HISTORICAL RESOURCES BASELINE and Phase 1 Assessment

CONNACHER OIL AND GAS LIMITED
GREAT DIVIDE SAGD EXPANSION PROJECT

Prepared For

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1.0 INTRODUCTION

This document provides a summary of baseline information available for the Great Divide SAGD Expansion Project (the "Project"), located approximately 70 km southwest of Fort McMurray. The Project will result in the expansion of the existing Great Divide (Pod One) SAGD Project (located on the west side of Highways 63) with the existing Algar (Pod Two) SAGD Project (located on the east side of Highway 63), and increase the total production to 44,000 bbl/d. The project will be developed in phases, with decommissioning expected to be complete by 2039. The currently proposed project footprint is illustrated in Figure 1.

1.1 HISTORICAL RESOURCES

In Alberta, historical resources are protected under the Historical Resources Act (RSA 2000) and are defined as precontact, historic, and palaeontological sites and their contents. Traditional Use sites may also be associated with historical resources. Precontact sites are comprised of artifacts, features and residues of native origin. They predate the arrival of Europeans and are typically characterized by modified bone and stone artifacts, as well as stone features or structures. Historic sites are characterized by structures, features, and objects of European influence. Buildings and building remains represent the most prominent type of historic sites. Palaeontological sites are areas where fossils of ancient animals or plants have been

preserved. Palaeontological sites include only those sites which contain fossils of multicellular invertebrates, vertebrates, and plants. Traditional use sites are identified in consultation with members of Aboriginal groups, and may comprise camping or hunting locales, plant collection locations or areas related to matters of a spiritual nature.

Because the cultural milieu in which historic resources functioned no longer exist, these resources are non-renewable. Although the cultures responsible for depositing historical resources cannot be observed, the preserved context and associations related to the remains can reveal much about past human behaviour, adaptations, and relationships. Many facets of these resources—particularly patterns of cultural deposition (observable in an undisturbed context)—are fragile, ephemeral, and the product of unique processes and conditions of preservation. Therefore, site integrity (e.g., an undisturbed state) is important for interpreting the remains. Once a site is disturbed, context cannot be replaced, recreated, or restored.

2.0 METHODOLOGY

Four components were included in the 2010 baseline studies: 1) determination of study areas, 2) update site data, 3) review of existing literature and data, and 4) analysis and assessment.

2.1 STUDY AREA BOUNDARIES

Study area boundaries are based on the potential for Project effects to historical resources. For the Great Divide SAGD Expansion Project, the following study areas were defined:

- The Project footprint represents the area most relevant to historical resources given that impact to historical resources is based on surficial and near-surface disturbance as a direct result of the project.
- The Project Area has been defined by Connacher as the entire lease area. This is also the historical resources Local Study Area (LSA), given that any potential future changes to the project footprint would occur within this area.
- The Regional Study Area (RSA) for historical resources has been defined as an area that includes the LSA and encompasses a larger area within which cultural continuity is expected in the archaeological and historic record. For the current project, the RSA is bounded generally by the Athabasca and Clearwater Rivers on the north, the Athabasca River on the west, Gordon

Lake and Birch Lake on the east, and Christina Lake on the south. The RSA is based on the borden block designation system. Identified archaeological sites are referred to by a Borden Number which consists of a four letter symbol accompanied by a number (e.g., LdNs-11). Within this system and north of latitude 62°, the upper case letters represent major blocks 2° by 4° in size (e.g., L = 64° to 66° latitude; N = 104° to 112° longitude) and the lower case letters denote 10' and 20' units within the major block (e.g., d = 30' to 40' latitude; s = 0' to 20' longitude). The numbers are assigned sequentially by the appropriate regulatory agency and refer to specific sites within each Borden Block unit. Historic period sites may or may not be assigned Borden Numbers by the regulators depending on the nature of the site.

2.2 UPDATED SITE FILE SEARCH

For the updated site file search, data on file at Alberta Culture and Community Spirit (ACCS) was acquired and reviewed to determine the number and nature of previously recorded sites in the general project area and within the RSA. The *Listing of Historical Resources* (March 2010 Edition) was also consulted to determine the Historical Resources Value (HRV) of the lands located within the Project Area.

2.3 REVIEW OF EXISTING LITERATURE AND DATA

A model of archaeological potential was previously developed for earlier historical resources studies carried out on the proposed Great Divide (Pod One) and Algar (Pod Two) projects (Youell 2008, 2009a, 2009b). The model was based on factors that are indicative of archaeological potential, including ecosite data, distance to watercourses, slope, aspect, and proximity to known historical resources sites. The proposed Project footprint was reviewed relative to this model, and the locations of previous assessment (shovel tests) and known historical resources sites were plotted.

Subsequent to completion of the site file search, some literature review was completed to provide the archaeological and historical context for the area and to determine whether significant and/or sensitive historical resources sites may be present in the Project area. Review of the previous HRIA reports prepared for earlier stages of study (Youell 2006, 2008, 2009a, 2009b) were the main focus of the

review. In addition, the Traditional Knowledge and Traditional Land Use Report for the Project was also reviewed to identify any traditional land use sites that may also be considered historical resources (Connacher 2010; Appendix 7).

A review of the palaeontological potential of the area was also undertaken. The review was completed using the following data sources:

- a 1:500,000 bedrock geology map (Carrigy and Green 1970)
- a 1:250,000 surficial geology map (Bayrock and Reimchen 1974)
- a 1:400,000 drift thickness map, with associated geological cross section (Andriashek and Meeks 2000)

These maps were used to determine the bedrock and surficial geology of the project area, and the thickness of surficial deposits.

2.4 ANALYSIS AND ASSESSMENT

Project activities can affect historical resources by altering a site's contents or context. To assess potential effects of the Project on historic resources, the scientific significance of identified sites must be determined. Factors affecting site significance include site integrity, size, complexity, presence of diagnostic or uncommon artifacts, and age. Recommendations are subsequently formulated as to the need for further work based on the perceived significance of the identified archaeological and historic sites as determined by the Project archaeologist based on the above listed factors. Actual requirements for additional site-specific study, however, are issued by ACCS.

Subsequent to assessment of site specific data, assessment and recommendations relative to the project were formulated. The site file search, literature review, mapped data and model of archaeological potential were used to assign archaeological potential to the terrain associated with the proposed Project, and to determine assessment coverage of previous studies. Subsequently, recommendations were formulated as to the need for additional field studies relative to historical resources.

3.0 RESULTS

3.1 SITE FILE SEARCH

The site file search revealed that the Project Area lies within portions of Archaeological Borden Blocks HaOv, HaOw, HaOx, HbOw and HbOx (Figure 2). Borden Blocks HaOv, HaOx and HbOx do not contain any previously recorded historical resources sites. Block HaOw contains a single site, the historic Algar Tower, which is located within the Project Area. Block HbOw contains two precontact archaeological sites, including one isolated artifact find with low heritage value, and one subsurface artifact scatter with high heritage value. Both of these precontact sites are located outside of the Project Area; however, the identification of a site with high heritage value within proximity of the project illustrates that the area does have the potential to contain significant archaeological sites.

Within the RSA, a total of 68 historic period sites are on record, and 96 precontact archaeological sites have been recorded. Historic site types recorded include cabins, campsites, posts, well sites, mills, towers, settlements, dwellings, chapels, cemeteries, trails and Indian Reserves. Precontact archaeological sites types on record within the RSA include isolated artifact finds, artifact scatters, lithic workshops and campsites. Many of these sites are of high heritage value.

The greatest concentration of sites is located northeast of the Project Area, around Gregoire Lake and south of the lake generally extending along the railroad and Highway 881. A number of sites are also present along the Athabasca River, which

would have been a major focal point for subsistence and travel in both precontact and historic period times. Lakes and major water courses are often considered to be of high potential for historical resources, and precontact and historic period sites tend to be identified more frequently in these areas. Hinterland areas away from major watercourses, such as the Great Divide SAGD Expansion Project Area, tend to have fewer sites and smaller sites; however, the presence of high value sites in other hinterland areas (such as the high value site recorded just north of the Great Divide Expansion project area) illustrates that high value sites does occur in hinterland areas.

Note also from Figure 2 that clusters of sites are present in other areas, away from lakes and watercourses. The presence of recorded sites is often a factor of development-related studies as well as terrain features, and the grouping of sites in Figure 2 is also reflective of this.

The most recent *Listing of Historical Resources* (March 2010 edition) lists no sections with Historical Resource Values (HRV) within Townships 83, 84 and 85, Ranges 11 and 12, West of the 4th Meridian. The lack of any sections on the current *Listing of Historical Resources* within proximity of the Project is due partially to the limited number of previous historical resources studies conducted in the area, and due partially to the overall low archaeological potential of the area.

3.2 ARCHAEOLOGICAL OVERVIEW

The proposed Project lies within the boreal forest culture area; cultural materials from the southern boreal forest share characteristics with the northern plains as well as with the northwestern boreal forest and the adjacent barrenlands to the northeast. Consistencies in cultural materials and dates in these areas bear witness to the movements and cultural influences between these zones through time.

Although numerous studies have been undertaken to the northeast of the study area in the Athabasca Oil Sands region north of Fort McMurray, the cultural chronologies that have been established for that area are not anticipated to be similar to the Project study area due to the differing resource base between these two areas. Very few studies have taken place within north-central Alberta in which the Project is situated, and the studies that have been undertaken have generally been small in

scale and not extensive in terms of coverage, given the nature of the SAGD and linear project footprints that characterize this region. As such, little is known about the precontact cultural sequences of this region.

In general in Alberta, the cultural sequence of the precontact era is segmented into three periods: the Early Period, the Middle Period, and the Late Period. The boundaries between these periods are recognized by changes in trends in projectile point styles, as well as other technological innovations of introductions and general economic orientations. Although this model is used by archaeologists mainly for the Plains area, it is often extended to the Subarctic cultural region to the north.

3.3 PREVIOUS STUDIES

Four previous studies have been conducted for Connacher's Great Divide and Algar Projects, including an assessment of the Great Divide Airstrip Project (Youell 2006) as well as assessments of various proposed footprints for both the Great Divide and Algar Projects (Youell 2008, 2009a, 2009b). For each of these projects, permit applications to conduct the field studies were submitted to ACCS; permit applications included project background, footprint, and outlined methodology for conducting the studies. ACCS approved each of these permit applications and issued Archaeological Permits 2006-642, 2007-251, 2008-292, and 2008-305.

As these then-proposed projects were small in size and were not the subject of Environmental Impact Assessment (EIA) studies, HRIAs were not required by ACCS; however, the client chose to conduct the studies as part of a risk management strategy. Although a requirement letter for the Great Divide Expansion Project has not been issued by ACCS, projects that are subject to EIAs require HRIA studies. HRIA studies have effectively been completed for a significant portion of the Project as a result of previous historical resources studies.

These studies focused largely on then-proposed project footprints but also included assessment of some neighbouring areas with higher archaeological potential. No precontact period archaeological sites were identified during these studies. One previously recorded historic period site, the Algar Tower, was documented during the assessment of the Great Divide Airstrip.

3.4 MODEL OF ARCHAEOLOGICAL POTENTIAL

As part of the 2007 and 2008 studies, a model of archaeological potential was developed using Geographic Information System (GIS). The model was developed in order to determine the relative ranking of terrain features in terms of the potential to identify precontact archaeological sites.

During field studies in 2007 and 2008, a number of areas of moderate to high archaeological potential were tested within the then-proposed project footprint. Although no historical resources sites were identified during these field studies, the potential for archaeological sites to be present, based on landform and terrain features, was largely considered to be accurately reflected in the map of archaeological potential produced, based on observations and results from other projects in the general oil sands region. The model of archaeological potential is illustrated in Figure 3. Overall the potential of the area is low to moderate, although some areas of high potential are present within the lease. Large tracts of water saturated terrain are present, and there is no potential for the identification of archaeological resources within these areas, but elevated landforms are present; elevated areas located along streams are of the highest potential.

3.5 PALAEONTOLOGICAL POTENTIAL

The project area is low lying and wet, underlain by bedrock of the Cretaceous Labiche Formation (Carrigy and Green 1970). The Labiche Formation is a sparsely fossiliferous marine shale with moderate palaeontological potential. The bedrock is blanketed in extremely thick surficial deposits, ranging from more than 180 m thick in the southeastern corner of the lease area, to a minimum of 90 m thick in the northern part (Andriashek and Meeks 2000). This huge thickness of till resulted from infilling of the palaeo-Conklin Channel. Surficial deposits consist mainly of glacial till (Kinosis Till) with rare pockets of outwash sand and large areas covered in recent organic deposits (Bayrock and Reimchen 1974).

Project development is not expected to disturb bedrock at the surface, nor is it expected to intersect surface surficial deposits with palaeontological potential. The likelihood of project impacts to significant palaeontological resources is considered

negligible. No further palaeontological studies are recommended.

3.6 TRADITIONAL LAND USE

A review of the draft Traditional Knowledge and Traditional Land Use report prepared for the Project (Connacher 2010, Appendix 7) indicates that all groups consulted in the study have traditionally used and traveled through the general area within which the project is located. One member of Fort McMurray Metis Local 1935 indicated that she has a cabin near the project area; however, historical resources studies for the project were all conducted within the Project Area only. One member of Fort McMurray First Nation indicated that his trap cabin used to be located just off the airstrip near the old Algar Fire Tower, but that the cabin burned down in a forest fire. This location puts the cabin within the Project Area, but no cabin remains were observed during any of the historical resources studies conducted for the Project, including the 2006 assessment of the airstrip. It appears that fire has destroyed this cabin; no physical evidence associated with this cabin appears to be present.

3.7 ANALYSIS AND ASSESSMENT

Figure 3 illustrates the model of archaeological potential, the project footprint, the location of previously recorded historical resources sites, and the locations of shovel tests excavated under previous studies. A single known historical resource site is on record within the Project Area. The historic Algar Tower was originally located near the airstrip. The HRIA study conducted on the proposed airstrip expansion (Youell 2006) recommended that no further study be required on the Algar Tower as fire had previously destroyed all historic components of this site; only contemporary (non-historic) components of the Algar Tower were observed during that study. The Algar Tower was subsequently moved to another location.

A relatively significant number of shovel tests have been excavated east of Highway 63 within proximity of the Phase 1 footprint. Assessment coverage of the Phase 1 footprint is considered to be relatively thorough given the potential of the area, particularly given that no historical resources sites were identified during previous studies.

The Phase 2 footprint that extends to the southeast of the Phase 1 area has not been assessed and includes some areas with archaeological potential, particularly at two stream crossings. Similarly, the Phase 3 footprint has also generally not been assessed, including pads and pipelines at the southeast portion of the lease, as well as locations on the west side of Highway 63. Additional assessment of the Phase 2 and 3 footprints is deemed necessary.

3.8 RECOMMENDATIONS

Given the nature and scope of assessment of terrain features within proximity of the Phase 1 footprint, it is recommended that sufficient historical resources studies have been undertaken. No known historical resources sites will be impacted, and the potential for unknown sites to be impacted is deemed to be low. No additional studies related to Phase 1 are recommended. Connacher is seeking clearance for the Phase 1 area of development.

The Phase 2 and Phase 3 footprints both contain some areas with moderate to high archaeological potential that have not been assessed, particularly in the southeastern part of the lease, and on the west side of Highway 63. Because of the potential for these uninvestigated areas to contain historical resources sites, it is recommended that an HRIA be conducted on the Phase 2 and 3 project footprints before construction of these Phases is initiated.

Project development is not expected to disturb bedrock at the surface, nor is it expected to intersect surface surficial deposits with palaeontological potential. The likelihood of project impacts to significant palaeontological resources is considered negligible. No further palaeontological studies are recommended.

4.0 REFERENCES CITED

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Connacher

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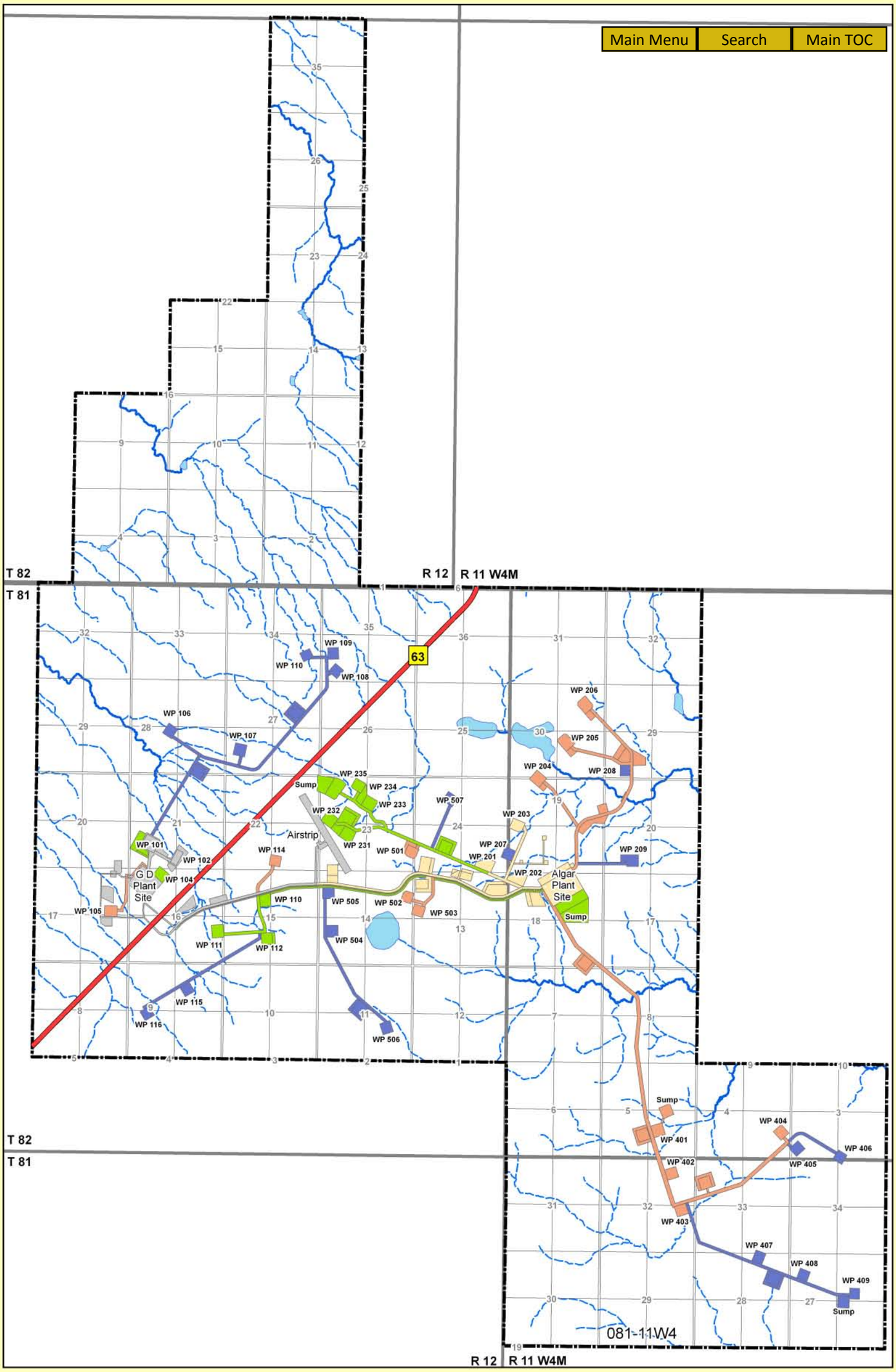
Youell, A. J.
2009b *Historical Resources Impact Assessment Final Report Connacher Oil and Gas Limited Great Divide SAGD Expansion Project, Permit 2008-305*. Consultant's report prepared by FMA Heritage Resources Consultants Inc. for Millenium EMS Solutions on behalf of Connacher Oil and Gas Limited. Report on file, Historic Resources Management Branch, ACCS.



LEGEND

- Lease Boundary
- EIA Phase 1
- EIA Phase 2
- EIA Phase 3
- Algar Existing
- Great Divide Existing

N

0 0.5 1 1.5 2

Kilometers

Data Source:
ESRI Canada
Reference:
D. Loucks Consulting Drifter Projects Ltd.
EIA Master Plan Rev 5. 27Oct09

Great Divide Expansion Project

PREPARED FOR		PREPARED BY	
CONNACHER OIL AND GAS LIMITED		FMA HERITAGE INC.	
SPATIAL REFERENCE		DATUM	SCALE
UTM Zone 12		NAD 83	1:75,000
DRAFT DATE	DRAWN BY	PROJECT	PERMIT
2010/04/07	KW	192409.OV	N/A
REVISED DATE	REVISED BY	FILE	
2010/04/07	KW	H:\Drafting\1900s\1924\mxd\03 192409_OV_GreatDivide_EIA_v1.mxd	

Figure 1 Great Divide Expansion Project

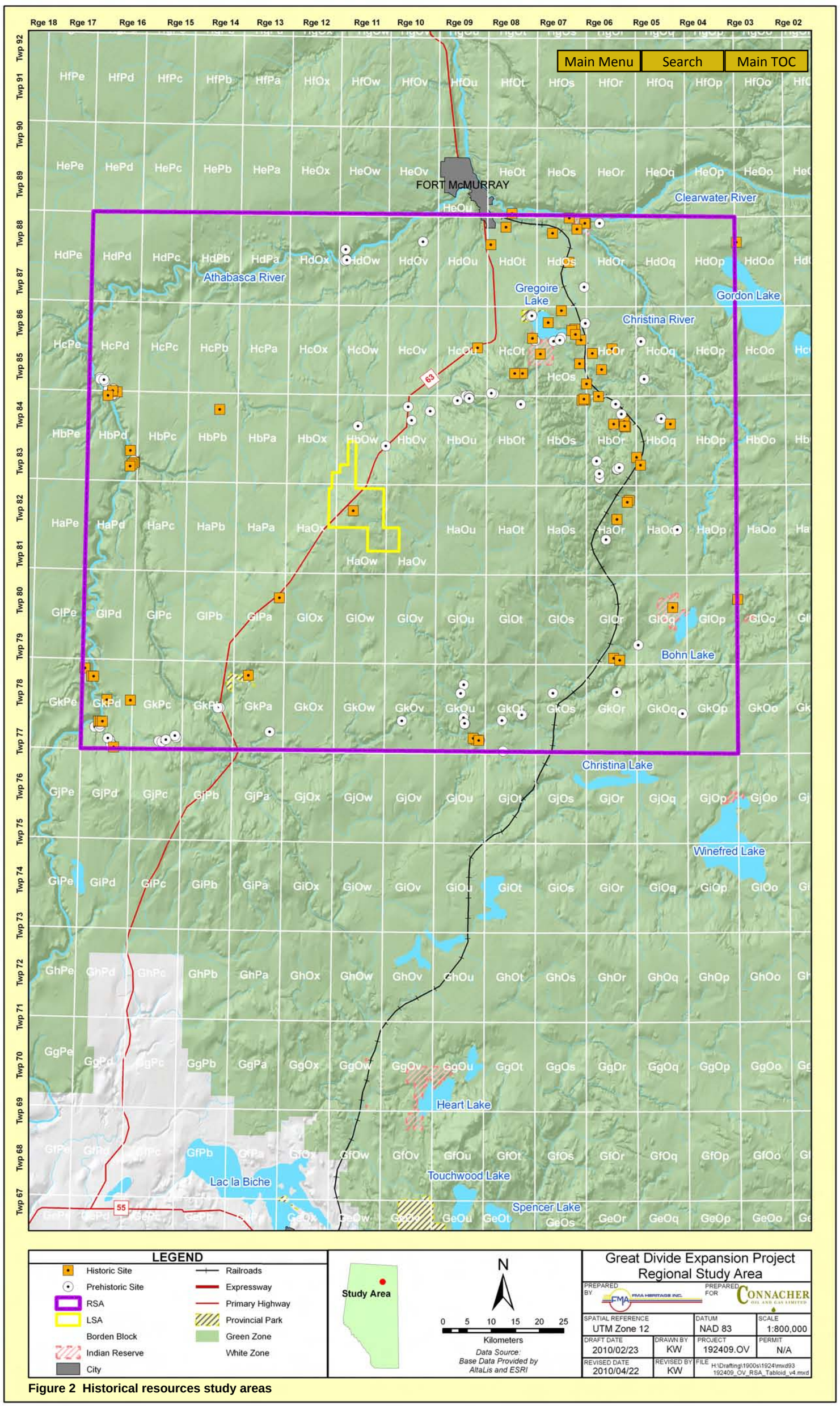


Figure 2 Historical resources study areas

084-12W4

084-11W4

083-12W4

083-11W4

082-11W4

082-12W4

081-12W4

081-11W4

Algar Forestry Tower

447,000 448,000 449,000 450,000 451,000 452,000 453,000 454,000 455,000 456,000 457,000 458,000 459,000 460,000 461,000

6,234,000 6,233,000 6,232,000 6,231,000 6,230,000 6,229,000 6,228,000 6,227,000 6,226,000 6,225,000 6,224,000 6,223,000 6,222,000 6,221,000 6,220,000 6,219,000 6,218,000 6,217,000 6,216,000 6,215,000 6,214,000 6,213,000 6,212,000 6,211,000

LEGEND

- Shovel Test Location (2008)
- Shovel Test Location (2007)
- Shovel Test Location (2006)
- Historic Site
- LSA
- EIA Phase 1
- EIA Phase 2
- EIA Phase 3
- Algar Existing
- Great Divide Existing

Archaeological Potential

- Low
- Low-Moderate
- Moderate-High
- High
- Wetland/ Muskeg

Study Area

N

0 0.75 1.5 2.25 3

Kilometers

Data Source: ESRI Canada

Model Created by FMA Heritage Inc.

Great Divide Project Area Archaeological Potential

PREPARED FOR	PREPARED BY		
CONNACHER OIL AND GAS LIMITED	FMA HERITAGE INC.		
SPATIAL REFERENCE	DATUM	SCALE	
UTM Zone 12	NAD 83	1:75,000	
DRAFT DATE	DRAWN BY	PROJECT	PERMIT
2009/09/21	KW	192409.OV	N/A
REVISED DATE	REVISED BY	FILE	
2010/04/22	KW	H:\Drafting\1900s\1924\mxd93 192409_OV_model_GreatDivide_75_v5.mxd	

Figure 3 Model of archaeological potential, site locations, and shovel test locations