Part D: Environmental Impact Assessment (EIA) Methodology

Table of Contents

List of Tables

List of Figures

D. ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

This section of the Application provides a description of the Environmental Impact Assessment (EIA) methodology that was used to prepare the EIA report. The EIA methodology explains how environmental components were selected and how they were assessed.

In March 2006, Parsons Creek Aggregates (PCA) was advised by Alberta Environment (AENV) that the proposed Parsons Creek Aggregates Limestone Quarry Project (the Project) is an activity under Section 39(e)(i) of the *Environmental Protection and Enhancement Act* (EPEA) and therefore is a mandatory activity pursuant to Schedule 1(b) of the *Environmental Assessment (Mandatory and Exempted Activities) Regulation*. Pursuant to Section 44(1) of *EPEA*, PCA was instructed by AENV to prepare and submit an EIA report for the Project in accordance with the provisions of Part 2 Division 1 of the *EPEA*.

The EIA methodology that was used to prepare the EIA report was adopted from several sources [Hegmann et al. (1999); Hegmann et al. (1995); FEARO (1990); FEARO (1994b); Beanlands and Duinker (1983); Barnes et al. (1993); Roots (1994)] and has been used successfully in the environmental evaluation of many resource and industrial projects and activities. Furthermore, this methodology is practical, technically sound, and has been accepted previously by provincial and federal regulators and follows the spirit of the Canada - Alberta Agreement on Environmental Assessment Cooperation.

The environmental and socio-economic effects of the Project and PCA's mitigative measures and monitoring relating to the atmospheric, aquatic, terrestrial, land use, traditional environmental knowledge and historical resources associated with the Project is addressed in Volume 1, Part E of this integrated application document and in the appended Consultant Reports (#1 - #15). In addition, methods specific to the evaluation of potential Project effects within each discipline are described in the Consultant Reports. Volume 1, Part E also provides for each environmental and socio-economic component considered, a summary of the baseline conditions, assessment of Project-specific and cumulative effects, impact predictions and mitigation and monitoring. The detailed description of methodologies, baseline conditions, and impact assessments are included in the appended Consultant Reports (#1 - #15).

D.1 EIA TERMS OF REFERENCE

On January 11, 2007, PCA advertised the availability of the proposed EIA Terms of Reference (TOR) for this Project and its Public Disclosure Document (PDD). The PDD provides an overview of the development plans for the Project. These documents were made available on the PCA website (www.parsonscreekresources.com) as well as the following locations:

- Fort McMurray Public Library;
- Fort McMurray Oils Sands Discovery Centre; and
- AENV Register of Environmental Assessment Information.

Notice of their availability was publicly advertised in the following newspapers:

- Fort McMurray Today (January 11, 2007);
- Edmonton Journal (January 11, 2007);

- Edmonton Sun (January 11, 2007); and
- Alberta Sweetgrass Paper (January 2007 - monthly).

The public review period for the proposed TOR ended on February 28, 2007. Following the public review period, AENV considered the comments and formally issued the final TOR for the EIA, which are reflective of a limestone quarry project, on June 18, 2007. The final TOR was made available to the public on the PCA and AENV websites.

In January 2009, PCA was preparing to submit the EIA Report for the Parsons Creek Aggregates Project. Alberta Transportation (AT) announced the Parsons Creek Interchange and HWY 63 Realignment Project that significantly impacted the Parsons Creek Aggregate Project by removing the ability to quarry the south one-third portion of the MAIM Lease area. PCA met with Alberta Environment's EIA review team on August 18, 2009 and the NRCB review team on October 7, 2009 to discuss the revised project and confirmed that the approved final TOR was appropriate for the revised project. PCA proceeded with a redesign of the quarry and revisions to the EIA report as appropriate.

A concordance table that cross-references the final TOR with sections of the Application is provided in Volume 1, Appendix 1 of this integrated application document. These TOR established the framework for the EIA provided in this Application. Consistent with the ongoing nature of environmental assessment, this report also addresses considerations subsequently expressed by government review agencies and the general public during the collection of baseline environmental information and preparation of the EIA report.

D.2 SCOPE OF THE ASSESSMENT

D.2.1 Scope of the Project

The scope of the Project for the purposes of the EIA involves all phases, including construction, operation, decommissioning, reclamation and closure of the Project and associated facilities and infrastructure to carry out the Project. The scope includes:

- temporary construction facilities, including utilities, infrastructure and temporary water supply, wastewater handling and materials handling;
- site preparation (surface water diversion, clearing, soil salvage);
- limestone quarry operation and processing (blasting, drilling, pit dewatering, loading, hauling, crushing, screening and washing);
- reclamation (overburden placement, soil placement and vegetation)
- infrastructure (process water supply, potable water supply, access roads, electrical power)

D.2.2 Valued Environmental Components

The Project EIA report addresses environmental effects by identifying Valued Environmental Components (VECs). VECs for the Project are those environmental attributes associated with the proposed Project development, which have been identified to be of concern by the public, government or professional community. VECs can include biophysical aspects, such as air, water, soils, terrain, vegetation, wildlife, fish, and avifauna,

land use, and social and economic aspects. PCA has been actively engaged in stakeholder consultation for this Project since 2005. This ongoing communication has provided PCA with valuable information to determine the VECs for this Project.

For each VEC, one or more parameters were selected to facilitate quantitative or qualitative measurement of potential Project effects and cumulative effects. Measurable parameters provide a means to determine the level or amount of change in a VEC. If possible, thresholds or standards were identified for each measurable parameter. For example, a measure of total suspended solids might be chosen as the measurable parameter for sedimentation effects in watercourses and on fish habitat and condition. Each discipline was responsible for identifying and defining measurable parameters for their VECs. The degree of change in these measurable parameters was used to help characterize Project-specific and cumulative effects and evaluate the significance of the residual effects.

As appropriate to the assessment, a list of the VECs identified for the Project or impacts is presented in each Consultant's Report. The categories identified that may be affected by the Project are:

- air quality;
- human health;
- noise;
- land use;
- soils and terrain;
- conservation and reclamation;
- vegetation;
- wildlife;
- hydrology;
- hydrogeology;
- aquatic resources;
- historical resources;
- traditional ecological knowledge and land use;
- socio-economic; and
- paleontological resources.

D.2.3 Study Areas

The study area boundaries identified for the Project EIA considered spatial, temporal and administrative dimensions. For the Project, spatial limitations are confined to activities associated with development of the

Project and related infrastructure. Temporal boundaries are defined as those boundaries that will exist during the life of the Project including the construction, operation and reclamation phases. Administrative boundaries are identified as the time and space limitations imposed because of administrative or economic reasons. VEC-specific spatial and temporal dimensions are presented in the Consultant Reports (#1- #15) of this integrated application document and are summarized in Figures D.2.3-1 and D.2.3-2.

The spatial boundaries for the EIA include the Project development area, which includes the Project footprint and associated infrastructure, as well as other local and regional areas, determined by the characteristics of each VEC where an effect from the Project can be reasonably expected. The Project footprint is shown on Figure D.2.3-1. Spatial boundaries for each discipline are based on the zone of the Project influence beyond which the potential environmental, cultural and socio-economic effects of the Project are expected to be non-detectable. Spatial boundaries are established for both a Local Study Area (LSA) and a Regional Study Area (RSA).

Temporal boundaries for the effects assessment are established in consideration of the construction period for the Project, operational life of the Project and anticipated period of reclamation and closure of the site. It is anticipated that the lifespan of the quarry will be +30 years. For most VECs, effects analyses considered construction and operations together. However, where an activity adds a measurable short-term change to the VEC, impacts during construction were assessed separately. There will be sequencing of both the removal and reclamation of terrestrial systems. This sequential development and reclamation process is not directly included in the assessment, which considers either that everything is undeveloped, developed or reclaimed. This is a conservative approach so effects are not under-estimated.

D.2.4 Assessment Cases

The assessment scenarios for the EIA report are defined in the EIA TOR and include:

- a Baseline Scenario, which includes existing environmental conditions, existing and approved projects or activities;
- an Application Scenario, which includes the Baseline Scenario plus the Project; and
- a Cumulative Effects Assessment (CEA) Scenario, which includes the Application Scenario (Baseline Scenario plus Project) plus planned projects or activities.

For the purposes of defining assessment scenarios, “approved” means approved by any federal, provincial or municipal regulatory authority, and “planned” means any project or activity that has been publicly disclosed prior to the issuance of the Terms of Reference or up to six months prior to the submission of the Project Application and the EIA report, whichever is most recent.

For the CEA, each of the environmental, social, economic, health, and land use components were evaluated, assessed and discussed where combined effects could reasonably be considered to result due to development of the Project in combination with other existing, approved and planned projects in the region. Industrial projects as well as activities associated with other land uses and infrastructure were included. Existing, approved and planned projects and activities in the region considered in the CEA are listed in Table D.2.4-1 and shown in Figure D.2.4-1.

Table D.2.4-1 List of Existing, Approved and Planned Activities

Company	Project	Existing Activity	Approved Activity	Planned Activity
Mining Operations				
Parsons Creek Aggregates	Parsons Creek Aggregates - Limestone Quarry			√
	North Parsons Creek - Sand & Gravel	√		
Birch Mountain Resources Ltd.	Muskeg Valley Quarry	√		
	Hammerstone Project – Limestone Quarry and Quicklime Plant			√
Albian Sands Energy Inc.	Muskeg River Mine	√		
	Muskeg River Expansion		√	
Canadian Natural Resources Limited	Horizon Mine		√	
Deer Creek Energy Limited	Joslyn North Mine			√
ExxonMobil Canada Ltd.	Kearl Mine		√	
Petro-Canada	Fort Hills Mine		√	
Shell Canada Ltd.	Jackpine Mine		√	
	Jackpine Mine Expansion			√
	Pierre River Mine			√
Suncor Energy	Base Mine, Steepbank Mine and Millennium	√		
	Voyageur Project		√	
	Voyageur South Project			√
Syncrude	Mildred Lake and North Mine	√		
	Aurora North Mine	√		
	Aurora South Mine		√	
Synenco Energy Inc.	Northern Lights			√
In-Situ Operations (SAGD)				
Connacher Oil & Gas Limited	Great Divide	√		
	Algar			√
ConocoPhillips	Surmont	√		
	Surmont Pilot	√		
Deer Creek Energy Limited	Joslyn Phase I	√		
	Joslyn Phase II	√		
	Joslyn Phase IIIA			√
EnCana Corporation	Borealis			√

Table D.2.4-1 List of Existing, Approved and Planned Activities

Company	Project	Existing Activity	Approved Activity	Planned Activity
Husky	Sunrise		√	
Japan Canada Oil Sands	Hangingstone Demonstration	√		
	Hangingstone Commercial			√
Nexen Inc./ Opti Canada Inc.	Long Lake	√		
	Long Lake 2			√
Petro-Canada	McKay River	√		
	McKay River Expansion			√
	Meadow Creek		√	
	Meadow Creek Expansion			√
	Lewis			√
	Dover UTF	√		
Suncor Energy	Firebag	√		
	Firebag ETS Phases 1 & 2	√		
	Firebag Expansion		√	
Other Activities				
Northlands Forest Products	Sawmill	√		
Sunset Salvage	Salvage yard	√		
Easy Span Bridge Rentals	Industrial	√		
E-T Energy Limited	ET-DSP in-situ bitumen recovery	√		
Williams Energy Canada	Liquid/olefin extraction plant.	√		
Regional Gas Production Facilities	Various sweet gas plants and compressor stations	√		
Non-industrial sources	Community, traffic and furnace emissions	√		

D.2.5 Significance

An important step in the environmental assessment process is the determination of significance of residual environmental effects. The significance of predicted residual Project effects was determined only after the incorporation of the planned environmental mitigative measures proposed for the Project. Residual environmental effects are determined to be significant or not significant based on well-defined criteria, an understanding of the environmental effects of the Project and the importance of those effects and the social consequences derived directly from them.

The Canadian Environmental Assessment Agency (CEA Agency) has prepared a reference guide to assist proponents and project reviewers in determining whether a project is likely to cause significant adverse environmental effects (FEARO, 1994b). This reference document was used for the Project EIA. Predicted

residual environmental effects are characterized in terms of the criteria recommended by the CEA Agency. These criteria include:

Magnitude of the Impact - "Magnitude refers to the severity of the adverse environmental effects. Minor or inconsequential effects may not be significant. On the other hand, if the effects are major or catastrophic, the adverse environmental effects will be significant. When using this criterion, it is important to consider the extent to which the project could trigger or contribute to any cumulative environmental effects."

Geographic Extent - "Localized adverse environmental effects may not be significant. Alternatively, widespread effects may be significant. When considering this criterion, it will be important to take into account the extent to which adverse environmental effects caused by the project may occur in areas far removed from it (e.g., acid rain and the long-range transportation of atmospheric pollutants), as well as contribute to any cumulative environmental effects."

Duration and frequency - "Long term and/or frequent adverse environmental effects may be significant. Future adverse environmental effects should also be taken into account. For example, many human cancers associated with exposure to ionizing radiation have long latency periods of up to 30 years. Obviously when considering future adverse environmental effects, the question of their likelihood becomes very important."

Degree to which the effects are reversible or irreversible - "Reversible adverse environmental effects may be less significant than adverse environmental effects that are irreversible. In practice, it can be difficult to know whether the adverse environmental effects of a project will be irreversible or not. It will be important to consider any planned decommissioning activities that may influence the degree to which the adverse environmental effects are reversible or irreversible."

Ecological context - "The adverse environmental effects of projects may be significant if they occur in areas or regions that have already been adversely affected by human activities; and/or are ecologically fragile and have little resilience to imposed stresses."

Environmental standards, guidelines, or objectives - "If the level of an adverse environmental effect is less than the standard, guideline, or objective, it may be insignificant. If, on the other hand, it exceeds the standard, guideline, or objective it may be significant."

The factors used to assess the predicted environmental effects of the Project are specific to the VECs for each biophysical or socio-economic component. For example, the assessment of environmental effects and determination of significance for each VEC that is population based (*e.g.* fish, wildlife, vegetation) may not be applicable for those VECs that are not population based (*e.g.* air quality, groundwater). This Application identifies potential adverse effects and the assessment of their significance is presented in detail in the respective sections of the Application. Where possible, the determination of significance makes reference to existing standards, guidelines or recognized thresholds (*e.g., Alberta Ambient Air Quality Objectives*).

D.3 EIA STEPS FOR THE PARSONS CREEK AGGREGATES PROJECT

The overall approach to conducting the EIA for the Project is shown in Table D.3-1 (Hegmann et al. (1999).

Table D.3-1 Environmental Assessment Framework	
Basic EIA Steps	**Tasks to complete for EIA**
1. Scoping	Identify regional issues of concern
	Select appropriate regional VECs
	Identify spatial and temporal boundaries
	Identify other actions that may affect the same VECs
	Identify potential impacts due to actions and possible effects
2. Analysis of Effects	Complete the collection of regional baseline data
	Assess effects of proposed action on selected VECs
	Assess effects of all selected actions on selected VECs
3. Identification of Mitigation	Recommend mitigation measures
4. Evaluation of Significance	Evaluate the significance of residual effects
	Compare results against thresholds or land use objectives and trends
5. Follow-up	Recommend regional monitoring and effect management

D.3.1 Scoping

The purpose of the scoping exercise was to identify issues of concern, the appropriate Project VECs, and the study area boundaries. Issues of concern were identified based on:

- Concerns expressed by stakeholders and the public including the scientific community, government departments and First Nations;
- EIA Terms of Reference;
- Review of legislation;
- Consideration of available reference material and literature;
- Previous assessment experience including proposed developments in the Project study areas; and
- Issues and concerns related to resources traditionally used by First Nations peoples were also considered.

Based on the evaluation of these issues, the Project VECs were identified. Generally, Project VECs were selected for analyses based on the extent of the interaction between the Project and the issue of concern. For some VECs, key questions were also developed to focus the assessment.

Throughout the EIA process, new VECs were identified and grouped into the appropriate resource discipline. Spatial and temporal boundaries for each resource discipline were established and other activities identified. A list of the VECs identified for the Project for each environmental discipline is presented in Volume 1, Part E and in Consultant Reports (#1 - #15) of this Application.

Analysis of Effect and Identification of Mitigation Measures

Baseline conditions for each resource were collected. Once baseline conditions for the resource were determined and Project activities were defined, an evaluation was carried out to determine whether environmental protection measures were required to mitigate impacts on the VEC. The evaluation considered those protection or mitigation measures that would be required to meet either regulatory, company or public acceptance during the planning, design, construction, operation and/or reclamation phases of the Project.

Evaluation of Significance

For all VECs except for socio-economic, predicted, residual Project-specific and cumulative effects were characterized using the criteria described in Part D.2. The type of effect was determined and the environmental component's sensitivity to and ability to recover from the impact was also considered by evaluating the geographic extent, duration, magnitude and reversibility of the impact resulting from Project activities. The evaluation criteria used for the Project is presented in

Table D.3-2. It should be noted that this table is general in nature but provides the details for the VEC tables. An example is shown in Table D.3-3. The detailed Consultant Reports provide further definition, where considered necessary, in order to assess the severity of the impact on the environmental component.

For all VECs, except for socio-economic, the severity of the predicted residual Project-specific and cumulative effect was rated as being either significant, or not significant. The determination of significance was made in reference to existing standards, guidelines or recognized thresholds where available. If the severity of the predicted residual effect was identified as significant, it was discussed and placed into perspective. Non-significant impacts were determined to be those residual effects:

- where the Project effect in combination with the existing baseline conditions does not result in the exceedance of established provincial or federal guidelines, thresholds or criteria;
- where the Project effect in combination with existing baseline conditions as well as future (disclosed) projects does not result in the exceedance of established provincial or federal guidelines, thresholds or criteria; or
- where the Project effect occurs to a population or species in a localized manner over a short period of time similar to natural variation or are reversible and have no measurable effects on the integrity of the population as a whole.

Table D.3-2 Parsons Creek Aggregates Evaluation Criteria for Assessing the Significance of the Environmental Impact of the Project

Criteria	Criteria Definition	
Geographic Extent of Impact	Local	Effects occurring mainly within or close proximity to the proposed development area.
	Regional	Effects extending outside of the project boundary to regional surroundings.
	Provincial	Effects extending outside of the regional surroundings, but within provincial boundary.

Table D.3-2 Parsons Creek Aggregates Evaluation Criteria for Assessing the Significance of the Environmental Impact of the Project

Criteria	Criteria Definition	
	National	Effects extending outside of the provincial surroundings, but within national boundary
	Global	Effects extending outside of national boundary.
Duration of Impact	Short	Effects occurring within development phase
	Long	Effects occurring after development and during operation of facility
	Extended	Effects occurring after facility closes but diminishing with time.
	Residual	Effects persisting after facility close for a long period of time.
Frequency	Continuous	Effects occurring continually over assessment periods.
	Isolated	Effects confined to a specified period (e.g. construction)
	Periodic	Effects occurring intermittently but repeatedly over assessment period (e.g. routine maintenance activities).
	Occasional	Effects occurring intermittently and sporadically over assessment period
	Accidental	Effects occurring rarely over assessment period.
	Seasonal	Effects occurring seasonally.
Ability for Recovery	Reversible in short-term	Effects which are reversible and diminish upon cessation of activities.
	Reversible in long-term	Effects which remain after cessation of activities but diminish with time.
	Irreversible - Rare	Effects which are not reversible and do not diminish upon cessation of activities and do not diminish with time.
Magnitude	Nil	No change from background conditions anticipated after mitigation.
	Low	Disturbance predicted to be somewhat above typical background conditions, but well within established or accepted protective standards and normal socio-economic fluctuations, or to cause no detectable change in ecological, social or economic parameters.
	Moderate	Disturbance predicted to be considerably above background conditions but within scientific and socio-economic effects thresholds, or to cause a detectable change in ecological, social or economic parameters within range of natural variability.
	High	Disturbance predicted to exceed established criteria or scientific and socio-economic effects thresholds associated with potential adverse effect, or to cause a detectable change in ecological, social or economic parameters beyond the range of natural variability.
Project Contribution	Neutral	No net benefit or loss to the resource, communities, region or province.
	Positive	Net benefit to the resource, community, region or province.
	Negative	Net loss to the resource, sites; access roads, communities, region or province.
Confidence Rating	Low	Based on incomplete understanding of cause-effect relationships and incomplete data pertinent to study area.
	Moderate	Based on good understanding of cause-effect relationships using data from

Table D.3-2 Parsons Creek Aggregates Evaluation Criteria for Assessing the Significance of the Environmental Impact of the Project		
Criteria	**Criteria Definition**	
		elsewhere or incomplete understood cause-effect relationship using data pertinent to study area.

Table D.3-3 Example Summary of Impact Significance on Valued Environmental Components (VECs)

VEC	Nature of Potential Impact or Effect	Mitigation/ Protection Plan	Assessment Case Effect	Geographical Extent of Impact or Effect[1]	Duration of Impact or Effect[2]	Frequency of Impact or Effect[3]	Ability for Recovery from Impact or Effect[4]	Magnitude of Impact or Effect[5]	Project Contribution[6]	Confidence Rating[7]	Probability of Impact or Effect Occurrence[8]	Significance[9]
1. List the VEC												
			Application Case									
			CEA Case									
2. List the VEC												
			Application Case									
			CEA Case									
3. List the VEC												
			Application Case									
			CEA Case									
4. List the VEC												
			Application Case									
			CEA Case									
5 List the VEC												
			Application Case									
			CEA Case									

1. Local, Regional, Provincial, National, Global
2. Short, Long, Extended, Residual
3. Continuous, Isolated, Periodic, Occasional, Accidental, Seasonal
4. Reversible in short term, Reversible in long term, Irreversible – rare
5. Nil, Low, Moderate, High
6. Neutral, Positive, Negative
7. Low, Moderate, High
8. Low, Medium, High
9. Not significant, Significant

D.4 APPLICATION OF THE METHODOLOGY

Based on the methodology described above, the EIA and CEA for the Parsons Creek Aggregates Project focused on the effects that the Project would have on the identified VECs in combination with other activities in the region over the projected life (40 years) of the Project. Based on the input received during the public involvement program, advice from regulatory agencies, and the professionals working on the Project, PCA is confident that the methodology and approach used to conduct the EIA and CEA has resulted in a comprehensive and accurate assessment of the effects of the PCA Project. The effects of the Project on the VEC categories are presented in detail in the respective sections of the Application as well as the specific Consultant Reports in the appendices.

D.5 EIA TERMS AND ABBREVIATIONS

A glossary of terms and abbreviations used in this Application is provided in Volume 1, Appendix 2 of this Application. Additional definitions are also provided, relating to specific assessments, in the supporting Consultant Reports (#1 - #15) appended as part of this integrated application document.

D.6 REFERENCES

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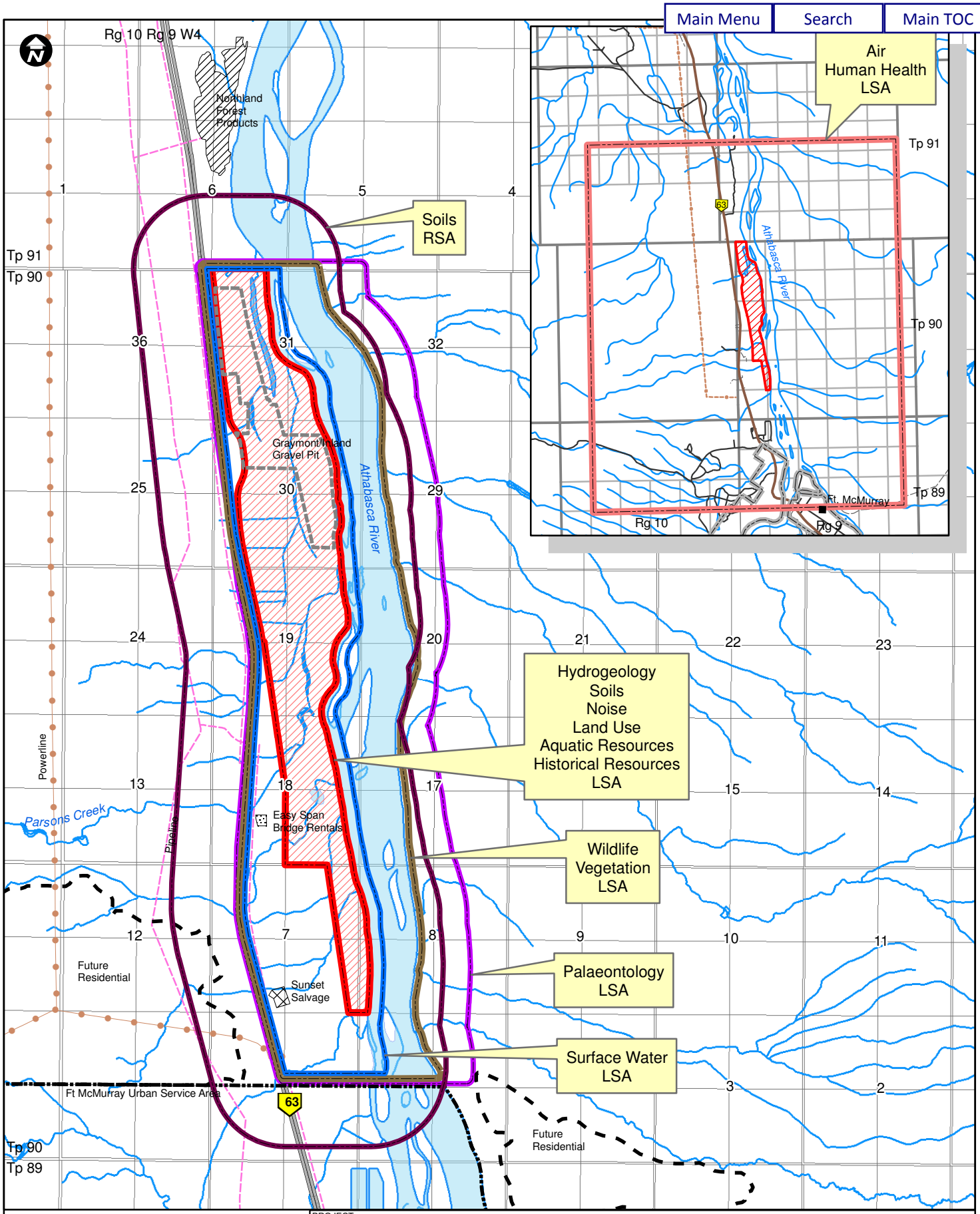


Legend

Project Area

0 0.5 1 2

Kilometres

PROJECT:

Parsons Creek Aggregates Project

Parsons Creek Aggregates

a joint venture between Graymont Western Canada Inc. & Lehigh Hanson Materials Limited

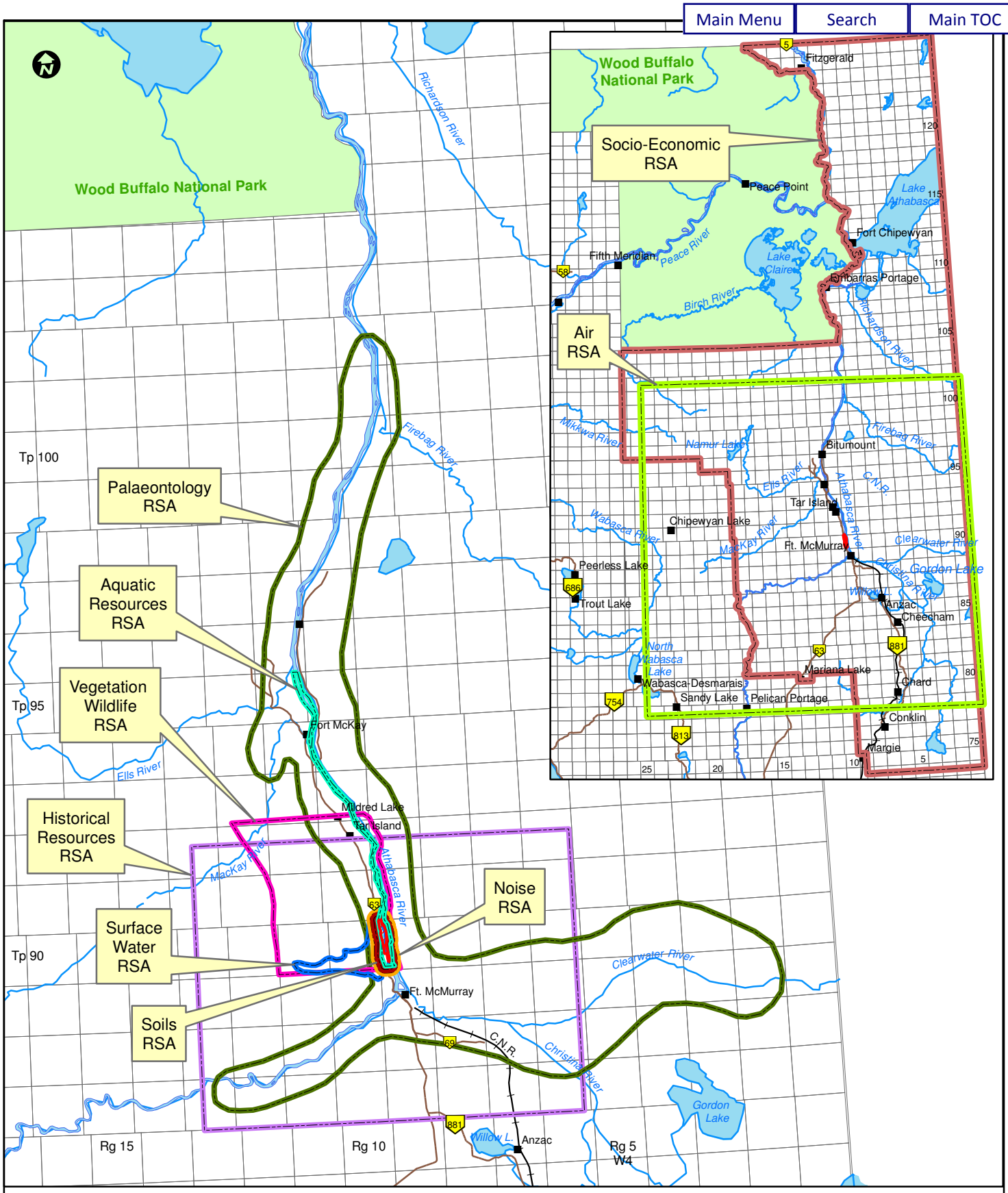
TITLE:

Study Areas - Local Map

DRAWN:	PS
CHECKED:	BJV
DATE:	Jan 5/09
PROJECT:	09-149

FIGURE:

D.2.3-1



Legend

Project Area

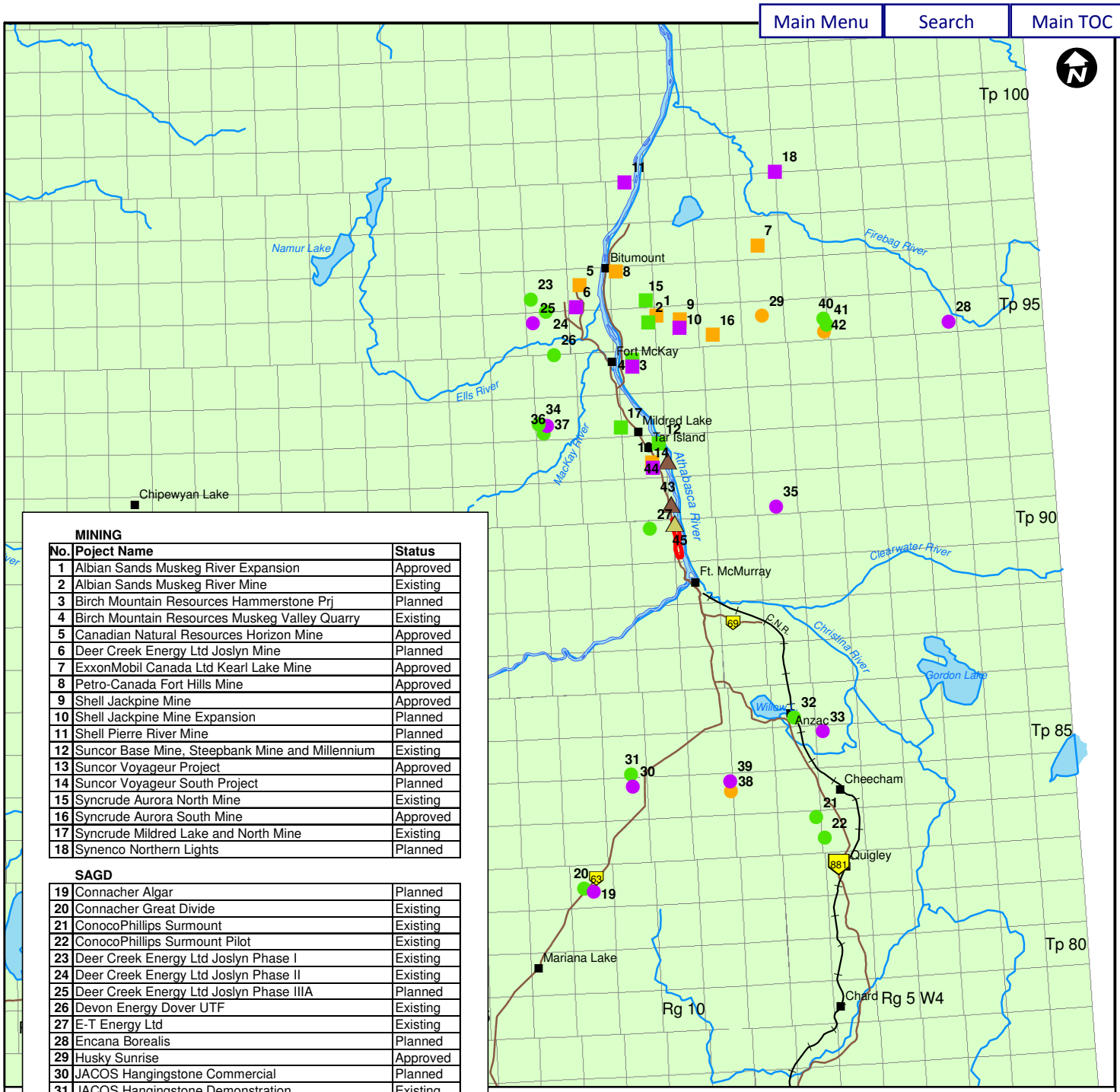
PROJECT:
Parsons Creek Aggregates Project

Parsons Creek Aggregates
a joint venture between Graymont Western Canada Inc. & Lehigh Hanson Materials Limited

TITLE:
Study Areas - Regional Map

DRAWN:	PS
CHECKED:	CC
DATE:	May 18/10
PROJECT:	09-149

FIGURE:
D.2.3-2



MINING

No.	Poject Name	Status
1	Albian Sands Muskeg River Expansion	Approved
2	Albian Sands Muskeg River Mine	Existing
3	Birch Mountain Resources Hammerstone Prj	Planned
4	Birch Mountain Resources Muskeg Valley Quarry	Existing
5	Canadian Natural Resources Horizon Mine	Approved
6	Deer Creek Energy Ltd Joslyn Mine	Planned
7	ExxonMobil Canada Ltd Kearl Lake Mine	Approved
8	Petro-Canada Fort Hills Mine	Approved
9	Shell Jackpine Mine	Approved
10	Shell Jackpine Mine Expansion	Planned
11	Shell Pierre River Mine	Planned
12	Suncor Base Mine, Steepbank Mine and Millennium	Existing
13	Suncor Voyageur Project	Approved
14	Suncor Voyageur South Project	Planned
15	Syncrude Aurora North Mine	Existing
16	Syncrude Aurora South Mine	Approved
17	Syncrude Mildred Lake and North Mine	Existing
18	Synenco Northern Lights	Planned

SAGD

19	Connacher Algar	Planned
20	Connacher Great Divide	Existing
21	ConocoPhillips Surmount	Existing
22	ConocoPhillips Surmount Pilot	Existing
23	Deer Creek Energy Ltd Joslyn Phase I	Existing
24	Deer Creek Energy Ltd Joslyn Phase II	Existing
25	Deer Creek Energy Ltd Joslyn Phase IIIA	Planned
26	Devon Energy Dover UTF	Existing
27	E-T Energy Ltd	Existing
28	Encana Borealis	Planned
29	Husky Sunrise	Approved
30	JACOS Hangingstone Commercial	Planned
31	JACOS Hangingstone Demonstration	Existing
32	Nexen Inc/Opti Canada Inc Long Lake	Existing
33	Nexen Inc/Opti Canada Inc Long Lake 2	Planned
34	Petro-Canada Dover UTF	Existing
35	Petro-Canada Lewis	Planned
36	Petro-Canada McKay River	Existing
37	Petro-Canada McKay River Expansion	Planned
38	Petro-Canada Meadow Creek	Approved
39	Petro-Canada Meadow Creek Expansion	Planned
40	Suncor Firebag	Existing
41	Suncor Firebag ETS Phases 1&2	Existing
42	Suncor Firebag Expansion	Approved

OTHER

43	Northlands Forest Products Sawmill	Existing
44	Williams Energy Canada Chemical Plant	Existing
45	Graymont/Inland Gravel Pit	Approved

Legend

Project Area

Project Type

- Mining - Existing
- Mining - Approved
- Mining - Planned
- SAGD - Existing
- SAGD - Approved
- SAGD - Planned
- Other - Existing
- Other, Approved

0 10 20 40

Kilometres

PROJECT:

Parsons Creek Aggregates Project

Parsons Creek Aggregates

a joint venture between Graymont Western Canada Inc. & Lehigh Hanson Materials Limited

TITLE:

Activities Considered in the Cumulative Effects Assessment

DRAWN:	PS
CHECKED:	DW
DATE:	Jan 5/09
PROJECT:	05-051

FIGURE: **D.2.4-1**