to total provincial and national greenhouse gas emissions on an annual basis;
e) describe the Project's greenhouse gas emissions relative to the provincial greenhouse gas emission limit for oil sands developments;
f) the greenhouse gas management plans for the Project;
g) amount and nature of Criteria Air Contaminants emissions including volatile organic compounds, polycyclic aromatic compounds, and reduced Sulphur compound emissions;
h) the amount and nature of acidifying and eutrophying emissions, probable deposition patterns and rates;
i) the applicable emission standards and limits for the emission sources as well as guidelines and frameworks including to Keep Areas Clean;
j) control technologies used to reduce emissions;
k) emergency flaring scenarios (e.g., frequency and duration) and proposed measures to ensure flaring events are minimized;

l) upset condition scenarios (e.g., frequency and duration) and proposed measures to ensure upset conditions are minimized;
m) gas collection and conservation, and the applicability of vapour recovery technology;
n) applicability of sulphur recovery, acid gas re-injection or flue gas desulphurization to reduce sulphur emissions; and
o) fugitive emissions control technology to detect, measure and control emissions and odours from equipment leaks.

2.6 Water Management

2.6.1 Water Supply

[A] Describe the water supply requirements for the Project, including:
a) the design factors considered, criteria used, options considered and rationale for selection of water supply sources(s);
b) the expected water balance during all stages of the Project. Discuss assumptions made or methods chosen to arrive at the water balances;
c) the process water, potable water, and non-potable water requirements and sources for construction (including, but not limited to, road construction, winter road construction, lease construction, production well drilling and dust suppression), camp(s) and plant site, start-up, normal and emergency operating situations, decommissioning and reclamation. Identify the volume of water to be withdrawn from each source, considering plans for wastewater reuse including criteria and rationale for selection of water sources as described;
d) the location of sources/intakes and associated infrastructure (e.g., pipelines for water supply);
e) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented and in consideration of various climate change scenarios;
f) the expected cumulative effects on water losses/gains resulting from the Project operations;
g) contingency plans in the event of restrictions on the Project's water supply source (e.g., due to license conditions, source volume limitations, climate change or cumulative impact water deficits);
h) potable water treatment systems for all stages of the Project;
i) type and quantity of potable water treatment chemicals used; and
j) measures for ensuring efficient use of water including alternatives to reduce the consumption of non-saline water such as water use minimization, recycling, conservation, and technological improvements.

2.6.2 Surface Water

[A] Describe the surface water management strategy for all stages of the Project, including:
a) design factors considered; and

b) permanent or temporary alterations or realignments of watercourses and other waterbodies and avoidance or mitigation measures to prevent effects to fish and fish habitat.

[B] Describe and map all roadway, pipeline, powerline and any other utility crossings of watercourses, wetlands or other waterbodies.

[C] Describe the placement of infrastructure (including processing facilities, well pads, roads and borrow pits) in relation to water bodies and watercourses.

[D] Describe how the Alberta Wetland Policy was considered in the assessment of impacts, including, but not limited to:

a) avoidance, minimization, or replacement of wetlands in accordance with the Alberta Wetland Mitigation Directive;
b) temporary and permanent alterations (direct and indirect) to wetlands classified under the Alberta Wetland Classification System;
c) any expected changes in wetland class, and causes for this change; and
d) consideration of cumulative effects in the watershed to wetlands.

2.6.3 Wastewater Management

[A] Describe the wastewater management strategy, including:

a) the criteria used, options considered and rationale for the selection of wastewater treatment and wastewater disposal;
b) the source, quantity and composition of each wastewater stream from each component of the proposed operation (e.g., bitumen extraction and associated facilities) for all project conditions, including normal, start-up, worst-case and upset conditions;
c) the proposed disposal locations and methods for each wastewater stream;
d) geologic formations for the disposal of wastewaters;
e) design of facilities that will collect, treat, store and release wastewater streams and evaluation done to determine that the facilities represent best management or treatment practices;
f) type and quantity of chemicals used in wastewater treatment; and
g) sewage treatment and disposal.

2.7 Waste Management

[A] Discuss the selection criteria used, options considered, and rationale for project-related waste disposal both on and off-site.

[B] Characterize and quantify the anticipated dangerous goods, and hazardous, non-hazardous, and recyclable wastes generated by the Project, and describe:

a) the composition and volume of specific waste streams and discuss how each stream will be managed;
b) the amount of drilling wastes and the options considered for disposal and the option chosen;

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c) the amount of drilling wastes and the options considered for disposal and the option chosen;

d)

~~a)~~

~~b)~~ how the disposal sites and sumps will be constructed; ~~and~~

e) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project; and ~~.~~

~~c)~~f) the location of off-site disposal including landfills and deep well disposal sites if any are in the Regional Municipality of Wood Buffalo.

2.8 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for the Project. Describe and map as applicable:

a) current and post-development anticipated land use and how equivalent land capability will be achieved from a number of perspectives including but not limited to traditional land use, wildlife and forest productivity;

b) anticipated timeframes for completion of reclamation stages and release of lands back to the Crown and for Indigenous land use including an outline of the key milestone dates for reclamation and how progress to achieve these targets will be measured. Provide a table and graph that shows cumulatively, for each year and for the entire life of the Project, the land disturbed by clearing, land disturbed through drainage alterations, land disturbed by soil removal or covering, the total land reclaimed and the land that remains unreclaimed. Describe how project design and reclamation planning has contributed to and an accelerated pace of reclamation in comparison to existing projects

~~b)~~ ~~;~~

c) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;

d) a revegetation plan for the Project Area including for disturbed vegetation, aquatic and wetlands;

e) how the proposed reclamation methods have performed in similar situations including ecosite and ecosite phases diversity establishment and re-population of these areas by plant and wildlife species of importance. Include in this discussion the plants and animals important to Indigenous communities;

~~d)~~

f) reclamation material salvage, storage areas and handling procedures; ~~and~~

g) reclamation material salvage plans, including soil resources from the entire development footprint;

h) the volumes of soil to be salvaged and the length of time to be stored before use; for organic soil materials, describe the expected soil decomposition and how this will be managed and how any volume changes will be accommodated in the reclamation plan;

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i) a description of LFH depth and volume and an assessment of the potential to strip LFH separately from the topsoil; and

~~e)~~j) the use of a certified soil scientist to supervise soil salvage and placement; and

~~f)~~k) existing and final reclaimed site drainage plans including for wetlands.

[B] Provide the expected timelines for establishment and recovery of vegetative communities and wildlife habitat. Discuss, from an ecological perspective, the expected success of establishment and recovery, and the expected differences in the resulting communities.

[C] Describe how Devon will consider the use of progressive reclamation in project design and reclamation planning.

[D] Discuss Devon's involvement in any in-situ reclamation initiatives or reclamation working groups.

[E] Discuss how Devon has consulted with Indigenous communities in reclamation planning, including plans on engagement and involvement throughout the life of the Project.

~~[C]~~

~~[D]~~[F] Discuss uncertainties related to the conceptual reclamation plan.

3 ENVIRONMENTAL ASSESSMENT

3.1 Assessment Cases

[A] In addition to the assessment scenarios set out in the AENV Guidance to Preparing Environmental Assessment Reports in Alberta, assess the following scenarios:

a) pre-development case (approximately mid 1960's); and

b) current case (approximately 2016) assessment case.

The pre-development case as describe in (a) above should serve as the baseline case upon which all other cases, including the application case, are compared.

[B] Cumulative effects Case:

a) assess effects of past, present and future developments and activities that might interact with the effects of the proposed project considering;

i) existing, approved and reasonably foreseeable anthropogenic and natural events (eg. forest fires, climate change); and

ii) a time horizon that will exposes any transient and residual permanent effects.

~~3.1~~3.2 Air Quality, Climate and Noise

~~3.1.1~~3.2.1 Baseline Information

[A] Discuss the baseline climatic and air quality conditions including:

a) the type and frequency of meteorological conditions that may result in poor air quality;

~~a)~~b) current regional air quality and air quality issues and trends;

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~~b)~~c) potential receptors, current regional air quality issues and trends (e.g., odours, exceedances of Ambient Air Quality Objectives); and

d) applicable federal, provincial and regional~~appropriate~~ ambient air quality parameters including SO2, CO, H2S, other RSCs, NOx, PAHs, VOCs, NH3, individual hydrocarbons of concern (e.g. odours and health related in the THC and VOC mixtures, O3 (ground level), heavy metals and particulates (TSP, PM10 and PM 2.5).

~~c)~~ [A] Discuss the baseline acoustic environment:~~.~~

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~~3.1.2~~3.2.2 Impact Assessment

[A] Identify components of the Project that will affect air quality, and:

a) describe the potential for reduced air quality (including odours and visibility) resulting from the Project and discuss any implications of the expected air quality for environmental protection, quality of life (e.g. odours) and public health;

b) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's Directive 60 *Odour Management Protocol;*

c) estimate ground-level concentrations of appropriate air quality parameters including odorants and ozone;

d) discuss any expected changes to particulate deposition, nitrogen deposition or acidic deposition patterns;

e) provide the expected gas-to-oil ratio, the expected concentration of sulphur in the produced gas and the requested sulphur dioxide emission limit. Show calculations for the sulphur dioxide limit including the basis for the expected parameters, factors and assumptions used;

f) identify areas that are predicted to exceed Potential Acid Input critical loading criteria;

g) identify nitrogen deposition rates and patterns and the areas that are expected to exceed 8 kg N/ha/yr; and

~~f)~~

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~~g)~~h) discuss interactive effects that may occur resulting from co-exposure of a receptor to all emissions; and

~~h)~~i) describe air quality impacts resulting from the Project, and their implications for other environmental resources.

[B] Identify stages or elements of the Project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events. Discuss the potential impacts over the life of the Project and adaptive management options that could address related climate change impacts.

[C] Summarize the results of the noise assessment conducted for the AER, and:

a) identify the nearest receptor used in the assessment and all receptors within 5 km of the proposed development; ~~and~~

b) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's *Directive 38: Noise Control*; and

c) discuss the predicted sound levels within 5km of the perimeter of the development area.

[D] Describe the plans for monitoring noise in and around the Project area.

[E] Estimate the impacts of any pure tonal sound sources (e.g. vehicle back up beepers) or any intermittent noise sources (e.g. steam venting) from the Project on areas in the vicinity that they are used by Indigenous peoples or the public.

~~b)~~ [F] Discuss accommodation or mitigation strategies and how best practices will be applied to minimize the potential impact of the Project on air quality and noise.~~.~~

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~~3.2~~3.3 Hydrogeology

~~3.2.1~~3.3.1 Baseline Information

[A] Provide an overview of the existing geologic and hydrogeologic setting from the ground surface down to, and including, the oil producing zones and disposal zones, and:

a) present regional and Project Area geology to illustrate depth, thickness and spatial extent of lithology, stratigraphic units and structural features; and

b) present regional and Project Area hydrogeology describing:

i) the major aquifers, aquitards and aquicludes (Quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities. Include maps and cross sections,

ii) the chemistry of groundwater aquifers including baseline concentrations of major ions, metals and hydrocarbon indicators,

iii) the potential discharge zones, potential recharge zones and sources, areas of groundwater-surface water interaction and areas of Quaternary aquifer-bedrock groundwater interaction,

iv) water well development and groundwater use, including a field-verified~~n~~ inventory of groundwater users,

v) the recharge potential for Quaternary aquifers,

vi) potential hydraulic connection between bitumen production zones, deep disposal formations and other aquifers resulting from project operations,

vii) the characterization of formations chosen for deep well disposal, including chemical compatibility and containment potential, injection capacity, hydrodynamic flow regime, and water quality assessments, and

viii) the locations of major facilities associated with the Project including facilities for waste storage, treatment and disposal (e.g., deep well disposal) and describe site-specific aquifer and shallow groundwater conditions beneath these proposed facilities. Provide supporting geological information.

~~3.2.2~~3.3.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the Project.

[B] Describe and assess the nature and significance of the potential project impacts on groundwater with respect to:

a) inter-relationship between groundwater and surface water in terms of both groundwater and surface water quantity and quality, including as it relates to winter stream flow in affected streams and rivers;
b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
c) changes in groundwater quality, quantity and flow;
d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
e) potential implications of seasonal variations and climate change; and
f) groundwater withdrawal for project operations, including any expected alterations in the groundwater flow regime during and following project operations.

[C] Discuss ground water issues with Indigenous people and review existing relevant TEK and TLU information to indicate how this information has influenced the assessment process.

~~f)~~[D] Discuss the accommodation or mitigation strategies to minimize the potential impact of the Project on hydrogeology.

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~~3.3~~3.4 Hydrology

~~3.3.1~~3.4.1 Baseline Information

[A] Describe and map the surface hydrology in the Project Area.

[B] Identify any surface water users who have existing approvals, permits or licenses or users who have indicated traditional uses of surface water that may be impacted by the project.

~~3.3.2~~3.4.2 Impact Assessment

[A] Describe and assess the extent of hydrological changes that will result from disturbances to groundwater and surface water movement, and:
a) include an assessment of potential ground heave/subsidence and the potential impact on surface water flows, including potential changes in stream slope;
b) include changes to the quantity of surface flow, water levels and channel regime in watercourses (during minimum, average and peak flows) and water levels in waterbodies, including as it relates to winter conditions;
c) assess the potential impact of any alterations in flow on the hydrology and identify all temporary and permanent alterations, channel realignments, disturbances or surface water withdrawals;
d) discuss the effect of these changes on hydrology (e.g., timing, volume, peak and minimum flow rates, river regime and water levels), including the significance of effects for downstream watercourses; ~~and~~
~~d)~~e) quantify the rate, volume and timing of any storm water releases to local surface waters; and
~~e)~~f) identify any potential erosion problems in watercourses resulting from the Project.

[B] Describe impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.

[C] Discuss the impact of low flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

[A] Describe and discuss the potential impact on flow conditions and in-stream flow needs under various climate change scenarios.

[F] Discuss surface water issues with Indigenous people and review existing relevant TEK and TLU information to indicate how this information has influenced the assessment process.

~~[C]~~[B] Discuss the accommodation or mitigation strategies to prevent or minimize the potential impact of the Project on hydrology.

~~3.4~~3.5 Surface Water Quality

~~3.4.1~~3.5.1 Baseline Information

[A] Describe the baseline water quality of watercourses and waterbodies and their seasonal variations. Include a description of temporal (seasonal and interannual) and spatial variability. Consider appropriate water quality parameters.

~~3.4.2~~3.5.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project on surface water and sediment quality for appropriate parameters (e.g. temperature, pH, conductivity, cations and anions, metals, dissolved oxygen, suspended sediment, dissolved solids, nutrients and other oil sands water contaminants (such as napthenic acids) and potential tainting compounds including but not limited to;

a) an assessment of potential impacts from thermal plumes and changes in thermally mobilized constituents;

b) potential impacts from aerial deposition and sedimentation arising from Project related activities;

c) potential impacts from acidifying and eutrophying components of aerial deposition arising from Project related activities;

d) an assessment of potential impacts to water quality due to alteration of water levels within the Project area, including from climate change.

[B] Assess the potential Project-related and cumulative impacts of acidifying and other contaminants in air emissions on surface water and sediment quality.

[C] Discuss the effect of changes in surface runoff and/or groundwater withdrawal on water and sediment quality in surface water bodies.

[D] Describe the effects if any, on water withdrawals considered, including cumulative effects on fish, fish habitat or other aquatic resources.

~~d)~~ [E] Describe how waterbodies and areas of importance to traditional users were identified and addressed in the assessment.

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~~3.5~~3.6 Aquatic Ecology

~~3.5.1~~3.6.1 Baseline Information

[A] Describe the pre-development and existing fish and other aquatic resources. Identify species composition, distribution, relative abundance, movements and general life history parameters.

~~[A]~~[B] Describe and map the fish, fish habitat and aquatic resources (e.g., aquatic and benthic invertebrates) of the lentic and lotic ecosystems, including intermittent and ephemeral water bodies. Describe the species composition, distribution, relative abundance, movements and general life history parameters, including their use and potential use of habitats. Provide the methods used and rationale for the baseline data collection.

~~[B]~~[C] Describe any species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);

b) ~~b)~~ "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';

c) species identified as of special concern, threatened or according to Alberta's Endangered Species Conservation Committee (ESCC);

~~b)~~

~~c)~~d) listed in Schedule 1 of the federal *Species at Risk Act*;

~~d)~~e) listed as "at risk" by COSEWIC; and

~~e)~~f) traditionally used species.

~~[C]~~[D] Describe and map fish habitat including critical or sensitive areas such as spawning, rearing, and over-wintering habitats, seasonal habitat use including migration and spawning routes as well as habitat disturbances that are related to proposed, existing and approved projects overlain on surface hydrology.

~~[D]~~[E] Describe the current and potential use of the fish resources by Indigenous, ~~or~~ recreational or commercial fisheries.

~~3.5.2~~3.6.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to fish, fish habitat, aquatic and benthic invertebrates and key indicators, including, but not limited to:

a) habitat loss and alteration including fish tainting, survival of eggs and fry, chronic or acute health effects (based on whole effluent toxicity tests), and increased stress on fish populations from release of contaminants, sedimentation, flow alterations, temperature and habitat changes;

b) potential water quality and quantity changes;

c) potential impacts on riparian areas that could affect aquatic resources and productivity;

d) changes to benthic invertebrate communities including those that might affect food quality and availability for fish;

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e) increased fishing pressures in the region that could arise from the increased human activity and improved access from the Project. Provide mitigation options considered in a project access management plan;
f) increased habitat fragmentation;
g) acidification and/or eutrophication;
h) groundwater-surface water interactions;
i) potential for thermal plumes to affect aquatic habitat; and
j) potential for ground heave/subsidence and impacts to aquatic habitat.

[B] Discuss the rationale for the selection of the key indicators.

[C] Describe the effects of any water withdrawals considered, including cumulative effects on fish, fish habitat and other aquatic resources.

[D] Discuss accommodation or mitigation measures to minimize potential impacts of the Project on fish, fish habitat and other aquatic resources. Clearly identify those accommodation or mitigation measures that will be implemented and provide rationale for their selection.

~~[B]~~

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[E] Identify proposed plans to offset any loss in productivity as a result of the Project. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat.

[F] Describe the residual impacts of the Project on fish, fish habitat, and other aquatic resources and discuss their significance in the context of local and regional fisheries - describe Devon's plans to manage or accommodate those impacts.

~~[C]~~

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~~3.6~~3.7 Vegetation

~~3.6.1~~3.7.1 Baseline Information

[A] Describe and map the vegetation communities, wetlands, rare plants, old growth forests, and communities of limited distribution. Describe the occurrence, relative abundance and distribution of all plant species providing methods used and rationale for the baseline data collection.

~~[A]~~[B] As appropriate, use the Alberta Vegetation Inventory (AVI) Standard AVI 2.1 The Field Guide to Ecosites of Northern Alberta and the Alberta Wetland Inventory Standards Manual (AWI) Version 1.0. Map the project development footprint at a scale of 1:20,000. Conduct verification of vegetation mapping to provide reliability equivalent to the soils mapping.

~~[B]~~[C] Describe any species that are:
a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);
b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';

c) species identified as of special concern, threatened or according to Alberta's Endangered Species Conservation Committee (ESCC);
~~b)~~

~~c)~~a) listed in Schedule 1 of the federal *Species at Risk Act*;
~~d)~~b) listed as "at risk" by COSEWIC; and
~~e)~~c) traditionally used species.

[A] Describe and quantify the current extent of habitat fragmentation.

[B] Identify key vegetation indicators used to assess the Project impacts. Discuss how impacts will be monitored and the rationale for indicator selection.

~~[C]~~

~~3.6.2~~3.7.2 Impact Assessment

[A] Identify the vegetation and wetland communities that will be disturbed by all stages of the Project. Discuss the number of impacted traditional use sites as identified in community-specific traditional land use information.

~~[A]~~[B] Describe and assess the potential impacts of the Project on vegetation communities and key indicators, including, but not limited to:

a) both temporary (include timeframe) and permanent impacts;
~~a)~~b) species richness and abundance;
~~b)~~c) the potential for introduction and colonization of weeds and non-native invasive species;
~~c)~~d) potential increased fragmentation and loss of upland, riparian and wetland habitats; ~~and~~
e) implications of vegetation changes for other environmental resources (e.g., terrestrial and aquatic habitat diversity and quantity, water quality and quantity, erosion potential); and
f) the effects and their implications to recreation, Indigenous and other uses.
~~d)~~ ~~.~~

[C] Discuss the rationale for the selection of the key indicators.

[D] Discuss the accommodation or mitigation measures to minimize impacts on vegetation communities, wetlands, rare plants, old growth forests and communites of limited distribution. Clearly identify those accommodation or mitigation measures that will be implemented and provide the rationale for their selection.

[E] Discuss weeds and non-native invasive species and how they will be controlled prior to and during operation and reclamation.

[F] Discuss how TEK and TLU information that was collected and indicate how this information has influenced the assessment process.

~~[B]~~

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~~3.7~~3.8 Wildlife

~~3.7.1~~3.8.1 Baseline Information

[A] Describe and map the wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species relative abundance, distribution and their use and potential use of habitat, providing methods used and rationale for the baseline data collection.

[B] Describe any species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);

b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';

c) species identified as of special concern, threatened or according to Alberta's Endangered Species Conservation Committee (ESCC);

~~b)~~

~~c)~~d) listed in Schedule 1 of the federal *Species at Risk Act*;

~~d)~~e) listed as "at risk" by COSEWIC; and

~~e)~~f) traditionally used species.

[C] Describe and map existing wildlife habitat and habitat disturbance including exploration activities. Identify habitat disturbances that are related to existing and approved projects.

[D] Identify the key wildlife and habitat indicators used to assess Project impacts. Discuss the rationale for their selection.

[E] Provide rationale behind sampling protocols and field methods implemented. Include information on number, timing and locations of surveys as well as statistical parameters used to determine population estimates. Indicate to what extent information is based on actual survey data or hunting and trapping data, TEK, scientific peer-reviewed literature, consultants reports or modeling.

[F] Discuss use of TEK or TLU information and/or participation of local Indigenous communities in base line field studies to inform baseline data collection.

~~[C]~~

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~~3.7.2~~3.8.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to wildlife and wildlife habitats and key indicators, including, but not limited to:

a) how the Project will affect wildlife relative abundance, mortality, movement patterns, and distribution for all stages of the Project;

b) how improved or altered access may affect wildlife, including potential obstruction of daily and seasonal movements, increased human-wildlife incidents and increased hunting pressures;

c) the spatial and temporal changes to habitat availability and function;

d) how increased habitat fragmentation may affect wildlife. Consider edge effects, the availability of core habitat and the influence of linear features and infrastructure on wildlife movements and predator-prey relationships;

a) the spatial and temporal changes to habitat availability and habitat effectiveness (types, quality, quantity, diversity and distribution);

~~d)~~

~~e)~~ potential effects on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health; ~~and~~

b) potential effects on wildlife from Devon's proposed and planned exploration, seismic and core hole activities, including monitoring/4D seismic; and

c) the resilience and recovery capabilities of wildlife populations and habitats to disturbance, in particular with regard to listed species and for those species with which a federal and/or provincial recovery strategy applies.

~~f)~~ ~~.~~

[A] Discuss the rationale for the selection of the key indicators.

[B] Comment on the availability and quantity of traditionally used species considering habitat loss, habitat avoidance, vehicle-wildlife collisions, increased non-Aboriginal hunting pressure, increased predator-prey interactions and other Project related effects on wildlife populations.

[C] Discuss the accommodation or mitigation measures to avoid or minimize the potential impact of the Project on wildlife and wildlife habitat for all stages of the Project and to return productive wildlife habitat to the area. Clearly identify those accommodation or mitigation measures, including buffers and offsets, to ensure that wildlife populations are maintained within their natural range of variability and are available for traditional use. Consider:

a) consistency of any plans with applicable regional, provincial and federal wildlife habitat objectives, policies, frameworks and strategies;

b) a schedule for the return of habitat capability to areas impacted by the Project;

c) the use of setbacks to protect riparian habitats and wildlife corridors, interconnectivity of such habitat and the unimpeded movement by wildlife species using the habitat;

d) anticipated access controls to or other management strategies to protect wildlife during and after project construction and operation;

e) measures to prevent habituation of wildlife to minimize the potential for human-wildlife encounters and consequent destruction of wildlife, including any staff or contractor training program, fencing camps, garbage containment measures or regular follow-up;

f) measures to mitigate habitat fragmentation considering impacts to habitat connectivity and wildlife movements resulting from linear features and other Project infrastructure and activities; and

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g) measures to minimize the impacts of light pollution on wildlife.

[D] Describe the Project's residual impacts on wildlife and wildlife habitat and Devon's plans to manage those impacts.

~~[B]~~[E]

~~3.8~~3.9 Biodiversity

~~3.8.1~~3.9.1 Baseline Information

~~[C]~~ [A] Describe and map the existing biodiversity including any unique features that affect the Project area's biodiversity in comparison to the Local Study Area.

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~~3.8.2~~ [B]Identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline biodiversity. Discuss the rationale for their selection.Impact Assessment

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~~[A]~~ [C]Describe and assess the potential impacts of the Project to biodiversity including, but not limited to:

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a) the biodiversity metrics, biotic and abiotic indicators selected;
b) the effects of fragmentation on biodiversity potential;
c) the contribution of the Project to any anticipated changes in regional biodiversity and the potential impact to local and regional ecosystems; and
d) effects during construction, operations and post-reclamation and the significance of these changes in a local and regional context.

~~d)~~ [D] Discuss accommodation or mitigation measures to minimize the potential impact of the Project on biodiversity. Clearly identify those accommodation or mitigation measures that will be implemented and provide rationale for their selection.

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~~3.9~~3.10 Terrain and Soils

~~3.9.1~~3.10.1 Baseline Information

[A] Describe and map the terrain and soils conditions in the Project Area. Discuss the reliability of the soil survey maps, both boundaries and map unit descriptions.

[B] Describe and map soil types in the areas that are predicted to exceed Potential Acid Input critical loading criteria.

~~3.9.2~~3.10.2 Impact Assessment

[A] Describe project activities and other related issues that could affect soil quality (e.g., compaction, contaminants) and:

a) indicate the amount (ha) of surface disturbance from plant, field (e.g., pads, pipelines, access roads), aggregate and borrow sites, camps, drilling waste disposal and other infrastructure-related construction and operational activities;
b) discuss the relevance of any changes for the local and regional landscapes, biodiversity, productivity, ecological integrity, aesthetics and future use resulting from disturbance for all stages of the Project;

c) describe the effect on soils in the Local Study Area from changes to surface water flow and shallow groundwater flow;

~~b)~~

~~c)~~d) identify the potential acidification and eutrophication impact on soils and discuss the significance of predicted impacts by acidifying and eutrophying emissions; and

~~d)~~e) describe potential sources of soil contamination.

[B] Discuss:

a) the environmental effects of proposed drilling methods on the landscape and surficial and bedrock geology;

b) the potential for changes in the ground surface during steaming and recovery operations (e.g., ground heave and/or subsidence) and their environmental implications; and

c) the potential impacts caused by the mulching and storage of woody debris considering, but not limited to, vulnerability to fire, degradation of soil quality, increased footprint.

[C] Include an assessment of soil types for reclamation suitability. Discuss reclamation material salvage, storage areas and handling procedures.

[D] Provide a mitigation plan to:

a) Minimize surface disturbance including the use of existing clearings for the Project;

b) Address potential effects of acid and nitrogen deposition;

c) Mitigate changes to ground surface during operations (temperature, heave and subsidence); and

d) Address impacts to land capability including for traditional uses, wildlife and forest productivity.

[E] Discuss accommodation or mitigation strategies to minimize the potential impact of the Project on soils or terrain.

~~c)~~

~~3.10~~3.11 Land Use and Management

~~3.10.1~~3.11.1 Baseline Information

[A] Describe and map the current land uses in the Project Area, including all Crown land dispositions and Crown Reservations (Holding Reservation, Protective Notation, Consultative Notation) and traditional land uses by Indigenous communities.

[B] Indicate where Crown land dispositions may be needed for roads or other infrastructure for the Project.

[C] Identify and map unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant

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sites and areas and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).

[C][D] Describe and map any federally or provincially identified critical habitat for listed wildlife species;

[E] Describe and map anticipated land clearing activities, showing the timing of the activities.

[D][F] Describe topographically project infrastructure and other features that may lead to visual impacts to the public and neighboring communities and land users using the Local Study Area.

[E][G] Describe the status of timber harvesting arrangements, including species and timing.

[F][H] Describe existing access control measures and provide an Access Management Plan.

[G][I] Identify land use activities for which locations will be determined at a later date. Discuss the approach that will be used to locate future activities on the landscape.

3.10.23.11.2 Impact Assessment

[A] Identify the potential impacts of the Project on land uses and land users, including:

a) unique sites or special features;
b) traplines and registered fur management areas;
c) changes in public access arising from linear development, including secondary effects related to increased hunter, angler and other recreational access;
d) aggregate reserves that may be located on land under Devon's control and reserves in the region;
e) development and reclamation on commercial forest harvesting and fire management in the Project Area;
f) the amount of commercial and non-commercial forest land base that will be disturbed by the Project, including the Timber Productivity Ratings for the Project Area. Compare the baseline and reclaimed percentages and distribution of all forested communities in the Project Area;
g) how the Project impacts Annual Allowable Cuts and quotas within the Forest Management Agreement area;
h) the operation of any agricultural crown land and provincial grazing reserves;
i) anticipated changes (type and extent) to the topography, elevation and drainage patterns within the Project Area; and
j) access control for public, regional recreational activities, Indigenous land use and other land uses during and after development activities. Provide an Access Management Plan.

[B] Describe how Integrated Land Management has been used (e.g., sharing of infrastructure, access requirements).

[B][C] Describe any visual impacts the Project may have on neighboring communities, local land users or from nearby public areas, including transportation routes. Identify accommodation or mitigation measures taken to minimize any visual impacts.

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~~[C]~~[D] Provide a fire control plan highlighting:

a) measures taken to ensure continued access for firefighters to adjacent wildland areas;
b) forest fire prevention, detection, reporting, and suppression measures, including proposed fire equipment;
c) measures for determining the clearing width of power line rights-of-way; and
d) required mitigation measures based on the *FireSmart Field Guide for the Upstream Oil and Gas Industry*.

4 HISTORIC RESOURCES

4.1 Baseline Information

[A] Provide a brief overview of the regional historical resources setting including a discussion of the relevant archaeological, historic and palaeontological records.

[B] Describe and map known historic resources sites in the Project Area, considering:

a) site type and assigned Historic Resources Values; and
b) existing site specific *Historical Resources Act* requirements.

[C] Provide an overview of previous Historical Resources Impact Assessments that have been conducted within the Project Area, including:

a) a description of the spatial extent of previous assessment relative to the Project Area, noting any assessment gap areas; and
b) a summary of *Historical Resources Act* requirements and/or clearances that have been issued for the Project to date.

[D] Identify locations within the Project Area that are likely to contain previously unrecorded historic resources. Describe the methods used to identify these areas.

[E] Describe the use of TEK and TLU information and/or participation of local Indigenous communities in the HRIA work completed or planned to inform Project design. Discuss what, if any, historical, heritage and cultural sites or areas were provided from TEK and how they were, or will be, incorporated into project planning.

~~[D]~~

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4.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect historic resources at all stages of the Project.

[B] Describe the nature and magnitude of the potential project impacts on historical resources, considering:

~~a)~~ effects on historic resources site integrity; ~~and~~
a) implications for the interpretation of the archaeological, historic and palaeontological records; and
b) effects on historical and cultural resources provided through the provision of TEK.

~~b)~~ [C] Describe and discuss management and mitigation to avoid or minimize the effects to historic resources including TEK identified historic, heritage and cultural sites and resources.~~.~~

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5 TRADITIONAL ECOLOGICAL KNOWLEDGE AND LAND USE

[A] Discuss how consultation with Indigenous communities during project planning and design provided TEK and TLU information to inform project plans and mitigation measures.

~~[A]~~[B] Provide:

a) a map and description of Traditional Land Use areas including fishing, hunting, trapping and nutritional, medicinal or cultural plant harvesting by affected Indigenous peoples (if the Indigenous community or group is willing to have these locations disclosed);

b) a map of cabin sites, spiritual sites, cultural sites, gravesites and other traditional use sites considered historic resources under the *Historical Resources Act* (if the Indigenous community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns; ~~and~~

c) a discussion of:

i) the availability of vegetation, fish and wildlife species for food, traditional, medicinal and cultural purposes in the identified traditional land use areas considering all project related impacts,

ii) access to traditional lands in the Project Area during all stages of the Project, and

iii) Indigenous views on land reclamation.

d) a description of traditional land use extent in both the project footprint and Local Study Area including hunting, fishing, trapping, nutritional and medicinal plant harvesting and cultural use by affected Indigenous peoples;

e) a quantitative assessment of impacts to traditionally important wildlife species including accommodation or mitigation strategies to address those impacts;

f) a list of culturally important plant species that will be used in reclamation and indicate the species that are currently available commercially and can be used successfully in reclamation.

g) an assessment of the richness, abundance and vigour of culturally important species collected during project vegetation surveys and include a summary of that information in both the vegetation and traditional land use sections of the EIA. Discuss project development impacts on those species (and the ecosites that support them) was well as accommodation, mitigation and reclamation strategies that will be employed to address those impacts;

h) include a discussion of:

i. the access to traditional lands in the Project area pre-development ((1960s), currently and during all stages of the Project;

ii. the vegetation and wildlife used for traditional, food, ceremonial, medicinal and other purposes;

iii. impacts to traditional lands and culture, including considering the impacts of existing development on changes to access and traditional-use patterns;

iv. trapper consultation; and
v. Indigenous views on traditionally and culturally meaningful land reclamation.

~~iii)~~

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~~[B]~~[C] Describe how Traditional Ecological Knowledge and Traditional Land Use information was ~~incorporated~~ integrated into the Project, EIA and SEIA development, the conservation and reclamation plan (including Indigenous views on land reclamation), management, monitoring and mitigation.

[D] Determine the impacts of the Project and cumulative effects on traditional, medicinal and cultural purposes and identify possible mitigation strategies.

[E] Describe the results of consultation with Indigenous communities with respect to traditional environmental knowledge and traditional land use.

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[F] Describe how TEK and TLU information was integrated into the technical components of the EIA and Closure and Reclamation Plan.

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[G] Describe how TEK and TLU information will be considered during project operation and reclamation.

~~[C]~~[H]

6 PUBLIC HEALTH AND SAFETY

6.1 Public Health

[A] Describe aspects of the Project that may have implications for public health or the delivery of regional health services including information specifically related to Indigenous communities. Determine quantitatively whether there may be implications for public and Indigenous health arising from the Project.

[B] Assess the potential health implications of the compounds that might be released to the environment from the Project in relation to exposure limits established to prevent acute and chronic adverse effects on human health and the potential health implications, if any, for compounds for which no exposure guidelines currently exist.

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[C] Provide the data, exposure modeling calculations and descriptions of methods Devon used to assess Project impacts on human health and safety.

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[D] Provide information, including chemical analyses and modeling results on selected environmental media samples (e.g. soil, water, air, vegetation, wildlife, etc.) used in the assessment.

[E] Discuss the potential for changes to water quality, air and soil quality to increase human exposure to contaminants, taking into consideration all Project activities for the life of the Project.

[F] Identify the human health impact on country foods and natural food sources from potential contamination, taking into consideration all Project activities for the life of the Project as well as the impact they might have on opportunities and desire (resulting from perceptions of health and safety) for traditional activities.

~~[A]~~[G] Discuss the potential for fish contamination relative to fish consumption guidelines (e.g. mercury and PAHs) as well as potential for flavor tainting and how this might affect opportunities and desire (resulting from perceptions of health and safety) for traditional activities.

~~[B]~~[H] Document any health concerns raised by stakeholders during consultation on the Project.

~~[C]~~[I] Document any health concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project, specifically on their traditional lifestyle and on overall health and community wellness. Include an Indigenous receptor type in the assessment.

[J] Describe the potential health impacts resulting from higher regional traffic volumes and the increased risk of accidental leaks and spills including potential impacts on traditionally used plant, wildlife and waters and lands.

[K] Assess human health from an ecosystem perspective, including but not limited to Health Canada's determinants of health, stress or risk perception.

[L] Discuss the accommodation or mitigation strategies to minimize the potential impact of the Project on human health.

~~[D]~~

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6.2 Public Safety

[A] Describe aspects of the Project that may have implications for public safety and determine whether there may be Project effects on public safety. Specifically:

a) describe the emergency response plan including Indigenous and public notification protocols and safety procedures to minimize adverse environmental effects, including emergency reporting procedures for spill containment and management;
b) document any safety concerns raised by stakeholders during consultation on the Project, particularly both those actively using lands in and around the Project area;
c) describe the spill response plans and assessment approach that would address spills, including pipeline spills, flow-to-surface events, and well head blow outs, including the potential associated residual effects;
d) describe how local residents, traditional land users, trapper and RFMA holders will be contacted during an emergency and the type of information that will be communicated to them;
e) describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual aid programs and municipal emergency response agencies; and
f) describe the potential safety impacts resulting from higher regional traffic volumes.

7 SOCIO-ECONOMIC ASSESSMENT

7.1 Baseline Information

[A] Describe the existing socio-economic conditions in the region and in the communities, including Indigenous communities, in the region.

[B] Describe factors that may affect existing socio-economic conditions including:

a) population changes;
b) workforce requirements for all stages of the Project, including a description of when peak activity periods will occur;
c) planned accommodations for the workforce for all stages of the Project. Discuss the rationale for their selection and the alternatives considered;
d) Devon's policies and programs regarding the use of local, regional and Alberta goods and services;
e) the project schedule and periods of peak employment and production;
f) the overall engineering and contracting plan for the Project; and
g) the impacts of the 2016 Fort McMurray wildfire.

~~g)~~ [C] In consultation with Aboriginal communities, provide community-specific socio-economic baseline information commensurate with that of the Fort McMurray and including cultural and lifestyle information unique to those communities.

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7.2 Impact Assessment

[A] Describe the effects of construction and operation of the Project and its contribution to cumulative socio-economic effects on:

a) housing;
b) availability and quality of health care services;
c) local and regional infrastructure and community services;
d) recreational activities;
e) hunting, fishing, trapping and gathering and loss of land and access to land required to carry out traditional pursuits by Indigenous people guaranteed under Treaty 8 and the Canadian Constitution; and
f) First Nations and Métis (e.g., traditional land use and social, lifestyle and cultural implications).
~~d)~~

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[B] Describe the socio-economic effects of any new or existing camp(s) required for the Project and identify:

a) its location and the rationale for selecting this location;
b) the number of workers it is intended to house;
~~b)~~c) the number of foreign workers Devon plans to bring in;
~~c)~~d) whether the camp will service the Project only or other clients;
~~d)~~e) the length of time the camp will be in service and whether it will be a 'dry camp';
~~e)~~f) describe the services that will be provided in the camp (e.g., security, recreation and leisure, medical services), including a description of the impacts on Municipal or other external services; and
~~f)~~g) outline the emergency services and evacuation plan that will be in place.

[C] Discuss opportunities to work with First Nation and Métis communities and groups, other local residents and businesses regarding employment, training needs and other economic development opportunities arising from the Project, including:

a) Indigenous hiring and procurement policies and programs and how Devon will maximize local Indigenous workers;

b) the systemic barriers that obstruct advancement in Indigenous education, training, employment and business development and describe how Devon will address those barriers; and

c) describing and providing copies of Devon's policies and practices that will be implemented to design, manage, monitor and evaluate Devon's employment and business development opportunities for First Nation and Métis peoples in the region.

~~[C]~~ .

[D] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages. Indicate the percentage of expenditures expected to occur in the region, within or associated with specific communities in the region including Indigenous communities, Alberta, Canada outside of Alberta, and outside of Canada.

[E] Discuss the accommodation and mitigation strategies to minimize the potential impact of the Project on socio-economic conditions in the region and communities, including Indigenous communities, in the region.

~~[D]~~

8 MITIGATION MEASURES

[A] Discuss mitigation measures planned to avoid, minimize or eliminate the potential impacts for all stages of the Project~~.~~

[B] Identify the mitigation objectives for each associated impact and describe those mitigation measures that will be implemented. Provide rationale for their selection, including a discussion on the effectiveness of the proposed mitigation.

~~[B]~~[C] Assess the risks (probability and hazard assessment) of mitigation ineffectiveness or failure.

9 RESIDUAL IMPACTS

[A] Describe the residual impacts of the Project following implementation of Devon's mitigation measures and Devon's plans to manage those residual impacts. Evaluate potential effectiveness of the accommodation or mitigation proposed and the associated risks. Provide contingency plans for ineffective or partially effective accommodation or mitigation performance.

~~[A]~~

10 MONITORING

[A] Describe Devon's current and proposed monitoring programs, including:

a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans and validity of the impacts predicted in the

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environmental and socio-economic assessments. Discuss how Devon will address any project impacts identified through the monitoring program;

b) how Devon will contribute to current and proposed regional monitoring programs including:

i. ~~;~~ regional monitoring that will be undertaken to assist in managing environmental effects, confirm performance of mitigation measures and improve environmental protection strategies; and

ii. monitoring done independently by Devon.

iii.

~~b)~~

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c) monitoring performed in conjunction with other stakeholders, including Indigenous communities and groups;

d) new monitoring initiatives that may be required as a result of the Project;

e) regional monitoring that will be undertaken to assist in managing environmental effects and improve environmental protection strategies;

f) how monitoring data will be disseminated to the public, Indigenous communities or other interested parties; ~~and~~

g) how the results of monitoring programs and publicly available monitoring information will be integrated with Devon's environmental management system; and

~~g)~~h) how Aboriginal communities might be involved in monitoring programs such as through community-based monitoring programs.~~.~~

AEP Environmental Assessment

From: kikinoconsultation@mcsnet.ca
Sent: Wednesday, October 03, 2018 4:05 PM
To: AEREnvironmental Assessment
Cc: kikinocouncil@mcsnet.ca
Subject: TOR- Devon Pike 2- Comments Letter
Attachments: TOR Review letter.docx.pdf

Good afternoon,

Please see attached letter regarding Devon Pike 2 ToR. Kikino Metis Settlement has provided comment.

Thank you,

Shelby Merchant
Consultation Coordinator
Kikino Metis Settlement
Office: (780) 623-7868
Cell: (780) 573-0596

KIKINO METIS SETTLEMENT, GEN DEL KIKINO, AB T0A 2B0 (780)6237868 FAX (780)623-7080

October 3, 2018

Director, Environmental Assessment
Authorizations Branch
Alberta Energy Regulator
Suite 1000, 250-5th St. SW
Calgary, Ab. T2P 0R4

AEREnvironmental.assessment@aer.ca

To whom it may concern,

Kikino Metis Settlement has reviewed the proposed terms of reference for the Devon Energy Pike 2 project. Concerns and questions have been raised with what has been proposed.

2.8 Conservation and Reclamation
a) Devon states that they will describe and map current and post-development land use, but does not take into consideration traditional land uses or traditional ecological knowledge from aboriginal groups in the area. In order to reach equivalent land capability, aboriginal right of traditional land use must be considered and implemented in the planning process. The traditional land use before and after the project can be indication if equivalent land capability is met.
d) Devon states they will describe and map a revegetation plan for the Project area, but does not include a plan for potentially applied for expansions of the project area that would support Pike 2. This is important, as we know they have applied for expansions on the approved Jackfish project area. As well, there needs to be consideration of native/medicinal plant species, specifically those important in the exercise of aboriginal right.

3.5 Aquatic Ecology
3.5.1
[B]
e) clarity needs to be provided on what "traditionally" means, and to who, which groups. Assumption is that traditionally as considered by indigenous groups, but this needs to be made clear. This same comment is made for **3.6 Vegetation, 3.6.1 [B] e)** and where/who this information will come from

3.9 Terrain and Soils

3.9.2 Impact Assessment[B]

c) Impacts from maintenance of roads, pad sites and plant site for dust control during summer months needs to be considered and what products are used for this and effects any seepage into soils can have on the soils themselves, as well as water systems.

3.10 Land Use Management

3.10.2 Impact Assessment

[A]

j) Consideration for the GoA proposed wildland parks and possible access specifically for the Dillon River Wildland. Land users may want access versus limiting access of the new roads.

5. Traditional Ecological Knowledge and Land Use

[A] c)

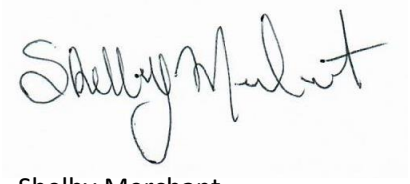
iii) Not only must views be considered, but involvement from indigenous groups on land reclamation. Once the proponent ceases operations, the land is still used by those land users.

7 Socio-Economic Assessment

7.1

[A] Indigenous communities in the region must be looked at as their own entity. There is no mention of cultural loss of land, a socio-economic assessment must be done in order to determine the impacts this project will have on indigenous groups who exercise their aboriginal harvesting rights.

Thank you for your time and consideration of expressed concerns.



Shelby Merchant
Consultation Coordinator
Kikino Metis Settlement
(780) 623 7868

AEP Environmental Assessment

From: Melina Scoville <localpresident1909@rocketmail.com>
Sent: Thursday, October 04, 2018 3:55 PM
To: AEREnvironmental Assessment
Subject: Devon Pike Phase 2 TOR
Attachments: Devon TOR Cover Letter.pdf; Pike2-ProposedTOR-Aug20-2018_Local1909_input.doc; Pike2-ProposedTOR-Aug20-2018_Local1909_input.pdf

Hello,

Please see the attached cover letter and word and PDF version of Lakeland Metis Local 1909s input into the TORs for the Devon Pike Phase 2 Project.

Cheers,

Melina Scoville

President
The Métis Nation of Alberta, Local 1909

Executive Secretary
The Métis Nation of Alberta, Region One

Phone: (780) 404-9291
Email: LocalPresident1909@rocketmail.com

Mailing Address:

P.O. Box 929

Lac La Biche, AB T0A 2C0

Métis Nation of Alberta Association Lakeland Local Council 1909
P.O. Box 929 Lac La Biche, AB T0A 2C0 Phone: (780) 404-9291
Email: LocalPresident1909@rocketmail.com

Sent via Email:

Director, Environmental Assessment
Authorizations Branch
Alberta Energy Regulator
Suite 1000, 250-5th Street SW
Calgary, Alberta T2P 0R4
Email: AEREnvironmental.Assessment@aer.ca

October 4, 2018

Re: TOR Devon Pike Phase 2 Project.

Dear Sir/Madam,

Please find attached the Word and PDF version of Lakeland Métis Local 1909 input into the Pike 2 Terms of Reference.

Do not hesitate to contact me if you have any questions.

Best Regards,

Melina Scoville
President
Lakeland Métis Local 1909

PROPOSED TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR DEVON CANADA CORPORATION'S PROPOSED

PIKE 2 PROJECT

Approximately 40 km Southeast of Conklin, Alberta

ISSUED BY: **Devon Canada Corporation**

DATE: **August 20, 2018**

TABLE OF CONTENTS

PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for Devon Canada Corporation (Devon), Indigenous communities and appropriate stakeholders the information required by government agencies for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Pike 2 Project (the Project).

Devon is proposing a new in situ oil sands project in the Southern Athabasca Oil Sands region. The Project is a 50/50 joint venture with BP Canada Energy Group ULC and will be operated by Devon. To recover bitumen resources from the McMurray formation, Devon's well-established Steam Assisted Gravity Drainage (SAGD) technology, along with diluent co-injection and cogeneration will be employed.

The Project will include a central processing facility (CPF), well pads, source water and disposal well sites, pipelines, roads and power lines. The Project is expected to produce up to 70,000 barrels per day (bpd) of bitumen. Pending regulatory approval, Pike 2 will be constructed over a two-year period with initial production projected for 2025. The Pike 2 CPF will have a full production life of approximately 30 years.

The Project is located approximately 40 km southeast of Conklin, Alberta, in portions of Townships 73 and 74, Ranges 4, 5 and 6, west of the 4th Meridian, in Lac La Biche County.

SCOPE OF THE EIA REPORT

Devon shall prepare and submit an EIA report that examines the direct, induced and cumulative environmental and socio-economic effects of the Project.

The EIA report shall be prepared considering all applicable provincial and federal legislation, codes of practice, guidelines, standards, policies and directives as well as federal and provincial climate change obligations and commitments.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations, and the *Canadian Environmental Assessment Act*, or *Impact Assessment Act,* if applicable. The EIA report will form part of Devon's application to the Alberta Energy Regulator (AER). An EIA report summary will also be included as part of the AER Application.

Devon shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* published by Alberta Environment and Parks (the Guide) and these Terms of Reference when preparing the Environmental Impact Assessment report. In any case where there is a difference in requirements between the Guide and these Terms of Reference, the Terms of Reference shall take precedence.

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT AND INDIGENOUS CONSULTATION

[A] Describe the concerns and issues expressed by the public and the actions taken to address those concerns and issues, including how public input was ~~incorporated~~

integrated into the Project development, impact management, mitigation and monitoring.

[B] Describe the concerns and issues expressed by Indigenous communities and the actions taken to address those concerns and issues, including how Indigenous community input was ~~incorporated~~ integrated into the Project, EIA development, management, mitigation, monitoring and reclamation. Describe consultation undertaken with Indigenous communities and groups with respect to Traditional Ecological Knowledge and Traditional Use of land, water, wildlife and vegetation and resources contained therein. Describe consultation undertaken with Indigenous communities and groups with respect to cultural practices in and around the Project area.

~~[B]~~[C] Discuss Devon's Indigenous consultation for the Project with respect to Devon's approved Consultation Plan(s) including how it was informed by potentially affected Indigenous communities.

[D] Describe plans to maintain the public engagement and Indigenous consultation process following completion of the EIA report to ensure that the public and Indigenous peoples will have an appropriate forum for expressing their views on the ongoing development, operation and reclamation of the Project. Describe how these views will be integrated into Project planning and adaptive management.

~~[C]~~[E] Provide a description, from Devon's perspective, of the effectiveness of the Indigenous consultation process to date and going forward.

2 PROJECT DESCRIPTION

2.1 Overview

[A] Provide a brief project description in sufficient detail to provide context for the EIA, including:

a) proponent information;
b) proposed extraction and bitumen processing technology;
c) amount and source of energy required for the Project;
d) the amount and source of diluent required for extraction and transportation over the life of the Project:
e) water supply and disposal requirements, including process water and potable water requirements;
f) proposed method to transport product to markets; and
g) development plan and schedule, including to reclamation certification.

[B] Provide maps and/or drawings of the Project components and activities including:

a) existing infrastructure, leases and clearings, including exploration clearings;
b) proposed central processing/treatment and field facilities;
c) other buildings and infrastructure (e.g., pipelines, utilities and camp(s));
d) temporary structures;
e) transportation and access routes;
f) on-site hydrocarbon storage;

g) containment structures such as retention ponds and storage ponds (e.g., lime sludge, stormwater runoff, boiler blow-down);
h) water wells/intakes, pipelines, and storage structures;
i) sources of aggregate resources, borrow material and other construction material and locations of any stockpiles that will be developed; and
j) waste storage area and disposal sites.

[C] Discuss alternative means of carrying out the Project which are technically and economically feasible and rationale for the preferred means including the extent to which it employs Best Available Technology Economically Achievable (BATEA).

[D] Discuss how environmental, socio-economic, traditional use, cultural and traditional environmental knowledge criteria informed and influenced the evaluation of alternatives and the selection of the proposed Project components.

[E] Discuss the implications of a delay in proceeding with the Project, or any phase of the Project, or not going ahead with the Project.

~~[C]~~[F] Discuss the extent to which the Project contributes to sustainability.

~~[D]~~[G] Describe the benefits of the Project, including jobs created, local training, employment and business opportunities, and royalties and taxes generated that accrue to:
a) Devon;
b) local and regional communities, including Indigenous communities;
c) the local authority;
d) Alberta; and
e) Canada.

~~[E]~~[H] Provide the adaptive management approach that will be implemented throughout the life of the Project. Include how monitoring, mitigation and evaluation were incorporated.

2.2 Constraints

[A] Discuss the process and criteria used to identify constraints to development, and how the Project has been designed to accommodate those constraints. Include the following:
a) any applicable *Alberta Land Stewardship Act* Regional Plan, including the draft Biodiversity Management Framework;
b) how this Project aligns with the *Comprehensive Regional Infrastructure Sustainability Plan for the Athabasca Oil Sands Area*;
c) any applicable Alberta Ambient Air Quality Objectives;
d) land use policies and resource management initiatives that pertain to the Project;
e) provincial and federal climate change commitments, obligations, policies and legislation;
f) Indigenous traditional land, water, wildlife and vegetation use and resources contained therein, including the potential to adversely affect Treaty and Aboriginal rights;
~~f)~~g) Indigenous cultural values and use;
~~g)~~h) campgrounds and recreational sites;

~~h)~~i) historic resources sites;
~~i)~~j) all known traplines and registered fur management areas;
~~j)~~k) the environmental setting;
~~k)~~l) cumulative environmental impacts in the region;
~~l)~~m) cumulative social and health impacts in the region;
~~m)~~n) results of project-specific and regional monitoring;
~~n)~~o) potential for new or additional technology to increase resource recovery at later times; and
~~o)~~p) potential for changes in the regulatory regime.

[B] Provide a detailed assessment of the selection criteria used, including energy and water efficiencies, options considered, and rationale for selecting:

a) location of facilities and infrastructure (including linear infrastructure such as pipelines, roads and utilities); ~~and~~
b) thermal energy and electric power required for the Project;~~.~~
c) water supply sources;
d) wastewater treatment, wastewater management and wastewater disposal;
e) air emissions and air quality management systems, including the environmental, health and cumulative effects management considerations behind the selections and how the selections reflect best energy efficiency practices and best available emission control technologies; and
~~b)~~f) waste disposal.

[C] Provide a list of facilities for which locations and access will be determined later. Describe the selection criteria that will be used to determine the specific location of these facilities. For facilities built by a third party, describe how Devon would participate in the process to ensure constraints are considered and how stakeholders and Indigenous communities will be consulted for input.

[D] Discuss the use of constraints mapping for the siting of facilities, wellpads and associated infrastructure. Report on involvement or input of Indigenous communities in the constraints mapping process.

~~[C]~~

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2.3 Regional and Cooperative Efforts

[A] Discuss Devon's involvement in regional and cooperative efforts to address environmental and socio-economic issues associated with regional development.

[B] Describe opportunities for sharing existing or planned infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.

[C] In the assessment, reference regional multi-stakeholder monitoring programs (e.g. WBEA, OSM Program), management frameworks and guidelines including those in draft or under revision (e.g. draft LARP BMF) as well as provincial cooperative efforts (e.g. ABMI) and cooperative industry efforts (e.g. COSIA programs and initiatives). In particular, discuss Devon's involvement (with regard to participation and funding) in

regional and cooperative efforts that address environmental and socio-economic issues associated with regional development including but not limited to:

a) Devon's direct participation in any regional forums, and rationale for not participating in particular forums;
b) potential cooperative ventures Devon has initiated, could initiate or could develop with other operators and other resource users;
c) how Devon will work to develop and implement such cooperative opportunities;
d) how Devon would design and implement research programs; and
e) how regional environmental management initiatives will be incorporated into Devon's management practices.

~~[B]~~

2.4 Transportation Infrastructure

[A] Prepare a Traffic Impact Assessment as per Alberta Transportation's *Traffic Impact Assessment Guideline (http://www.transportation.alberta.ca/613.htm)*. If there are any previous Traffic Impact Assessment studies that have been carried out for the Project or adjacent Projects using the same access, review and validate the findings and recommendations.

[B] Describe background traffic and consider the cumulative effects of traffic impacts due to other existing and planned developments using the same highways and accesses.

[C] Discuss anticipated changes to highway traffic (e.g., type, volume) due to the Project.

[D] Assess potential traffic impacts for all stages of the Project (e.g., construction, operation, maintenance, expansion, shutdown).

[E] Determine any necessary improvements and methods to mitigate traffic impacts.

~~[E]~~[F] Provide an Access Management Plan for the Project and project area. Discuss how the plan was informed by neighboring operators, land users and Indigenous communities. Describe how access will be managed with regard to public access, access by staff and contractors and access by Indigenous communities for traditional and cultural purposes.

~~[F]~~[G] Describe and map the locations of any new access, road or intersection construction, or any improvements to existing roads or intersections, related to the development of the Project, from the boundary of the Project Area up to and including the highway access points, and

a) discuss the alternatives and the rationale for selection for the preferred alternative;
b) discuss compatibility of the preferred alternative to Alberta Transportation's immediate and future plans;
c) describe the impacts to local communities of the changes in transportation and infrastructure including safety considerations;
~~c)~~d) provide a consultation summary with Indigenous communities, trapline users and RFMA holders regarding selection of alternatives and access management; and
~~d)~~e) provide a proposed schedule for the work.

[H] Describe any infrastructure or activity that could have a potential impact on existing roads (e.g., pipelines or utilities crossing provincial highways, any facilities in close proximity of the highways, any smoke, dust, noise, light or precipitation generated by the Project that could impact the highway and road users).

[A] Identify the type, volume, location and availability of construction and reclamation materials for all road construction and/or road improvement work, related to the development of the Project, within and outside of the Project area.

~~[G]~~

~~[H]~~[B] Provide a summary of any discussions with Alberta Transportation in regards to the Project and its traffic impacts.

~~[I]~~[C] Indicate where Crown land dispositions may be needed for roads or infrastructure required for the Project.

2.5 Air Emissions Management

[A] Discuss the selection criteria used, options considered, and rationale for selecting control technologies to minimize air emission and ensure air quality management. Discuss how these technologies represent BATEA and how best management practices will be employed.

[B] Provide emission profiles (type, composition, rate and source) for the Project's operating and construction emissions including point and non-point sources and fugitive emissions. Consider both normal and upset conditions. Discuss:

a) odorous and visible emissions from the proposed facilities;
b) annual and total greenhouse gas emissions during all stages of the Project. Identify the primary sources and provide detailed calculations;
c) the intensity of greenhouse gas emissions per unit of bitumen produced;
d) the Project's contribution to total provincial and national greenhouse gas emissions on an annual basis;
e) describe the Project's greenhouse gas emissions relative to the provincial greenhouse gas emission limit for oil sands developments;
f) the greenhouse gas management plans for the Project;
g) amount and nature of Criteria Air Contaminants emissions including volatile organic compounds, polycyclic aromatic compounds, and reduced Sulphur compound emissions;
h) the amount and nature of acidifying and eutrophying emissions, probable deposition patterns and rates;
i) the applicable emission standards and limits for the emission sources as well as guidelines and frameworks including to Keep Areas Clean;
j) control technologies used to reduce emissions;
k) emergency flaring scenarios (e.g., frequency and duration) and proposed measures to ensure flaring events are minimized;

l) upset condition scenarios (e.g., frequency and duration) and proposed measures to ensure upset conditions are minimized;
m) gas collection and conservation, and the applicability of vapour recovery technology;
n) applicability of sulphur recovery, acid gas re-injection or flue gas desulphurization to reduce sulphur emissions; and
o) fugitive emissions control technology to detect, measure and control emissions and odours from equipment leaks.

2.6 Water Management

2.6.1 Water Supply

[A] Describe the water supply requirements for the Project, including:
a) the design factors considered, criteria used, options considered and rationale for selection of water supply sources(s);
b) the expected water balance during all stages of the Project. Discuss assumptions made or methods chosen to arrive at the water balances;
c) the process water, potable water, and non-potable water requirements and sources for construction (including, but not limited to, road construction, winter road construction, lease construction, production well drilling and dust suppression), camp(s) and plant site, start-up, normal and emergency operating situations, decommissioning and reclamation. Identify the volume of water to be withdrawn from each source, considering plans for wastewater reuse including criteria and rationale for selection of water sources as described;
d) the location of sources/intakes and associated infrastructure (e.g., pipelines for water supply);
e) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented and in consideration of various climate change scenarios;
f) the expected cumulative effects on water losses/gains resulting from the Project operations;
g) contingency plans in the event of restrictions on the Project's water supply source (e.g., due to license conditions, source volume limitations, climate change or cumulative impact water deficits);
h) potable water treatment systems for all stages of the Project;
i) type and quantity of potable water treatment chemicals used; and
j) measures for ensuring efficient use of water including alternatives to reduce the consumption of non-saline water such as water use minimization, recycling, conservation, and technological improvements.

2.6.2 Surface Water

[A] Describe the surface water management strategy for all stages of the Project, including:
a) design factors considered; and

b) permanent or temporary alterations or realignments of watercourses and other waterbodies and avoidance or mitigation measures to prevent effects to fish and fish habitat.

[B] Describe and map all roadway, pipeline, powerline and any other utility crossings of watercourses, wetlands or other waterbodies.

[C] Describe the placement of infrastructure (including processing facilities, well pads, roads and borrow pits) in relation to water bodies and watercourses.

[D] Describe how the Alberta Wetland Policy was considered in the assessment of impacts, including, but not limited to:

a) avoidance, minimization, or replacement of wetlands in accordance with the Alberta Wetland Mitigation Directive;
b) temporary and permanent alterations (direct and indirect) to wetlands classified under the Alberta Wetland Classification System;
c) any expected changes in wetland class, and causes for this change; and
d) consideration of cumulative effects in the watershed to wetlands.

2.6.3 Wastewater Management

[A] Describe the wastewater management strategy, including:

a) the criteria used, options considered and rationale for the selection of wastewater treatment and wastewater disposal;
b) the source, quantity and composition of each wastewater stream from each component of the proposed operation (e.g., bitumen extraction and associated facilities) for all project conditions, including normal, start-up, worst-case and upset conditions;
c) the proposed disposal locations and methods for each wastewater stream;
d) geologic formations for the disposal of wastewaters;
e) design of facilities that will collect, treat, store and release wastewater streams and evaluation done to determine that the facilities represent best management or treatment practices;
f) type and quantity of chemicals used in wastewater treatment; and
g) sewage treatment and disposal.

2.7 Waste Management

[A] Discuss the selection criteria used, options considered, and rationale for project-related waste disposal both on and off-site.

[B] Characterize and quantify the anticipated dangerous goods, and hazardous, non-hazardous, and recyclable wastes generated by the Project, and describe:

a) the composition and volume of specific waste streams and discuss how each stream will be managed;
b) the amount of drilling wastes and the options considered for disposal and the option chosen;

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c) the amount of drilling wastes and the options considered for disposal and the option chosen;

d)

~~a)~~

~~b)~~ how the disposal sites and sumps will be constructed; ~~and~~

e) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project; and ~~.~~

~~c)~~f) the location of off-site disposal including landfills and deep well disposal sites if any are in the Regional Municipality of Wood Buffalo.

2.8 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for the Project. Describe and map as applicable:

a) current and post-development anticipated land use and how equivalent land capability will be achieved from a number of perspectives including but not limited to traditional land use, wildlife and forest productivity;

b) anticipated timeframes for completion of reclamation stages and release of lands back to the Crown and for Indigenous land use including an outline of the key milestone dates for reclamation and how progress to achieve these targets will be measured. Provide a table and graph that shows cumulatively, for each year and for the entire life of the Project, the land disturbed by clearing, land disturbed through drainage alterations, land disturbed by soil removal or covering, the total land reclaimed and the land that remains unreclaimed. Describe how project design and reclamation planning has contributed to and an accelerated pace of reclamation in comparison to existing projects

~~b)~~ ~~;~~

c) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;

d) a revegetation plan for the Project Area including for disturbed vegetation, aquatic and wetlands;

e) how the proposed reclamation methods have performed in similar situations including ecosite and ecosite phases diversity establishment and re-population of these areas by plant and wildlife species of importance. Include in this discussion the plants and animals important to Indigenous communities;

~~d)~~

f) reclamation material salvage, storage areas and handling procedures; ~~and~~

g) reclamation material salvage plans, including soil resources from the entire development footprint;

h) the volumes of soil to be salvaged and the length of time to be stored before use; for organic soil materials, describe the expected soil decomposition and how this will be managed and how any volume changes will be accommodated in the reclamation plan;

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i) a description of LFH depth and volume and an assessment of the potential to strip LFH separately from the topsoil; and

~~e)~~j) the use of a certified soil scientist to supervise soil salvage and placement; and

~~f)~~k) existing and final reclaimed site drainage plans including for wetlands.

[B] Provide the expected timelines for establishment and recovery of vegetative communities and wildlife habitat. Discuss, from an ecological perspective, the expected success of establishment and recovery, and the expected differences in the resulting communities.

[C] Describe how Devon will consider the use of progressive reclamation in project design and reclamation planning.

[D] Discuss Devon's involvement in any in-situ reclamation initiatives or reclamation working groups.

[E] Discuss how Devon has consulted with Indigenous communities in reclamation planning, including plans on engagement and involvement throughout the life of the Project.

~~[C]~~

~~[D]~~[F] Discuss uncertainties related to the conceptual reclamation plan.

3 ENVIRONMENTAL ASSESSMENT

3.1 Assessment Cases

[A] In addition to the assessment scenarios set out in the AENV Guidance to Preparing Environmental Assessment Reports in Alberta, assess the following scenarios:

a) pre-development case (approximately mid 1960's); and

b) current case (approximately 2016) assessment case.

The pre-development case as describe in (a) above should serve as the baseline case upon which all other cases, including the application case, are compared.

[B] Cumulative effects Case:

a) assess effects of past, present and future developments and activities that might interact with the effects of the proposed project considering;

i) existing, approved and reasonably foreseeable anthropogenic and natural events (eg. forest fires, climate change); and

ii) a time horizon that will exposes any transient and residual permanent effects.

~~3.1~~3.2 Air Quality, Climate and Noise

~~3.1.1~~3.2.1 Baseline Information

[A] Discuss the baseline climatic and air quality conditions including:

a) the type and frequency of meteorological conditions that may result in poor air quality;

~~a)~~b) current regional air quality and air quality issues and trends;

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~~b)~~c) potential receptors, current regional air quality issues and trends (e.g., odours, exceedances of Ambient Air Quality Objectives); and

d) applicable federal, provincial and regional~~appropriate~~ ambient air quality parameters including SO2, CO, H2S, other RSCs, NOx, PAHs, VOCs, NH3, individual hydrocarbons of concern (e.g. odours and health related in the THC and VOC mixtures, O3 (ground level), heavy metals and particulates (TSP, PM10 and PM 2.5).

~~c)~~ [A] Discuss the baseline acoustic environment:~~.~~

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~~3.1.2~~3.2.2 Impact Assessment

[A] Identify components of the Project that will affect air quality, and:

a) describe the potential for reduced air quality (including odours and visibility) resulting from the Project and discuss any implications of the expected air quality for environmental protection, quality of life (e.g. odours) and public health;

b) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's Directive 60 *Odour Management Protocol;*

c) estimate ground-level concentrations of appropriate air quality parameters including odorants and ozone;

d) discuss any expected changes to particulate deposition, nitrogen deposition or acidic deposition patterns;

e) provide the expected gas-to-oil ratio, the expected concentration of sulphur in the produced gas and the requested sulphur dioxide emission limit. Show calculations for the sulphur dioxide limit including the basis for the expected parameters, factors and assumptions used;

f) identify areas that are predicted to exceed Potential Acid Input critical loading criteria;

g) identify nitrogen deposition rates and patterns and the areas that are expected to exceed 8 kg N/ha/yr; and

~~f)~~

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~~g)~~h) discuss interactive effects that may occur resulting from co-exposure of a receptor to all emissions; and

~~h)~~i) describe air quality impacts resulting from the Project, and their implications for other environmental resources.

[B] Identify stages or elements of the Project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events. Discuss the potential impacts over the life of the Project and adaptive management options that could address related climate change impacts.

[C] Summarize the results of the noise assessment conducted for the AER, and:

a) identify the nearest receptor used in the assessment and all receptors within 5 km of the proposed development; ~~and~~

b) discuss the design, construction and operational factors to be incorporated into the Project to comply with the AER's *Directive 38: Noise Control*; and

c) discuss the predicted sound levels within 5km of the perimeter of the development area.

[D] Describe the plans for monitoring noise in and around the Project area.

[E] Estimate the impacts of any pure tonal sound sources (e.g. vehicle back up beepers) or any intermittent noise sources (e.g. steam venting) from the Project on areas in the vicinity that they are used by Indigenous peoples or the public.

~~b)~~ [F] Discuss accommodation or mitigation strategies and how best practices will be applied to minimize the potential impact of the Project on air quality and noise.~~.~~

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~~3.2~~3.3 Hydrogeology

~~3.2.1~~3.3.1 Baseline Information

[A] Provide an overview of the existing geologic and hydrogeologic setting from the ground surface down to, and including, the oil producing zones and disposal zones, and:

a) present regional and Project Area geology to illustrate depth, thickness and spatial extent of lithology, stratigraphic units and structural features; and

b) present regional and Project Area hydrogeology describing:

i) the major aquifers, aquitards and aquicludes (Quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities. Include maps and cross sections,

ii) the chemistry of groundwater aquifers including baseline concentrations of major ions, metals and hydrocarbon indicators,

iii) the potential discharge zones, potential recharge zones and sources, areas of groundwater-surface water interaction and areas of Quaternary aquifer-bedrock groundwater interaction,

iv) water well development and groundwater use, including a field-verified~~n~~ inventory of groundwater users,

v) the recharge potential for Quaternary aquifers,

vi) potential hydraulic connection between bitumen production zones, deep disposal formations and other aquifers resulting from project operations,

vii) the characterization of formations chosen for deep well disposal, including chemical compatibility and containment potential, injection capacity, hydrodynamic flow regime, and water quality assessments, and

viii) the locations of major facilities associated with the Project including facilities for waste storage, treatment and disposal (e.g., deep well disposal) and describe site-specific aquifer and shallow groundwater conditions beneath these proposed facilities. Provide supporting geological information.

~~3.2.2~~3.3.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the Project.

[B] Describe and assess the nature and significance of the potential project impacts on groundwater with respect to:

a) inter-relationship between groundwater and surface water in terms of both groundwater and surface water quantity and quality, including as it relates to winter stream flow in affected streams and rivers;
b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
c) changes in groundwater quality, quantity and flow;
d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
e) potential implications of seasonal variations and climate change; and
f) groundwater withdrawal for project operations, including any expected alterations in the groundwater flow regime during and following project operations.

[C] Discuss ground water issues with Indigenous people and review existing relevant TEK and TLU information to indicate how this information has influenced the assessment process.

~~f)~~[D] Discuss the accommodation or mitigation strategies to minimize the potential impact of the Project on hydrogeology.

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~~3.3~~3.4 Hydrology

~~3.3.1~~3.4.1 Baseline Information

[A] Describe and map the surface hydrology in the Project Area.

[B] Identify any surface water users who have existing approvals, permits or licenses or users who have indicated traditional uses of surface water that may be impacted by the project.

~~3.3.2~~3.4.2 Impact Assessment

[A] Describe and assess the extent of hydrological changes that will result from disturbances to groundwater and surface water movement, and:
a) include an assessment of potential ground heave/subsidence and the potential impact on surface water flows, including potential changes in stream slope;
b) include changes to the quantity of surface flow, water levels and channel regime in watercourses (during minimum, average and peak flows) and water levels in waterbodies, including as it relates to winter conditions;
c) assess the potential impact of any alterations in flow on the hydrology and identify all temporary and permanent alterations, channel realignments, disturbances or surface water withdrawals;
d) discuss the effect of these changes on hydrology (e.g., timing, volume, peak and minimum flow rates, river regime and water levels), including the significance of effects for downstream watercourses; ~~and~~
~~d)~~e) quantify the rate, volume and timing of any storm water releases to local surface waters; and
~~e)~~f) identify any potential erosion problems in watercourses resulting from the Project.

[B] Describe impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.

[C] Discuss the impact of low flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

[A] Describe and discuss the potential impact on flow conditions and in-stream flow needs under various climate change scenarios.

[F] Discuss surface water issues with Indigenous people and review existing relevant TEK and TLU information to indicate how this information has influenced the assessment process.

~~[C]~~[B] Discuss the accommodation or mitigation strategies to prevent or minimize the potential impact of the Project on hydrology.

~~3.4~~3.5 Surface Water Quality

~~3.4.1~~3.5.1 Baseline Information

[A] Describe the baseline water quality of watercourses and waterbodies and their seasonal variations. Include a description of temporal (seasonal and interannual) and spatial variability. Consider appropriate water quality parameters.

~~3.4.2~~3.5.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project on surface water and sediment quality for appropriate parameters (e.g. temperature, pH, conductivity, cations and anions, metals, dissolved oxygen, suspended sediment, dissolved solids, nutrients and other oil sands water contaminants (such as napthenic acids) and potential tainting compounds including but not limited to;

a) an assessment of potential impacts from thermal plumes and changes in thermally mobilized constituents;

b) potential impacts from aerial deposition and sedimentation arising from Project related activities;

c) potential impacts from acidifying and eutrophying components of aerial deposition arising from Project related activities;

d) an assessment of potential impacts to water quality due to alteration of water levels within the Project area, including from climate change.

[B] Assess the potential Project-related and cumulative impacts of acidifying and other contaminants in air emissions on surface water and sediment quality.

[C] Discuss the effect of changes in surface runoff and/or groundwater withdrawal on water and sediment quality in surface water bodies.

[D] Describe the effects if any, on water withdrawals considered, including cumulative effects on fish, fish habitat or other aquatic resources.

~~d)~~ [E] Describe how waterbodies and areas of importance to traditional users were identified and addressed in the assessment.

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~~3.5~~3.6 Aquatic Ecology

~~3.5.1~~3.6.1 Baseline Information

[A] Describe the pre-development and existing fish and other aquatic resources. Identify species composition, distribution, relative abundance, movements and general life history parameters.

~~[A]~~[B] Describe and map the fish, fish habitat and aquatic resources (e.g., aquatic and benthic invertebrates) of the lentic and lotic ecosystems, including intermittent and ephemeral water bodies. Describe the species composition, distribution, relative abundance, movements and general life history parameters, including their use and potential use of habitats. Provide the methods used and rationale for the baseline data collection.

~~[B]~~[C] Describe any species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);

b) ~~b)~~ "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';

c) species identified as of special concern, threatened or according to Alberta's Endangered Species Conservation Committee (ESCC);

~~b)~~

~~c)~~d) listed in Schedule 1 of the federal *Species at Risk Act*;

~~d)~~e) listed as "at risk" by COSEWIC; and

~~e)~~f) traditionally used species.

~~[C]~~[D] Describe and map fish habitat including critical or sensitive areas such as spawning, rearing, and over-wintering habitats, seasonal habitat use including migration and spawning routes as well as habitat disturbances that are related to proposed, existing and approved projects overlain on surface hydrology.

~~[D]~~[E] Describe the current and potential use of the fish resources by Indigenous, ~~or~~ recreational or commercial fisheries.

~~3.5.2~~3.6.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to fish, fish habitat, aquatic and benthic invertebrates and key indicators, including, but not limited to:

a) habitat loss and alteration including fish tainting, survival of eggs and fry, chronic or acute health effects (based on whole effluent toxicity tests), and increased stress on fish populations from release of contaminants, sedimentation, flow alterations, temperature and habitat changes;

b) potential water quality and quantity changes;

c) potential impacts on riparian areas that could affect aquatic resources and productivity;

d) changes to benthic invertebrate communities including those that might affect food quality and availability for fish;

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e) increased fishing pressures in the region that could arise from the increased human activity and improved access from the Project. Provide mitigation options considered in a project access management plan;
f) increased habitat fragmentation;
g) acidification and/or eutrophication;
h) groundwater-surface water interactions;
i) potential for thermal plumes to affect aquatic habitat; and
j) potential for ground heave/subsidence and impacts to aquatic habitat.

[B] Discuss the rationale for the selection of the key indicators.

[C] Describe the effects of any water withdrawals considered, including cumulative effects on fish, fish habitat and other aquatic resources.

[D] Discuss accommodation or mitigation measures to minimize potential impacts of the Project on fish, fish habitat and other aquatic resources. Clearly identify those accommodation or mitigation measures that will be implemented and provide rationale for their selection.

~~[B]~~

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[E] Identify proposed plans to offset any loss in productivity as a result of the Project. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat.

[F] Describe the residual impacts of the Project on fish, fish habitat, and other aquatic resources and discuss their significance in the context of local and regional fisheries - describe Devon's plans to manage or accommodate those impacts.

~~[C]~~

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~~3.6~~3.7 Vegetation

~~3.6.1~~3.7.1 Baseline Information

[A] Describe and map the vegetation communities, wetlands, rare plants, old growth forests, and communities of limited distribution. Describe the occurrence, relative abundance and distribution of all plant species providing methods used and rationale for the baseline data collection.

~~[A]~~[B] As appropriate, use the Alberta Vegetation Inventory (AVI) Standard AVI 2.1 The Field Guide to Ecosites of Northern Alberta and the Alberta Wetland Inventory Standards Manual (AWI) Version 1.0. Map the project development footprint at a scale of 1:20,000. Conduct verification of vegetation mapping to provide reliability equivalent to the soils mapping.

~~[B]~~[C] Describe any species that are:
a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);
b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';

c) species identified as of special concern, threatened or according to Alberta's Endangered Species Conservation Committee (ESCC);
~~b)~~

~~c)~~a) listed in Schedule 1 of the federal *Species at Risk Act*;
~~d)~~b) listed as "at risk" by COSEWIC; and
~~e)~~c) traditionally used species.

[A] Describe and quantify the current extent of habitat fragmentation.

[B] Identify key vegetation indicators used to assess the Project impacts. Discuss how impacts will be monitored and the rationale for indicator selection.

~~[C]~~

~~3.6.2~~3.7.2 Impact Assessment

[A] Identify the vegetation and wetland communities that will be disturbed by all stages of the Project. Discuss the number of impacted traditional use sites as identified in community-specific traditional land use information.

~~[A]~~[B] Describe and assess the potential impacts of the Project on vegetation communities and key indicators, including, but not limited to:

a) both temporary (include timeframe) and permanent impacts;
~~a)~~b) species richness and abundance;
~~b)~~c) the potential for introduction and colonization of weeds and non-native invasive species;
~~c)~~d) potential increased fragmentation and loss of upland, riparian and wetland habitats; ~~and~~
e) implications of vegetation changes for other environmental resources (e.g., terrestrial and aquatic habitat diversity and quantity, water quality and quantity, erosion potential); and
f) the effects and their implications to recreation, Indigenous and other uses.
~~d)~~ ~~.~~

[C] Discuss the rationale for the selection of the key indicators.

[D] Discuss the accommodation or mitigation measures to minimize impacts on vegetation communities, wetlands, rare plants, old growth forests and communites of limited distribution. Clearly identify those accommodation or mitigation measures that will be implemented and provide the rationale for their selection.

[E] Discuss weeds and non-native invasive species and how they will be controlled prior to and during operation and reclamation.

[F] Discuss how TEK and TLU information that was collected and indicate how this information has influenced the assessment process.

~~[B]~~

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~~3.7~~3.8 Wildlife

~~3.7.1~~3.8.1 Baseline Information

[A] Describe and map the wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species relative abundance, distribution and their use and potential use of habitat, providing methods used and rationale for the baseline data collection.

[B] Describe any species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Parks);

b) "species at risk" identified by the *Alberta Wildlife Act* as 'Endangered', 'Threatened', or 'Species of Special Concern';

c) species identified as of special concern, threatened or according to Alberta's Endangered Species Conservation Committee (ESCC);

~~b)~~

~~c)~~d) listed in Schedule 1 of the federal *Species at Risk Act*;

~~d)~~e) listed as "at risk" by COSEWIC; and

~~e)~~f) traditionally used species.

[C] Describe and map existing wildlife habitat and habitat disturbance including exploration activities. Identify habitat disturbances that are related to existing and approved projects.

[D] Identify the key wildlife and habitat indicators used to assess Project impacts. Discuss the rationale for their selection.

[E] Provide rationale behind sampling protocols and field methods implemented. Include information on number, timing and locations of surveys as well as statistical parameters used to determine population estimates. Indicate to what extent information is based on actual survey data or hunting and trapping data, TEK, scientific peer-reviewed literature, consultants reports or modeling.

[F] Discuss use of TEK or TLU information and/or participation of local Indigenous communities in base line field studies to inform baseline data collection.

~~[C]~~

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~~3.7.2~~3.8.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to wildlife and wildlife habitats and key indicators, including, but not limited to:

a) how the Project will affect wildlife relative abundance, mortality, movement patterns, and distribution for all stages of the Project;

b) how improved or altered access may affect wildlife, including potential obstruction of daily and seasonal movements, increased human-wildlife incidents and increased hunting pressures;

c) the spatial and temporal changes to habitat availability and function;

d) how increased habitat fragmentation may affect wildlife. Consider edge effects, the availability of core habitat and the influence of linear features and infrastructure on wildlife movements and predator-prey relationships;

a) the spatial and temporal changes to habitat availability and habitat effectiveness (types, quality, quantity, diversity and distribution);

~~d)~~

~~e)~~ potential effects on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health; ~~and~~

b) potential effects on wildlife from Devon's proposed and planned exploration, seismic and core hole activities, including monitoring/4D seismic; and

c) the resilience and recovery capabilities of wildlife populations and habitats to disturbance, in particular with regard to listed species and for those species with which a federal and/or provincial recovery strategy applies.

~~f)~~ ~~.~~

[A] Discuss the rationale for the selection of the key indicators.

[B] Comment on the availability and quantity of traditionally used species considering habitat loss, habitat avoidance, vehicle-wildlife collisions, increased non-Aboriginal hunting pressure, increased predator-prey interactions and other Project related effects on wildlife populations.

[C] Discuss the accommodation or mitigation measures to avoid or minimize the potential impact of the Project on wildlife and wildlife habitat for all stages of the Project and to return productive wildlife habitat to the area. Clearly identify those accommodation or mitigation measures, including buffers and offsets, to ensure that wildlife populations are maintained within their natural range of variability and are available for traditional use. Consider:

a) consistency of any plans with applicable regional, provincial and federal wildlife habitat objectives, policies, frameworks and strategies;

b) a schedule for the return of habitat capability to areas impacted by the Project;

c) the use of setbacks to protect riparian habitats and wildlife corridors, interconnectivity of such habitat and the unimpeded movement by wildlife species using the habitat;

d) anticipated access controls to or other management strategies to protect wildlife during and after project construction and operation;

e) measures to prevent habituation of wildlife to minimize the potential for human-wildlife encounters and consequent destruction of wildlife, including any staff or contractor training program, fencing camps, garbage containment measures or regular follow-up;

f) measures to mitigate habitat fragmentation considering impacts to habitat connectivity and wildlife movements resulting from linear features and other Project infrastructure and activities; and

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g) measures to minimize the impacts of light pollution on wildlife.

[D] Describe the Project's residual impacts on wildlife and wildlife habitat and Devon's plans to manage those impacts.

~~[B]~~[E]

~~3.8~~3.9 Biodiversity

~~3.8.1~~3.9.1 Baseline Information

~~[C]~~ [A] Describe and map the existing biodiversity including any unique features that affect the Project area's biodiversity in comparison to the Local Study Area.

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~~3.8.2~~ [B]Identify the biodiversity metrics, biotic and abiotic indicators that are used to characterize the baseline biodiversity. Discuss the rationale for their selection.Impact Assessment

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~~[A]~~ [C]Describe and assess the potential impacts of the Project to biodiversity including, but not limited to:

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a) the biodiversity metrics, biotic and abiotic indicators selected;
b) the effects of fragmentation on biodiversity potential;
c) the contribution of the Project to any anticipated changes in regional biodiversity and the potential impact to local and regional ecosystems; and
d) effects during construction, operations and post-reclamation and the significance of these changes in a local and regional context.

~~d)~~ [D] Discuss accommodation or mitigation measures to minimize the potential impact of the Project on biodiversity. Clearly identify those accommodation or mitigation measures that will be implemented and provide rationale for their selection.

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~~3.9~~3.10 Terrain and Soils

~~3.9.1~~3.10.1 Baseline Information

[A] Describe and map the terrain and soils conditions in the Project Area. Discuss the reliability of the soil survey maps, both boundaries and map unit descriptions.

[B] Describe and map soil types in the areas that are predicted to exceed Potential Acid Input critical loading criteria.

~~3.9.2~~3.10.2 Impact Assessment

[A] Describe project activities and other related issues that could affect soil quality (e.g., compaction, contaminants) and:

a) indicate the amount (ha) of surface disturbance from plant, field (e.g., pads, pipelines, access roads), aggregate and borrow sites, camps, drilling waste disposal and other infrastructure-related construction and operational activities;
b) discuss the relevance of any changes for the local and regional landscapes, biodiversity, productivity, ecological integrity, aesthetics and future use resulting from disturbance for all stages of the Project;

c) describe the effect on soils in the Local Study Area from changes to surface water flow and shallow groundwater flow;

~~b)~~

~~c)~~d) identify the potential acidification and eutrophication impact on soils and discuss the significance of predicted impacts by acidifying and eutrophying emissions; and

~~d)~~e) describe potential sources of soil contamination.

[B] Discuss:

a) the environmental effects of proposed drilling methods on the landscape and surficial and bedrock geology;

b) the potential for changes in the ground surface during steaming and recovery operations (e.g., ground heave and/or subsidence) and their environmental implications; and

c) the potential impacts caused by the mulching and storage of woody debris considering, but not limited to, vulnerability to fire, degradation of soil quality, increased footprint.

[C] Include an assessment of soil types for reclamation suitability. Discuss reclamation material salvage, storage areas and handling procedures.

[D] Provide a mitigation plan to:

a) Minimize surface disturbance including the use of existing clearings for the Project;

b) Address potential effects of acid and nitrogen deposition;

c) Mitigate changes to ground surface during operations (temperature, heave and subsidence); and

d) Address impacts to land capability including for traditional uses, wildlife and forest productivity.

[E] Discuss accommodation or mitigation strategies to minimize the potential impact of the Project on soils or terrain.

~~c)~~

~~3.10~~3.11 Land Use and Management

~~3.10.1~~3.11.1 Baseline Information

[A] Describe and map the current land uses in the Project Area, including all Crown land dispositions and Crown Reservations (Holding Reservation, Protective Notation, Consultative Notation) and traditional land uses by Indigenous communities.

[B] Indicate where Crown land dispositions may be needed for roads or other infrastructure for the Project.

[C] Identify and map unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant

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sites and areas and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).

[C][D] Describe and map any federally or provincially identified critical habitat for listed wildlife species;

[E] Describe and map anticipated land clearing activities, showing the timing of the activities.

[D][F] Describe topographically project infrastructure and other features that may lead to visual impacts to the public and neighboring communities and land users using the Local Study Area.

[E][G] Describe the status of timber harvesting arrangements, including species and timing.

[F][H] Describe existing access control measures and provide an Access Management Plan.

[G][I] Identify land use activities for which locations will be determined at a later date. Discuss the approach that will be used to locate future activities on the landscape.

3.10.23.11.2 Impact Assessment

[A] Identify the potential impacts of the Project on land uses and land users, including:

a) unique sites or special features;
b) traplines and registered fur management areas;
c) changes in public access arising from linear development, including secondary effects related to increased hunter, angler and other recreational access;
d) aggregate reserves that may be located on land under Devon's control and reserves in the region;
e) development and reclamation on commercial forest harvesting and fire management in the Project Area;
f) the amount of commercial and non-commercial forest land base that will be disturbed by the Project, including the Timber Productivity Ratings for the Project Area. Compare the baseline and reclaimed percentages and distribution of all forested communities in the Project Area;
g) how the Project impacts Annual Allowable Cuts and quotas within the Forest Management Agreement area;
h) the operation of any agricultural crown land and provincial grazing reserves;
i) anticipated changes (type and extent) to the topography, elevation and drainage patterns within the Project Area; and
j) access control for public, regional recreational activities, Indigenous land use and other land uses during and after development activities. Provide an Access Management Plan.

[B] Describe how Integrated Land Management has been used (e.g., sharing of infrastructure, access requirements).

[B][C] Describe any visual impacts the Project may have on neighboring communities, local land users or from nearby public areas, including transportation routes. Identify accommodation or mitigation measures taken to minimize any visual impacts.

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~~[C]~~[D] Provide a fire control plan highlighting:

a) measures taken to ensure continued access for firefighters to adjacent wildland areas;
b) forest fire prevention, detection, reporting, and suppression measures, including proposed fire equipment;
c) measures for determining the clearing width of power line rights-of-way; and
d) required mitigation measures based on the *FireSmart Field Guide for the Upstream Oil and Gas Industry*.

4 HISTORIC RESOURCES

4.1 Baseline Information

[A] Provide a brief overview of the regional historical resources setting including a discussion of the relevant archaeological, historic and palaeontological records.

[B] Describe and map known historic resources sites in the Project Area, considering:

a) site type and assigned Historic Resources Values; and
b) existing site specific *Historical Resources Act* requirements.

[C] Provide an overview of previous Historical Resources Impact Assessments that have been conducted within the Project Area, including:

a) a description of the spatial extent of previous assessment relative to the Project Area, noting any assessment gap areas; and
b) a summary of *Historical Resources Act* requirements and/or clearances that have been issued for the Project to date.

[D] Identify locations within the Project Area that are likely to contain previously unrecorded historic resources. Describe the methods used to identify these areas.

[E] Describe the use of TEK and TLU information and/or participation of local Indigenous communities in the HRIA work completed or planned to inform Project design. Discuss what, if any, historical, heritage and cultural sites or areas were provided from TEK and how they were, or will be, incorporated into project planning.

~~[D]~~

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4.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect historic resources at all stages of the Project.

[B] Describe the nature and magnitude of the potential project impacts on historical resources, considering:

~~a)~~ effects on historic resources site integrity; ~~and~~
a) implications for the interpretation of the archaeological, historic and palaeontological records; and
b) effects on historical and cultural resources provided through the provision of TEK.

~~b)~~ [C] Describe and discuss management and mitigation to avoid or minimize the effects to historic resources including TEK identified historic, heritage and cultural sites and resources.~~.~~

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5 TRADITIONAL ECOLOGICAL KNOWLEDGE AND LAND USE

[A] Discuss how consultation with Indigenous communities during project planning and design provided TEK and TLU information to inform project plans and mitigation measures.

~~[A]~~[B] Provide:

a) a map and description of Traditional Land Use areas including fishing, hunting, trapping and nutritional, medicinal or cultural plant harvesting by affected Indigenous peoples (if the Indigenous community or group is willing to have these locations disclosed);

b) a map of cabin sites, spiritual sites, cultural sites, gravesites and other traditional use sites considered historic resources under the *Historical Resources Act* (if the Indigenous community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns; ~~and~~

c) a discussion of:

i) the availability of vegetation, fish and wildlife species for food, traditional, medicinal and cultural purposes in the identified traditional land use areas considering all project related impacts,

ii) access to traditional lands in the Project Area during all stages of the Project, and

iii) Indigenous views on land reclamation.

d) a description of traditional land use extent in both the project footprint and Local Study Area including hunting, fishing, trapping, nutritional and medicinal plant harvesting and cultural use by affected Indigenous peoples;

e) a quantitative assessment of impacts to traditionally important wildlife species including accommodation or mitigation strategies to address those impacts;

f) a list of culturally important plant species that will be used in reclamation and indicate the species that are currently available commercially and can be used successfully in reclamation.

g) an assessment of the richness, abundance and vigour of culturally important species collected during project vegetation surveys and include a summary of that information in both the vegetation and traditional land use sections of the EIA. Discuss project development impacts on those species (and the ecosites that support them) was well as accommodation, mitigation and reclamation strategies that will be employed to address those impacts;

h) include a discussion of:

i. the access to traditional lands in the Project area pre-development ((1960s), currently and during all stages of the Project;

ii. the vegetation and wildlife used for traditional, food, ceremonial, medicinal and other purposes;

iii. impacts to traditional lands and culture, including considering the impacts of existing development on changes to access and traditional-use patterns;

iv. trapper consultation; and
v. Indigenous views on traditionally and culturally meaningful land reclamation.

~~iii)~~

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~~[B]~~[C] Describe how Traditional Ecological Knowledge and Traditional Land Use information was ~~incorporated~~ integrated into the Project, EIA and SEIA development, the conservation and reclamation plan (including Indigenous views on land reclamation), management, monitoring and mitigation.

[D] Determine the impacts of the Project and cumulative effects on traditional, medicinal and cultural purposes and identify possible mitigation strategies.

[E] Describe the results of consultation with Indigenous communities with respect to traditional environmental knowledge and traditional land use.

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[F] Describe how TEK and TLU information was integrated into the technical components of the EIA and Closure and Reclamation Plan.

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[G] Describe how TEK and TLU information will be considered during project operation and reclamation.

~~[C]~~[H]

6 PUBLIC HEALTH AND SAFETY

6.1 Public Health

[A] Describe aspects of the Project that may have implications for public health or the delivery of regional health services including information specifically related to Indigenous communities. Determine quantitatively whether there may be implications for public and Indigenous health arising from the Project.

[B] Assess the potential health implications of the compounds that might be released to the environment from the Project in relation to exposure limits established to prevent acute and chronic adverse effects on human health and the potential health implications, if any, for compounds for which no exposure guidelines currently exist.

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[C] Provide the data, exposure modeling calculations and descriptions of methods Devon used to assess Project impacts on human health and safety.

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[D] Provide information, including chemical analyses and modeling results on selected environmental media samples (e.g. soil, water, air, vegetation, wildlife, etc.) used in the assessment.

[E] Discuss the potential for changes to water quality, air and soil quality to increase human exposure to contaminants, taking into consideration all Project activities for the life of the Project.

[F] Identify the human health impact on country foods and natural food sources from potential contamination, taking into consideration all Project activities for the life of the Project as well as the impact they might have on opportunities and desire (resulting from perceptions of health and safety) for traditional activities.

~~[A]~~[G] Discuss the potential for fish contamination relative to fish consumption guidelines (e.g. mercury and PAHs) as well as potential for flavor tainting and how this might affect opportunities and desire (resulting from perceptions of health and safety) for traditional activities.

~~[B]~~[H] Document any health concerns raised by stakeholders during consultation on the Project.

~~[C]~~[I] Document any health concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project, specifically on their traditional lifestyle and on overall health and community wellness. Include an Indigenous receptor type in the assessment.

[J] Describe the potential health impacts resulting from higher regional traffic volumes and the increased risk of accidental leaks and spills including potential impacts on traditionally used plant, wildlife and waters and lands.

[K] Assess human health from an ecosystem perspective, including but not limited to Health Canada's determinants of health, stress or risk perception.

[L] Discuss the accommodation or mitigation strategies to minimize the potential impact of the Project on human health.

~~[D]~~

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6.2 Public Safety

[A] Describe aspects of the Project that may have implications for public safety and determine whether there may be Project effects on public safety. Specifically:

a) describe the emergency response plan including Indigenous and public notification protocols and safety procedures to minimize adverse environmental effects, including emergency reporting procedures for spill containment and management;
b) document any safety concerns raised by stakeholders during consultation on the Project, particularly both those actively using lands in and around the Project area;
c) describe the spill response plans and assessment approach that would address spills, including pipeline spills, flow-to-surface events, and well head blow outs, including the potential associated residual effects;
d) describe how local residents, traditional land users, trapper and RFMA holders will be contacted during an emergency and the type of information that will be communicated to them;
e) describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual aid programs and municipal emergency response agencies; and
f) describe the potential safety impacts resulting from higher regional traffic volumes.

7 SOCIO-ECONOMIC ASSESSMENT

7.1 Baseline Information

[A] Describe the existing socio-economic conditions in the region and in the communities, including Indigenous communities, in the region.

[B] Describe factors that may affect existing socio-economic conditions including:

a) population changes;
b) workforce requirements for all stages of the Project, including a description of when peak activity periods will occur;
c) planned accommodations for the workforce for all stages of the Project. Discuss the rationale for their selection and the alternatives considered;
d) Devon's policies and programs regarding the use of local, regional and Alberta goods and services;
e) the project schedule and periods of peak employment and production;
f) the overall engineering and contracting plan for the Project; and
g) the impacts of the 2016 Fort McMurray wildfire.

~~g)~~ [C] In consultation with Aboriginal communities, provide community-specific socio-economic baseline information commensurate with that of the Fort McMurray and including cultural and lifestyle information unique to those communities.

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7.2 Impact Assessment

[A] Describe the effects of construction and operation of the Project and its contribution to cumulative socio-economic effects on:

a) housing;
b) availability and quality of health care services;
c) local and regional infrastructure and community services;
d) recreational activities;
e) hunting, fishing, trapping and gathering and loss of land and access to land required to carry out traditional pursuits by Indigenous people guaranteed under Treaty 8 and the Canadian Constitution; and
f) First Nations and Métis (e.g., traditional land use and social, lifestyle and cultural implications).
~~d)~~

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[B] Describe the socio-economic effects of any new or existing camp(s) required for the Project and identify:

a) its location and the rationale for selecting this location;
b) the number of workers it is intended to house;
~~b)~~c) the number of foreign workers Devon plans to bring in;
~~c)~~d) whether the camp will service the Project only or other clients;
~~d)~~e) the length of time the camp will be in service and whether it will be a 'dry camp';
~~e)~~f) describe the services that will be provided in the camp (e.g., security, recreation and leisure, medical services), including a description of the impacts on Municipal or other external services; and
~~f)~~g) outline the emergency services and evacuation plan that will be in place.

[C] Discuss opportunities to work with First Nation and Métis communities and groups, other local residents and businesses regarding employment, training needs and other economic development opportunities arising from the Project, including:

a) Indigenous hiring and procurement policies and programs and how Devon will maximize local Indigenous workers;

b) the systemic barriers that obstruct advancement in Indigenous education, training, employment and business development and describe how Devon will address those barriers; and

c) describing and providing copies of Devon's policies and practices that will be implemented to design, manage, monitor and evaluate Devon's employment and business development opportunities for First Nation and Métis peoples in the region.

~~[C]~~ .

[D] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages. Indicate the percentage of expenditures expected to occur in the region, within or associated with specific communities in the region including Indigenous communities, Alberta, Canada outside of Alberta, and outside of Canada.

[E] Discuss the accommodation and mitigation strategies to minimize the potential impact of the Project on socio-economic conditions in the region and communities, including Indigenous communities, in the region.

~~[D]~~

8 MITIGATION MEASURES

[A] Discuss mitigation measures planned to avoid, minimize or eliminate the potential impacts for all stages of the Project~~.~~

[B] Identify the mitigation objectives for each associated impact and describe those mitigation measures that will be implemented. Provide rationale for their selection, including a discussion on the effectiveness of the proposed mitigation.

~~[B]~~[C] Assess the risks (probability and hazard assessment) of mitigation ineffectiveness or failure.

9 RESIDUAL IMPACTS

[A] Describe the residual impacts of the Project following implementation of Devon's mitigation measures and Devon's plans to manage those residual impacts. Evaluate potential effectiveness of the accommodation or mitigation proposed and the associated risks. Provide contingency plans for ineffective or partially effective accommodation or mitigation performance.

~~[A]~~

10 MONITORING

[A] Describe Devon's current and proposed monitoring programs, including:

a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans and validity of the impacts predicted in the

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environmental and socio-economic assessments. Discuss how Devon will address any project impacts identified through the monitoring program;

b) how Devon will contribute to current and proposed regional monitoring programs including:

i. ~~;~~ regional monitoring that will be undertaken to assist in managing environmental effects, confirm performance of mitigation measures and improve environmental protection strategies; and

ii. monitoring done independently by Devon.

iii.

~~b)~~

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c) monitoring performed in conjunction with other stakeholders, including Indigenous communities and groups;

d) new monitoring initiatives that may be required as a result of the Project;

e) regional monitoring that will be undertaken to assist in managing environmental effects and improve environmental protection strategies;

f) how monitoring data will be disseminated to the public, Indigenous communities or other interested parties; ~~and~~

g) how the results of monitoring programs and publicly available monitoring information will be integrated with Devon's environmental management system; and

~~g)~~h) how Aboriginal communities might be involved in monitoring programs such as through community-based monitoring programs.~~.~~