PROPOSED TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR
CANADIAN NATURAL RESOURCES LIMITED
HORIZON NORTH PIT EXTENSION PROJECT

Approximately 70 km North of Fort McMurray, Alberta

ISSUED BY: **Canadian Natural Resources Limited**

DATE: **October 20, 2017 VERSION CLEAN**

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PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for Canadian Natural Resources Limited (Canadian Natural), Aboriginal communities and appropriate stakeholders, the information required by the Alberta Energy Regulator (AER) for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Horizon North Pit Extension Project (the Project).

Canadian Natural is proposing a northeast mine pit extension of the previously approved North Mine Pit at the Horizon Oil Sands Processing Plant and Mine (Horizon). The extension will be immediately adjacent and east of the existing approved North Pit, west of the Athabasca River and is within the AER Approved Project Boundary for Horizon. The mine extension and the additional area required for overburden storage represents an increase in disturbance area of approximately 7% and 11% respectively.

The proposed extension will be actively mined for approximately seven years with all ore continuing to be processed at the existing Horizon Central Processing Facility. Accordingly, an increase in water withdrawal from the Athabasca River is not required for this Project. The extension would be a continuation of the mine sequence, additional workforce would not be required and would not result in an increase in population, housing or camp requirements, local or regional traffic, and would not impact local or regional infrastructure or community services.

The area associated with the North Pit Extension was not previously included in the Horizon 2002 EIA. As a result, Canadian Natural is preparing an EIA for the proposed Project with a focus on the potential incremental impacts that may result from the extension. Canadian Natural will be seeking regulatory approvals by amending the current Horizon approvals under EPEA, *Water Act, Public Lands Act* and *Oil Sands Conservation Act* (OSCA) through an Integrated Application. Existing environmental management and monitoring programs will be expanded to accommodate the development of the proposed Project.

SCOPE OF THE EIA REPORT

Canadian Natural shall prepare and submit an EIA report that examines the incremental 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.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations. The EIA report will form part of Canadian Natural's application to the AER. An EIA report summary will also be included as part of the AER Application.

Canadian Natural shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta (March 2013)* published by Alberta Environment and Sustainable Resource Development (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 ABORIGINAL 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 into the Project development, impact mitigation and monitoring.

[B] Describe the concerns and issues expressed by Aboriginal communities and the actions taken to address those concerns and issues, including how Aboriginal community input was incorporated into the Project, EIA development, mitigation, monitoring and reclamation. Describe consultation undertaken with Aboriginal communities and groups with respect to traditional ecological knowledge and traditional use of land and water.

[C] Describe plans to maintain the public engagement and Aboriginal consultation process following completion of the EIA report to ensure that the public and Aboriginal peoples will have an appropriate forum for expressing their views on the ongoing development, operation and reclamation of the Project.

2 PROJECT DESCRIPTION

2.1 Overview

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

a) Canadian Natural information;
b) proposed extraction technology;
c) water supply and disposal requirements, if differs from existing operations including process water and potable water requirements;
d) proposed method to transport product to markets; and
e) 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 mining excavation(s);
c) temporary structures;
d) transportation and access routes;
e) containment structures such as, retention ponds and storage ponds;
f) water wells/intakes, pipelines, and storage structures;
g) sources of borrow material and other construction material and locations of any stockpiles that will be developed; and
h) waste storage area and disposal sites.

[C] Provide a development plan that includes:

a) the phases of development;
b) the extent of mine excavation and dump areas in each stage of the Project;
c) tailings management;
d) overburden storage areas;
e) dewatering and water control facilities;
f) infrastructure (pipelines, access roads and, power lines);
g) other buildings;
h) field maintenance operations; and

i) activities associated with each stage of the Project.

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

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

[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 (e.g. the Lower Athabasca Regional Plan);
b) land use policies and resource management initiatives that pertain to the Project;
c) Aboriginal traditional land and water use;
d) all known traplines;
e) the environmental setting;
f) cumulative environmental impacts in the region;
g) results of Project-specific and regional monitoring;
h) potential for new or additional technology to increase resource recovery at later times; and
i) potential for changes in the regulatory regime.

[B] Discuss the selection criteria used, options considered, and rationale for selecting:
a) location of project development.

[C] Provide a list of facilities for which locations will be determined later. Discuss the selection criteria that will be used to determine the specific location of these facilities.

2.3 Regional and Cooperative Efforts

[A] Discuss Canadian Natural's involvement in regional and cooperative efforts to address environmental and socio-economic issues associated with regional development, including:
a) potential cooperative ventures that Canadian Natural has initiated, could initiate or could develop with other oil sands operators and other resource users.

2.4 Process and Infrastructure Alternatives

[A] Discuss the route or site selection criteria for any linear or other infrastructure development or modification and provide the rationale for selecting the proposed alignment and design.

[B] Discuss the tailings management options considered for the Project and the environmental implications of each. Compare and contrast to the Horizon Tailings Management Plan in terms of fluid fines tailings volumes production, containment, abandonment and progressive reclamation and, tailings water treatment and recycling.

[C] Discuss the potential for new or additional technology to increase resource recovery at later times in the development.

[D] Discuss options and technologies considered for tailings water treatment and recycling, including water quality effects on the bitumen extraction and processing operations and environmental considerations in relation to the Project.

[E] Discuss the effects of the Project on tailings characteristics including, but not limited to, quantity, quality, physical characteristics, generation and storage requirements, air and water discharges, toxicity, water and energy requirements, chemical and hydrocarbon waste streams, bitumen recovery and effects on reclamation programs.

2.5 Project Processes and Facilities

[A] Describe the primary resource recovery process, any proposed follow-up recovery process and other related processes and process facilities of the Project.

[B] Describe the proposed method to transport product to markets

[C] Provide a list of chemical products to be processed or otherwise used for the Project and describe, in general terms, how these products will be stored and managed. Identify products containing substances that are:

a) listed in the *Canadian Environmental Protection Act, Schedule 1, List of Toxic Substances*;
b) listed on the *National Pollutant Release Inventory*;
c) dangerous goods as defined by the federal *Transportation of Dangerous Goods Act*; and
d) on the *Domestic Substances List* and categorized as requiring further assessment under Canada's *Chemicals Management Plan*.

2.6 Transportation Infrastructure

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

2.7 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, rate and source) for the Project's operating and construction emissions including point and non-point sources and fugitive emissions. Discuss:

a) odorous and visible emissions from the proposed facilities;
b) annual and total greenhouse gas emissions for 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) Canadian Natural's overall greenhouse gas management plans;
f) amount and nature of Criteria Air Contaminants emissions;
g) the amount and nature of acidifying emissions, probable deposition patterns and rates;
h) control technologies used to reduce emissions;

2.8 Water Management

2.8.1 Water Supply

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

a) the expected water balance during all stages of the Project. Discuss assumptions made or methods chosen to arrive at the water balances;
b) the water, sources for construction (including, but not limited to, road construction, winter road construction, lease construction, and dust suppression), decommissioning and reclamation. Identify the volume of water to be withdrawn from each source, considering plans for wastewater reuse;
c) the existing location of sources/intakes and associated infrastructure (e.g., pipelines for water supply);
d) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented if different from existing;
e) the expected cumulative effects on water losses/gains resulting from the Project operations;
f) existing 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); and
g) measures for continuing efficient use of water including alternatives to reduce the consumption of non-saline water such as water use minimization, recycling, conservation, and technological improvements.

2.8.2 Surface Water

[A] Describe the surface water management strategy for all stages of the Project, including:

a) design factors considered, such as:
    i) site drainage,
    ii) run-on management,
    iii) road and plant run-off,
    iv) erosion/sediment control,
    v) geotechnical stability concerns,
    vi) groundwater and surface water protection,
    vii) muskeg dewatering,
    viii) mine pit dewatering,
    ix) groundwater seepage, and
    x) flood protection;
b) permanent or temporary alterations or realignments of watercourses, wetlands and other waterbodies;
c) the pre and post-disturbance alignment and condition of all ephemeral and permanent streams, wetlands and waterbodies including those created by the Project; and

d) factors used in the design of water management facilities with respect to the *Canadian Dam Safety Association Dam Safety Guidelines*, including expected flood and flood protection.

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

2.8.3 Wastewater Management

[A] Describe the wastewater management strategy associated with the Project, including:
a) discharges to the surrounding watershed from existing and reclaimed sites, including the tailings management areas and end pit lakes and the management strategy for handling such releases.

2.9 Waste Management

[A] Discuss the rationale for waste disposal. Include:
a) the location, availability of on-site waste disposal.

[B] Characterize and quantify the anticipated dangerous goods, and hazardous, non-hazardous, and recyclable wastes generated by the Project if differs from existing operations, and describe:
a) the composition and volume of specific waste streams and discuss how each stream will be managed;
b) the management plan for produced tailings, overburden and other mining wastes, as well as any by-products. Include evaluations to minimize fine fluid tailings production, considering mining methods;
c) how disposal sites and sumps will be constructed; and
d) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project.

2.10 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for the Project considering:
a) existing Conservation and Reclamation Plan;
b) current land use and capability, vegetation, commercial forest land base by commercialism class, forest productivity, recreation, wildlife, aquatic resources, aesthetics, traditional land uses and land use resources;
c) integration of operations, decommissioning, reclamation planning and reclamation activities;
d) 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;
e) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;
f) post-development land capability with respect to:
    i) topography, drainage and surface watercourses,
    ii) traditional use with consideration for traditional vegetation and wildlife species in the reclaimed landscape,
    iii) end pit lakes,

iv) wetlands,
v) vegetation communities, and
vi) reforestation and forest productivity;

g) water supply capability of post-mine landscape;
h) reclamation material salvage, storage areas and handling procedures;
i) reclamation material replacement indicating depth, volume and type;
j) existing and final reclaimed site drainage plans;
k) integrating surface and near-surface drainage within the Project Area; and
l) promotion of biodiversity.

[B] Provide a conceptual revegetation plan for the disturbed terrestrial, riparian and wetland areas. Consider factors such as biological capability and diversity, natural disturbance regimes and end land use objectives.

[C] Provide an Ecological Land Classification map for the post reclamation landscape considering potential land uses, including traditional uses and how the landscape and soils have been designed to accommodate future land use.

[D] Describe how Canadian Natural considered the use of progressive reclamation in project design and reclamation planning.

[E] Provide a discussion of issues related to the design of a self-sustaining and productive aquatic ecosystem for a range of users and uses, including implications of the selected tailings technology. Explain processes and activities Canadian Natural will undertake to address issues of uncertainty surrounding the long-term ecological viability of end pit lakes.

[F] Provide a discussion of any off-site mitigation that is being considered for habitat types that cannot be reclaimed.

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

2.11 Environmental Management Systems

[A] Summarize key elements of Canadian Natural's existing environment, health and safety management system.

[B] Describe adaptive management plans that minimize the impact of the Project. Describe the flexibility built into the Project to accommodate future modifications required as a result of:

a) any change in environmental standards, limits and guidelines; and
b) findings from project-specific regional monitoring programs.

[C] Describe Canadian Natural's current and proposed monitoring programs with respect to:

a) air emissions, including fugitive emissions;
b) wastewater treatment and release; and
c) hazardous and non-hazardous waste treatment and storage.

[D] Describe the emergency response system that will be used to minimize adverse environmental effects while protecting the safety of personnel.

3 ENVIRONMENTAL ASSESSMENT

3.1 Air Quality, Climate and Noise

3.1.1 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; and
b) appropriate ambient air quality parameters.

3.1.2 Impact Assessment

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

a) describe the potential for reduced air quality (including odours) resulting from the Project and discuss any implications of the expected air quality for environmental protection and public health;
b) estimate ground-level concentrations of appropriate air quality parameters;
c) discuss any expected changes to particulate deposition, nitrogen deposition or acidic deposition patterns;
d) identify areas that are predicted to exceed Potential Acid Input critical loading criteria;
e) discuss interactive effects that may occur resulting from co-exposure of a receptor to all emissions; and
f) 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 and discuss the potential impacts over the life of the Project.

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

a) identify the nearest receptor used in the assessment; 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*.

3.2 Hydrogeology

3.2.1 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.

3.2.2 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 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;
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
f) groundwater withdrawal for project operations, including any expected alterations in the groundwater flow regime during and following project operations.

3.3 Hydrology

3.3.1 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.

3.3.2 Impact Assessment

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

c) discuss the effect of these changes on hydrology (e.g., timing, volume, peak and minimum flow rates, river regime and lake levels), including the significance of effects for downstream watercourses; and
d) 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 changes in sedimentation patterns in receiving waters.

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

3.4 Surface Water Quality

3.4.1 Baseline Information

[A] Describe the baseline water quality of watercourses and waterbodies and their seasonal variations. Consider appropriate water quality parameters.

3.4.2 Impact Assessment

[A] Identify project components that may influence or impact water quality.

[B] Describe the potential impacts of the Project on surface water quality, including:
a) changes in water quality that may exceed the *Surface Water Quality Guidelines for Use in Alberta* or the *Canadian Water Quality Guidelines for the Protection of Aquatic Life*;
b) implications of the tailings deposits, including the amount and quality of water or leachates released, their permeability and groundwater characteristics;
c) seasonal variation;
d) acidifying and other air emissions; and
e) changes in surface runoff or groundwater discharge.

[C] Describe water and sediment quality conditions and suitability for aquatic biota in constructed waterbodies.

3.5 Aquatic Ecology

3.5.1 Baseline Information

[A] Describe and map the fish, fish habitat and aquatic resources (e.g., aquatic and benthic invertebrates) of the lakes, rivers, ephemeral water bodies and other waters. Describe the species composition, distribution, relative abundance, movements and general life history parameters of fish resources. Also identify 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 Sustainable Resource Development);
b) listed in Schedule 1 of the federal *Species at Risk Act*;
c) listed as “at risk” by COSEWIC; and
d) traditionally used species.

[B] Describe and map existing critical or sensitive areas such as spawning, rearing, and over-wintering habitats, seasonal habitat use including migration and spawning routes.

[C] Describe the current and potential use of the fish resources by Aboriginal, sport or commercial fisheries.

3.5.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to fish, fish habitat, and other aquatic resources, considering:

a) fish tainting, survival of eggs and fry, chronic or acute health effects, and increased stress on fish populations from release of contaminants, sedimentation, flow alterations;
b) habitat loss and alteration;
c) increased fishing pressures in the region that could arise from improved access from the Project;
d) increased habitat fragmentation;
e) acidification;
f) groundwater-surface water interactions.

[B] Identify the key aquatic indicators that Canadian Natural used to assess project impacts. Discuss the rationale for their selection.

[C] Discuss the design, construction and operational factors to be incorporated into the Project to minimize effects to fish and fish habitat and protect aquatic resources.

[D] 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.

3.6 Vegetation

3.6.1 Baseline Information

[A] Describe and map the vegetation communities, wetlands, rare plants, old growth forests, and communities of limited distribution. Identify the occurrence, relative abundance and distribution and identify 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 Sustainable Resource Development);
b) listed in Schedule 1 of the federal *Species at Risk Act*;
c) listed as “at risk” by COSEWIC; and
d) traditionally used species.

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

[C] Discuss the potential of each ecosite phase to support rare plant species, plants for traditional, medicinal and cultural purposes, old growth forests and communities of limited distribution. Consider their importance for local and regional habitat, sustained forest growth, rare plant habitat and the hydrologic regime.

3.6.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project on vegetation communities, considering:

a) both temporary (include timeframe) and permanent impacts;

b) the potential for introduction and colonization of weeds and non-native invasive species;
c) the sensitivity to disturbance (including acid deposition);
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).

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

[C] Discuss weeds and non-native invasive species and describe how these species will be assessed and controlled in all stages of the Project.

3.7 Wildlife

3.7.1 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 habitats. Also identify 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 Sustainable Resource Development);
b) listed in Schedule 1 of the federal *Species at Risk Act*;
c) listed as "at risk" by COSEWIC; and
d) traditionally used species.

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

3.7.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to wildlife and wildlife habitats, considering:
a) how the Project will affect wildlife relative abundance, habitat availability, mortality, movement patterns, and distribution for all stages of the Project;
b) improved or altered access, obstructions to daily or seasonal movements, noise and hunting during all stages of the Project;
c) 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;
d) the use of setbacks;
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 Canadian Natural's proposed and planned exploration, seismic and core hole activities, including monitoring/4D seismic.

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

[C] Describe any additional deterrent systems that will be incorporated into the Project to reduce the impacts on birds and other wildlife.

3.8 Biodiversity

3.8.1 Baseline Information

[A] Describe and map the existing biodiversity.

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

[C] Describe the current level of habitat fragmentation.

3.8.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to biodiversity considering:

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.

3.9 Terrain and Soils

3.9.1 Baseline Information

[A] Describe and map the terrain and soils conditions in the Project Area, including:

a) surficial geology and topography, overburden geology and mineralogy;
b) the soil types and their distribution;
c) the suitability and availability of soils for reclamation; and
d) a description of the soil drainage and soil moisture regimes.

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

3.9.2 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 field (pipelines, access roads), 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;
c) identify the potential acidification impact on soils and discuss the significance of predicted impacts by acidifying emissions;
d) discuss the potential for soil erosion; and
e) describe potential sources of soil contamination.

[B] Discuss:

a) 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.

3.10 Land Use and Management

3.10.1 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).

[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 any land use policies and resource management initiatives that pertain to the Project, and discuss how the Project will be consistent with the intent of these initiatives.

[E] Describe and map 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.

3.10.2 Impact Assessment

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

a) unique sites or special features;
b) changes in public access arising from linear development, including secondary effects related to increased hunter, angler and other recreational access and facilitated predator movement;
c) aggregate reserves that may be located on land under Canadian Natural's control and reserves in the region;
d) development and reclamation on commercial forest harvesting and fire management in the Project Area;
e) 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;
f) how the Project impacts Annual Allowable Cuts and quotas within the Forest Management Agreement area;
g) anticipated changes (type and extent) to the topography, elevation and drainage patterns within the Project Area; and
h) access control for public, regional recreational activities, Aboriginal land use and other land uses during and after development activities.

[B] Describe how Integrated Land Management has been used (e.g., 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 mitigative measures for areas adjacent to the Project Area 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.

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.

5 TRADITIONAL ECOLOGICAL KNOWLEDGE AND LAND USE

[A] Provide:
a) a map and description of traditional land use areas including fishing, hunting, trapping and nutritional, medicinal or cultural plant harvesting by affected Aboriginal peoples (if the Aboriginal community or group is willing to have these locations disclosed);
b) a map of cabin sites, spiritual sites, cultural sites, graves and other traditional use sites considered historic resources under the *Historical Resources Act* (if the Aboriginal 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) Aboriginal views on land reclamation.

[B] Describe how Traditional Ecological Knowledge and Traditional Land Use information was incorporated into the Project, EIA development, the conservation and reclamation plan, monitoring and mitigation.

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

6 PUBLIC HEALTH AND SAFETY

6.1 Public Health

[A] Determine quantitatively whether there may be implications for public health arising from the Project.

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

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

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 how local residents will be contacted during an emergency and the type of information that will be communicated to them; and
d) 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.

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) Canadian Natural's policies and programs regarding the use of local, regional and Alberta goods and services;
b) the project schedule; and
c) the overall engineering and contracting plan for the Project.

7.2 Impact Assessment

[A] Describe the effects of construction and operation of the Project on:

a) recreational activities;
b) hunting, fishing, trapping and gathering; and

c) First Nations and Métis (e.g., traditional land use and social and cultural implications).

[B] Describe the need for additional Crown land.

[C] Discuss additional 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, Alberta, Canada outside of Alberta, and outside of Canada, as applicable.

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.

9 RESIDUAL IMPACTS

[A] Describe the residual impacts of the Project following implementation of Canadian Natural's mitigation measures and plans to manage those residual impacts.

10 MONITORING

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

a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans. Discuss how Canadian Natural will address any project impacts identified through the monitoring program;
b) how Canadian Natural will contribute to current and proposed regional monitoring programs;
c) monitoring performed in conjunction with other stakeholders, including Aboriginal 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, Aboriginal communities or other interested parties; and
g) how the results of monitoring programs and publicly available monitoring information will be integrated with Canadian Natural's environmental management system.