

**HISTORICAL RESOURCES IMPACT ASSESSMENT
PENGROWTH LINDBERGH SAGD EXPANSION
SUMMARY REPORT**

**For Inclusion in the
Technical Application and Environmental Impact Assessment Report**

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HISTORICAL RESOURCES

1. INTRODUCTION

Pengrowth Energy Corporation (Pengrowth) is proposing to develop the Lindbergh SAGD Expansion Project (the Project), which will expand bitumen production of the Lindbergh SAGD Project (Phase 1) from 1,987 m³/day (12,500 barrels per day (bpd)) to 4,770 m³/day (30,000 bpd).

The Project is approximately 24 km southeast of Bonnyville within St. Paul County No. 19 and the Municipal District of Bonnyville No. 87. All facilities will be located within Townships 58 and 59 and Ranges 4 and 5, West of the 4th Meridian.

This summary report presents a summary of the Historical Resources Impact Assessment (HRIA) undertaken in 2013 as part of the Environmental Impact Assessment (EIA) for the Project. The HRIA meets Alberta Environment and Sustainable Resource Development (ESRD) Terms of Reference (TOR) for the Project, the requirements of the Alberta *Historical Resources Act* (1980), and the associated Regulations and Guidelines administered through Alberta Culture (Culture). Due to the sensitive nature of some information in the HRIA, it has been filed under separate cover to Alberta Culture and this summary document has been included in the application to satisfy the final Project Terms of Reference.

The TOR specific to the HRIA being conducted as part of the EIA for the Project include:

4 HISTORIC RESOURCES

a. 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.

b. 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.

Historical Resources, as defined by the Alberta Historical Resources Act, include natural or cultural works that are of value for archaeological, palaeontological, historic, scientific, or aesthetic interest. Archaeological resources are objects, structures, or groups of objects created by people. Archaeological resources are usually divided into two major descriptive chronological categories; Precontact, being material of Aboriginal manufacture dating to a time before the arrival of Europeans in Alberta, and Post-Contact, being any material dating to the more recent past (i.e. after the arrival of Europeans in Alberta). The Precontact Period is further divided into Early Precontact (pre- 7,500 years before present (BP)), Middle Precontact (7,500 BP to 1,200 BP), and Late Precontact (1,200 BP to ca. 300 BP). Archaeological sites may also be: multicomponent, containing materials representing different time or cultural periods; or single component, resulting from one single occupation. Palaeontological resources are works of nature consisting of, or containing evidence of, extinct plants and animals.

Historical Resource Impact Assessments for specific development projects are conducted under a permit issued by the Archaeological Survey of Alberta, part of the Historical Resource Management Branch of Alberta Culture. The permit for HRIA work associated with the Project was issued based upon review of a Statement of Justification (SoJ) and Historic Resources clearance application (submitted by Lifeways on Pengrowth's behalf on September 24th, 2013). This SoJ resulted in the issuance of "HISTORICAL RESOURCES ACT (HRA) REQUIREMENTS 4750130012-001 (Schedule A)" by Alberta Culture ([Appendix A](#)). The Schedule A details the requirements, objectives and constraints under which HRIA work must operate. It does not require a palaeontological Impact Assessment and does not specifically require First Nations consultation, but does require a pre-impact archaeological HRIA. Permit # 13-226 to conduct the pre-impact HRIA for the Lindbergh SAGD Expansion Project was granted on October 10th, 2013, and all fieldwork was completed by October 28th, 2013. Alberta Culture will review the results of HRIA studies, and may issue subsequent requirements or development clearance based upon these results.

2. OBJECTIVES, ISSUES AND ASSESSMENT CRITERIA

2.1 HRIA Objectives and Issues

The fundamental goals of HRIA studies are the identification and the assessment of historical resources in the development area. HRIA goals include the relocation of previously recorded sites, and the discovery of new sites. Assessment is based on a variety of criteria as discussed in [Section 2.2](#).

Objectives for EIA-related HRIA studies are somewhat more complex than for non-EIA HRIA programs. Normally an HRIA examines a well-established development footprint that is unlikely to change. However, for EIA related HRIAs, footprints may be unavailable, incomplete, or only preliminary in nature. Consequently, besides addressing areas of anticipated impact, the HRIA must also develop a suitable level of baseline information that permits the adequate assessment of Historic Resource potential against future developments associated with the Project.

Just as individual artifacts compose a site, all archaeological sites exist as parts of a greater complex of past human settlement and behaviour, which is theoretically definable in terms of time and space. Due to natural decay, burial, and post-deposition disturbance, however, sites contain an incomplete record of that behaviour. The basic processes of human mobility and resource utilization will always be expressed as an interrelated matrix of archaeological sites, in which no individual site is representative of the whole. Since the original context is not known, especially in the case of Precontact Aboriginal sites, archaeological data are cumulative. Archaeological knowledge is created only through interpretation.

Unlike many EIA level assessments, the Lindbergh site encompasses existing infrastructure and includes projected development plans consisting of “Initial” and “Future” development. These plans are provisional in nature and may be subject to considerable change. The “Initial” development, which is relatively modest in scope and largely limited to the area around the existing Pengrowth facilities (Figure 2.1). The “Future” phase includes extensive developments to the south, west, east and northeast of the existing facilities (Figure 2.1).

2.2 Assessment Criteria

HRIA studies are designed to assess historical resource sites in terms of site type, size, age, condition, and archaeological/historical significance with respect to the proposed development. Site type refers to the function that the site played in past human settlement systems. Precontact archaeological sites in the region are usually one of four types, depending on the nature of the artifacts recovered from them. **Isolated finds** are sites from which only one artifact is recovered. **Lithic (chipped stone) scatters** are those sites dominated by stone flakes and other debitage, with little evidence of formed tools and other domestic activities; they may be classed as **Large** or **Small** depending upon number of artifacts observed. **Lithic workshops** are those sites that contain some evidence of stone tool manufacture other than simply flakes. A workshop is usually identified by the presence of cores or core fragments, or partially manufactured tools. **Campsites** are those sites that contain formed tools and/or fire-broken rock and fragmentary animal bone indicating a longer-term occupation of the area with multiple domestic activities taking place. Hide scrapers and cutting tools, hearth and lodge features, and other remains are usual indicators of campsite occupations. Although not common in this region, sites may also be identified as **kill sites** if they contain animal bones and hunting tools.

The determination of **site size** at this stage in archaeological investigations is based on the horizontal spread of positive shovel tests (those containing archaeological material), surface finds and/or the extent of the landform. An estimation of the age of sites is based on comparisons with other

archaeological sites in the region. Some chipped stone tools are known to change stylistically over time in certain ways and their presence in archaeological sites is diagnostic of certain periods or cultures.

Site condition refers to the existing condition of the site as it is encountered, either disturbed in an exposure or undisturbed in a buried context. Some portions of Historic sites, particularly structures, may exist in surface deposits but also remain undisturbed.

The determination of **significance or interpretive potential** is the most important and most complex valuation in the assessment process. This evaluation is also flexible, depending on the relationship of the resources to specific developments. As outlined in the *Guidelines for Archaeological Permit Holders in Alberta* (Alberta Culture and Multiculturalism, 1989); “The key step involved in the estimation of scientific significance – and it is far too frequently overlooked – is that of developing arguments that warrant the position being adopted.” At the HRIA level, assessment is based on four site characteristics, all valued with respect to known sites in the region. These characteristics include location, size, age, and internal site structure.

The **site location** category includes the position of the site relative to landforms and geomorphological processes as well as its location with respect to other sites in the study area. **Site size** as an assessment category is self-explanatory, but there is no direct correlation between site size and significance. Sometimes small sites are more significant than larger sites. The **age** of sites is often difficult to determine and again, there is no direct correlation between age and significance. **Internal site structure** includes the variety, density and distribution of artifacts and features within a site. All of these site characteristics are assessed with respect to what can be learned about past human behaviour within a particular region. The potential knowledge the sites may contribute should be framed within an explicitly stated set of regional, scientifically posed hypotheses.

2.3 Project Study Area: Spatial and Temporal Boundaries

The study area for the HRIA portion of the Lindbergh SAGD Expansion Project consisted of the following legal descriptions:

- Sections 5-8, 17-20 and 29-32 of T58-R4-W4M;
- Sections 1-3, 10-15, 22-27 and 34-36 of T58-R5-W4M;
- Sections 1-36 of T59-R4-W4M; and
- Sections 1, 2, 11, 12 and parts of Sections 13 and 14 of T59-R4-W4M.

The HRIA study area is presented in [Figure 2.1](#).

The Project is on the very northern limits of the agricultural “White Area” in Alberta, and is on the northern limits of the Central Parkland Subregion of the Parkland Region, just south of the Central Mixedwood Subregion of the Boreal Forest Region (Natural Regions Committee 2006). The study area is largely uncultivated, and natural vegetation communities are dominated by variations on aspen communities.

The surficial geology of the study area is dominated by relatively hummocky stagnation moraine. A major glacial meltwater channel also runs from the southeast to the northwest from Garnier Lake to Muriel Lake. Rieta Lake straddles the northeast margin of the study area. All three lakes are characterized by mixed shorelines, with both low boggy ground and elevated beach/shoreline landforms. All are productive fish lakes and have localized sand and gravel beaches, including relict beaches at considerable remove from modern shorelines.

The major meltwater channel running through Bluet and Garnier Lakes north to Muriel Lake is a deep, broad valley, and has well defined margins and relatively steep valley walls. The channel's valley is occupied by the under-fit drainage of Muriel Creek, and a number of small unnamed streams. The resulting topographic and drainage complexity of the study area would have been attractive for past use, and has considerable potential for preserving intact historic resource sites.

Previous disturbances within the study area are variable, ranging from very limited in the northern portions, to more extensive in the southern agricultural lands. Other previous disturbances include oil and gas development, agricultural cultivation in portions of the southern footprint, and some residential/recreational developments at the northern limits of the EIA footprint near Muriel Lake. Agricultural development is largely limited to flat uplands. Other smaller disturbances include crosscutting roadways and minor pipelines. The study area generally can be described as predominantly undisturbed.

3.0 METHODS

The primary objectives of this HRIA were to locate and assess archaeological resources in the development area for the Project. In order to achieve these objectives, areas with highest potential for archaeological sites were chosen based on overhead imagery and LiDAR analysis, then two methods of ground-truthing were employed: shovel prospecting and surface survey. Site assessment was also accomplished through the implementation of these methods.

3.1 Literature Review

Most of the study area is undisturbed, and previous HRIA investigations have been limited in scope and are generally localized within overlapping areas. The distribution of previously permitted HRIA studies is indicated in [Figure 3.1](#), and a full list of previous studies in [Table 3.1](#). Although [Figure 3.1](#) indicates areas encompassed by permitted studies, it should be noted that it does not necessarily indicate which areas were examined. In keeping with the confidentiality requirements of Alberta Culture, the actual location of previously known and newly discovered sites are not presented in this summary document.

Four highway-related HRIA projects along the south shore of Muriel Lake resulted in the identification of four Precontact sites (Reeves and McCullough 1976; Gryba 1982, Pollock 1982, 1983) Although only three of these sites were fully reported, two were partially excavated prior to highway construction (Pollock 1982), establishing the first baseline indicating that sites of significance should be expected in the area.

Five pipeline studies have been conducted in the general study area; all associated with a large north-south running energy corridor that crosses the meltwater spillway north of Garnier Lake (McCullough 1980; Heitzmann 1983; Unfreed 1997; Clarke and Dalmer 1997; Gryba et al 2001a). These identified no sites within the study area, although it is unclear how much of the pipeline right-of-ways were actually subjected to field examination by any of these researchers. At least some of these HRIA studies appear to have dismissed portions of the pipeline corridors as low potential and not worth archaeological investigations.

Three other pipeline studies are associated with another, smaller, north-south running energy corridor that roughly parallels the first (Van Dyke 1993; Kulle 1997; Gryba et al 2001b). These resulted in the identification of only one site within the study area (Van Dyke 1993). It is unclear how much of the pipeline right-of-way in the study area was actually subjected to field examination.

Two other pipeline studies have isolated short segments that pass through the eastern limits of the study area (McCullough 1992; McCullough and Lewis 1993). Neither of these identified any historic resource sites within the study area.

Table 3.1: Previous archaeological investigations in the study area

Permit Number	Development Type	Form	Sites Newly Identified in EIA Study Area	Relationship To Study Area
76-019	Transportation	Linear	0	Partly encompassed
80-044	Pipeline	Linear	0	Partly encompassed
82-072	Transportation	Linear	3	Partly encompassed
82-087	Transportation	Linear	1 (2 revisited)	Entirely encompassed within
83-027	Transportation	Area	0	Entirely encompassed within
83-030	Pipeline	Linear	0	Partly encompassed
87-058	Energy	Area	9	Partly encompassed
92-021	Pipeline	Linear	0	Partly encompassed
93-023	Pipeline	Linear	1	Partly encompassed
93-085	Pipeline	Linear	0	Partly encompassed
97-036	Pipeline	Linear	0	Partly encompassed
97-075	Pipeline	Linear	0	Partly encompassed
97-110	Pipeline	Linear	0	Partly encompassed
01-079	Pipeline	Linear	0	Partly encompassed
01-130	Pipeline	Linear	0	Partly encompassed
04-246	Wellsite	Area	0	Entirely encompassed
09-067	Transmission	Linear	1	Partly encompassed
11-185	Energy	Area	8	Entirely encompassed

A more recent HRIA, associated with construction of a wellsite and access road, was triggered by proximity to known sites (Balls 2004) but did not identify any new sites. A separate transmission line development project in the same general area and triggered by the same circumstances resulted in the identification of one new site within the study area (Porter 2009).

Only two larger scale area-based studies had been carried out in the study area, both associated with the Lindbergh property. In 1987, Balcom carried out a small (two sections) generalized study for Murphy Oil, resulting in the identification of five Precontact and four Historic era sites within the study area. These sites are all associated with a small unnamed drainage that rises within the southwest portion of the study area. The most comprehensive and relevant precious large-scale study is Hanna (2011), which recorded eight previously unknown Precontact sites (GaOp-4 through GaOp-11); four of which were deemed significant. This HRIA was carried out in support of Pengrowth's approved Lindbergh SAGD Project, currently under construction. This previous study is entirely encompassed within the EIA study area and indicated that there were likely substantial numbers of intact and significant but unrecorded historic resource sites within the EIA study area.

Review by Alberta Culture of the recorded site database has resulted in the identification of certain lands within the study area as having "Historical Resource Value" ratings (HRV) of 4 or 5 for archaeology on the "Listing of Historic Resources" for September, 2013 (Table 3.2 and Figure 3.1). These lands, comprising 33 LSDs in parts of nine Sections and grouped in three areas, indicate lands where Alberta Culture has instituted an automatic requirement for Historic Resources Act scrutiny prior to certain types of developments.

Table 3.2: Lands listed on Alberta Culture's "Listing of Historic Resources"

LSD	Section	Historic Resource Value	Category
12 & 13	2-58-5-W4M	5 (Potential)	Archaeological
9, 10 & 15	3-58-5-W4M	5 (Potential)	Archaeological
16	3-58-5-W4M	4 (Present)	Archaeological
1	10-58-5-W4M	4 (Present)	Archaeological
2, 7 & 8	10-58-5-W4M	5 (Potential)	Archaeological
4 & 5	11-58-5-W4M	5 (Potential)	Archaeological
9, 10, 11, 14	19-58-4-W4M	5 (Potential)	Archaeological
15 & 16	19-58-4-W4M	5 (Potential)	Archaeological
12 & 13	20-58-4-W4M	4 (Present)	Archaeological
4	29-58-4-W4M	5 (Potential)	Archaeological
1, 2, 3, 13, 14 & 15	30-58-4-W4M	5 (Potential)	Archaeological
2, 4, 5, 6 & 7	31-58-4-W4M	5 (Potential)	Archaeological
3	31-58-4-W4M	4 (Present)	Archaeological

Of the known Precontact sites, a clear distribution pattern can be inferred. Sites are associated with elevated landforms in close proximity to lakes and streams, and with the margins and bottoms of the relict glacial spillway.

Of the recorded Historic sites and structures, a different distributional pattern is apparent. Not surprisingly, sites are closely associated with developed road allowances and cultivated lands in relatively flat and well-drained context. Review of early historic Township maps indicate that there are several historic trails passing through the study area, indicating areas of usage during the early historic

period. There are also several (N=6) historic era sites and structure identified in the study area. One of these sites, *the McGee homestead* may have elevated significance due to its association with the Robert Service poem, "The Cremation of Sam McGee". Another, *the Holyoke Cemetery*, requires further investigations and documentation. Consequently, the evaluated potential for historic era sites is regarded as high.

Given the close proximity of First Nations Reserves (Kehiwan and Fishing Lake), there is a high potential for Traditional Use sites to be present within the study area. Pengrowth is in active consultation with First Nations. Although the detailed results of this consultation are not yet available, consultation is known to have resulted in the identification of areas of concern within the study area.

In summary, there have been limited investigations in this region and few sites were known prior to the current HRIA. In general, previously recorded Precontact sites are associated with larger fish lakes, river and stream valleys, and smaller watercourses or waterbodies in hummocky upland terrain. Previously recorded Historic sites have a more specific distribution, and are closely associated with cleared lands adjacent to road allowances or documented trail systems.

3.2 Overhead Imagery and LiDAR based Terrain Analysis

The examination of overhead imagery and LiDAR generated contours in prefield analysis of landscapes is an effective technique in determining the likelihood of archaeological sites to be present in a given area, particularly with respect to previous archaeological studies. The scale of topographic diversity in the study area is too fine to be depicted on NTS maps but is visible on LiDAR derived elevational models.

While this analysis is an important part of preparing for archaeological field studies, ground-truthing these areas is always necessary. Some landforms look much different on Overhead Imagery than they do on the ground. This ground-truthing of potential consists first of simply visiting the area and walking over the landforms. If the landforms are well defined and elevated, then they are subjected to shovel prospecting and/or more detailed surface survey. LiDAR generated contour information overlaid on satellite imagery formed the basis for the preliminary identification of target lands.

Areas identified as exhibiting high potential for historic resource sites were largely confined to undisturbed or lightly disturbed lands. Areas selected for examination were predominantly lands that are intersected by Pengrowth's "Initial" and "Future" development areas. Landforms specifically targeted for field study included:

- 1) Areas near previously identified historic resource sites;
- 2) The highest margins of the large glacial spillway. Particular attention was focussed on well-defined margins, marked by abrupt changes in slope;
- 3) Subsidiary ridges and knolls within the glacial spillway;
- 4) The highest margins of creek valleys entering into the spillway system, and residual terraces and benches within these valleys;
- 5) Knolls, ridges, and relict beach landforms associated with the shorelines of Muriel, Rieta Garnier Lake and Bluet Lake; and
- 6) Well-defined elevated landforms in otherwise flat and poorly drained upland.

Selected areas were then visited and the level of archaeological potential authenticated with respect to field conditions. Some “landforms” were immediately rejected for various reasons, while some were subjected to intensive shovel prospecting and surface survey in order to test for the presence of archaeological material.

3.3 Shovel Prospecting

Shovel prospecting is an essential method of locating and assessing archaeological sites in areas characterized by thick vegetation cover. Since archaeological materials are commonly buried, sites cannot be discovered without the examination of subsurface sediments. This is achieved through the excavation of small shovel holes at regular intervals on landforms identified in the aerial photograph analysis as potentially containing archaeological sites.

Usually, shovel tests encompass an area of approximately 40 cm² and vary in depth with respect to the potential of artifact bearing sediments encountered. As sedimentation and soil accumulation in the boreal forest are minimal in the absence of external mechanisms such as wind and water, these prospects tend to not exceed a depth of 30 cm below the ground surface.

The landform must be relatively well defined as shovel prospecting is most effectively done with respect to the orientation of the landform. Landforms without clear edges or a noticeable gain in elevation above the level of muskeg rarely contain archaeological material in the study area. Shovel prospecting occurs when landform edges are evident and then a pattern of linear transects of shovel prospects is designed relative to the orientation of the landscape. On long linear landforms such as ravine edges, an interval of 10 m between prospects is generally employed, and the intervals are decreased if part of that landform appears more likely to contain sites, based on various criteria such as levelness, aspect, and orientation. On smaller, amorphously-shaped landforms, shorter intervals are often employed and transects run along the edges and across the tops of these higher areas.

For each shovel test excavated, a GPS location (waypoint) was recorded together with a brief description of the sediments encountered. The tests were also noted as being positive (i.e. contains archaeological material), or negative (i.e. does not contain archaeological material).

3.4 Surface Survey

Examination of exposed sediments is also a key part of archaeological reconnaissance. Since archaeological materials in the study area are not generally found in deeply buried contexts, surface disturbance of sediments including sometimes simply the removal of surface vegetation, tends to cause artifacts to be dislodged from their original contexts. Artifacts may then be observed on the surface of these disturbed locations and excavation is not necessary to locate sites.

Ground surfaces were examined during foot traverses. Particular attention was paid to exposures in the form of vehicle tracks, rodent casts, tree throws, animal trails, or other vegetation-free areas exhibiting exposed soils. If archaeological materials were located, then a GPS waypoint was taken at the location of the first surface find, and the area was examined more closely for other material. If less disturbed

sediments occurred in the immediate vicinity of the findspots, then a shovel prospecting program was implemented in order to assess the level of disturbance to which the site had been subjected.

3.5 Site Revisits

Many of the previously recorded sites within the study area were recorded more than 30 years ago. Since then, the use of Global Positioning Systems, more intensive shovel testing, and higher levels of site data recording have become the standard. For the purposes of this assessment, all historic and Precontact era sites recorded during earlier projects that were accessible were revisited and site data was updated.

3.6 Inaccessible Lands

Unlike many SAGD projects, the Lindbergh SAGD Expansion Project falls in a mix of public and private lands. It was necessary to obtain surface land access from a number of landowners and/or tenants. Some landowners did not wish to grant surface access and certain lands were not available for study. The location of these lands is indicated in [Figure 3.1](#).

4.0 BASELINE CONDITIONS, PREVIOUSLY IDENTIFIED SITES

The selection of original target areas in the study area was based partly on previous archaeological investigations and partly on terrain analysis. Throughout much of the region, the prevailing pattern of archaeological site distribution is one based on landscape variables. While relatively few time diagnostic artifacts have been recovered, comparative studies of Precontact sites indicate that the majority of the sites are Middle or Late Precontact in age, a period when environments were broadly similar to those of today. A summary of known site environmental locational characteristics is presented in [Table 4.1](#). Twenty-four sites had been previously recorded within the study area ([Table 4.1](#)) The Precontact sites ranged from isolated finds (n=5), to small artifact scatters (n=5), to campsites (n=8). Previously recorded Historic sites consisted of a trail (n=1), cemetery (n=1), and early homestead/farmsteads (n=4). Of these 24 sites, 12 were revisited during the 2013 HRIA. These are described below.

Table 4.1: Previously Recorded Sites in Study Area

Borden No.	Permit	Period	Site Type	Context	Condition	Significance	Impacted by Project	Recommendations
FIOp-13	87-058	Precontact	Isolated Find/ Small Scatter	Upland/ Creek	Cultivated/ Impacted	Limited	No	No further investigations
Flop-14	87-058	Precontact	Small Campsite	Upland/ Creek	Cultivated/ Impacted	Limited	Yes, Initial Development	No further investigations
Flop-15	87-058	Precontact	Small Campsite	Upland/ Creek	Cultivated/ Impacted	Limited	Yes, Initial Development	No further investigations
Flop-29	93-023	Precontact	Isolated Find	Upland/ Flat	Pipeline/ Impacted	Limited	No	No further investigations
Flop-44	09-067	Historic	Trail	Upland/ Flat	Cultivated/ Partly Intact	Limited	Yes, Initial Development	No further investigations
FIOq-7	87-058	Precontact	Small Scatter	Upland/ Creek	Cultivated/ Partly Intact	Limited	No	No further investigations

Borden No.	Permit	Period	Site Type	Context	Condition	Significance	Impacted by Project	Recommendations
FIOq-8	87-058	Precontact	Isolated Find	Upland/ Creek	Intact	Limited	No	No further investigations
GaOp-1	82-072, 82-087	Precontact	Campsite	Spillway bottom /Creek/ Lake	Highway/ Partly Intact	Moderate	No	Avoidance or further investigations
GaOp-2	82-072, 82-087	Precontact	Campsite	Spillway bottom /Creek/ Lake	Highway/ Impacted	Limited	No	No further investigations
GaOp-3	82-072, 82-087	Precontact	Small Campsite	Spillway /Creek /Lake	Intact	Limited	No	No further investigations
GaOp-4	11-185	Precontact	Small Scatter	Spillway bottom/ Creek	Intact	Limited	No	No further investigations
GaOp-5	11-185	Precontact	Isolated Find	Spillway bottom/ Creek	Developed/ Impacted	Limited	No	No further investigations
GaOp-6	11-185	Precontact	Campsite	Spillway /Creek/ Lake	Partly Intact	Moderate	No	Avoidance or further investigations
GaOp-7	11-185	Precontact	Small Scatter	Spillway /Creek/ Lake	Intact	Moderate	No	Avoidance or further investigations
GaOp-8	11-185	Precontact	Campsite	Spillway /Creek/ Lake	Intact	High	No	Avoidance or further investigations
GaOp-9	11-185	Precontact	Small Scatter	Spillway /Creek	Intact	Limited	No	No further investigations
GaOp-10	11-185	Precontact	Isolated Find	Spillway bottom/ Creek	Developed/ Impacted	Limited	No	No further investigations
GaOp-11	11-185	Precontact	Small Campsite	Spillway bottom/ Creek	Partly Intact	Moderate	No	Avoidance or further investigations
GaOp-29	82-087	Precontact	Small Scatter	Spillway /Creek	Highway/ Impacted	Limited	No	No further investigations
GaOp-18 Holyoke Cemetery (40277)	NA	Historic (1921)	Cemetery and Church foundation	Upland	Deteriorating	Moderate- High	No	Avoidance
McGee Homestead (73696- 736703)	87-058	Historic (1916)	Structures (8)	Upland	Deteriorating	Moderate	No	Avoidance
Scott Homestead (43552)	87-058	Historic (1921)	Structure	Upland	Deteriorating	Limited	No	No further investigations
Keichenger Homestead	87-058	Historic (1917)	Structure	Upland	Impacted	Limited	No	No further investigations

Borden No.	Permit	Period	Site Type	Context	Condition	Significance	Impacted by Project	Recommendations
(43554)								
Thorsell Homestead (43555)	87-058	Historic (1918)	Structure	Upland	Impacted	Limited	No	No further investigations

4.1 Site FIOp-13

FIOp-13 was originally recorded in 1987 as an isolated find consisting of a stone hide-scraping tool (Balcom 1987). The scraper was recovered in a disturbed (cultivated field), creek-side setting. A single shovel test was excavated nearby, with no additional materials recovered. The FIOp-13 area was revisited in 2013 and additional Precontact lithic cultural materials in the form of four quartzite and quartz pieces of debitage were identified on the surface and recovered. Additional shovel testing in the vicinity of the newly discovered materials did not recover any other artifacts, and no potential for intact cultural deposits below the disturbed plow zone was identified. “No further work” was recommended by Balcom in 1987. Although the new finds change the classification of this site from an Isolated Find to a Small Scatter, **FIOp-13 is considered to have limited significance, and neither avoidance nor further investigations are recommended.**

4.2 Site FIOp-14

FIOp-14 was originally recorded in 1987 as a small campsite consisting of a diffuse surface scatter of stone tools and debitage in a recently cultivated field on the upland edge of a small creek valley (Balcom 1987). A single shovel test was excavated, with no materials recovered. Artifacts recovered on the surface included two endscrapers, two retouched flakes, three cores, and other debitage. Three of these artifacts are identified as obsidian, a relatively rare toolstone in assemblages in this area. Obsidian is most commonly associated with either Early Precontact or Late Period sites, and is very important for reconstructing past trade networks. Based largely on the presence of obsidian and the potential cultural historical implications of this material, Balcom recommended avoidance. The FIOp-14 was revisited in 2013; no additional Precontact surface lithic cultural materials were noted. Additional shovel testing in the vicinity of the previously discovered materials did not result in the recovery of any other artifacts, and no potential for intact cultural deposits below the disturbed plow zone was identified. Based on this shovel testing, it is clear that the integrity of the site deposits have been largely compromised by past cultivation. Consequently, although the presence of obsidian at this site is noteworthy, **FIOp-14 is considered to have limited significance, and no further investigations are recommended.**

4.3 Site FIOp-15

FIOp-15 was originally recorded in 1987 as a small campsite consisting of a very diffuse surface scatter of stone tools, debitage, fire-broken rock, and fragmentary animal bone in a recently cultivated field on the upland edge of a small creek valley (Balcom 1987). A single negative shovel test was excavated. Collected artifacts include a leaf-shaped bifacial “knife”, a biface fragment, a small endscraper, and a large unifacially retouched flake (all quartzite). The site lies very close to FIOp-14. Based on the high proportion of tools and the proximity to FIOp-14, Balcom recommended avoidance. FIOp-15 was revisited in 2013 and small quantities of additional Precontact lithic cultural materials were noted and collected. Additional shovel testing in the vicinity of the newly discovered materials did not result in the

recovery of any buried artifacts, and no potential for intact cultural deposits below the disturbed plow zone was identified. Consequently **FIOp-15 is considered to have limited significance, and no further investigations are recommended.**

4.4 Site FIOp-29

FIOp-29 was originally recorded in 1993 as a surface isolated find consisting of a stone retouched spall tool (Van Dyke 1993). The retouched spall was recovered in a disturbed context (existing pipeline right-of-way) near a small wetland. Two shovel tests were excavated, with no materials recovered. FIOp-29 was revisited in 1997 (Kulle), and four additional shovel tests were excavated; all of which were negative. **FIOp-29 was not revisited in 2013** as part of the Pengrowth Lindbergh EIA/HRIA, as the area was within an active pipeline construction zone. **FIOp-29 is considered to have limited significance, and no further investigations are recommended.**

4.5 Site FIOp-44

FIOp-44 was originally recorded in 2009 as a possible historic trail remnant (Porter 2009) during an electrical power transmission line project HRIA. The possible trail site was identified on the basis of a gap in the treeline between two cultivated fields at approximately the same location as the “Moose Lake to Onion Lake Trail” as indicated on the 1906 Dominion Land Survey Township Plan. FIOp-44 was not tested, and no historic or Precontact cultural materials were reported. This site was not revisited in 2013 due to land access constraints. Given the degree of disturbance to the trail in the surrounding cultivated lands, **FIOp-44 is considered to have limited significance, and no further investigations are recommended.**

4.6 Site FIOq-7

FIOq-7 was originally recorded in 1987 as a small surface scatter consisting of a projectile point and a quartzite flake in a disturbance adjacent to a small gravel pit (Balcom 1987). The projectile point was described as a Swan River Chert “Duncan Stemmed Projectile Point”; a style which generally dates between 5,000 and 3,000 years ago. At the time, five shovel tests were excavated, with no additional cultural materials recovered. FIOq-7 was revisited in 2013 and retested, but no additional artifacts were recovered, and no potential for intact cultural deposits below the already disturbed plow zone was identified. Consequently, although this site is notable for the recovery of temporally diagnostic projectile point, **FIOq-7 is considered to have limited significance, and no further investigations are recommended.**

4.7 Site FIOq-8

FIOq-8 was originally recorded in 1987 as an Isolated Find consisting of a single quartzite flake recovered in one of fifteen shovel tests excavated on a high knoll between two creek branches (Balcom 1987). This undisturbed context site was revisited in 2013 and retested (n=7), but no additional artifacts were recovered, although potential for intact cultural deposits in a subsurface context does exist. However, based upon the sparse nature of the cultural materials recovered, **FIOq-8 is considered to have limited significance, and no further investigations are recommended.**

4.8 Site GaOp-1

First recorded in 1982 in an HRIA for planned Highways development, GaOp-1 was described as an intact campsite in rolling terrain adjacent to a stream in a meltwater channel near the outlet into Muriel Lake (Gryba 1982). Seven of Gryba's 34 shovel tests yielded cultural materials, resulting in the recovery of two stone tools, a core, 22 pieces of debitage, and three pieces of fire-broken rock. GaOp-1 was scheduled to be impacted by highway construction, and was revisited and test excavated later in 1982 (Pollock 1982). By this point the highway right-of-way had been altered, and after small-scale excavations (6 m²) yielding very little cultural material, Pollock concluded that the main elements of the site would not be impacted. Pollock monitored surface stripping of the landform during early phases of construction, and no further materials were recovered. The landform was re-visited in 2013, and shovel testing of the eastern, intact portion of the knoll was carried out. Of 19 shovel tests, three were positive. Shovel test #1 contained four pieces of fire-broken rock and one quartzite flake. Shovel test #2 yielded two pieces of fire-broken rock. Shovel test #3 contained a single quartz flake. Although much of the landform containing GaOp-1 has been removed, portions remain and **GaOp-1 is considered to be of moderate archaeological significance and avoidance or further investigations are recommended.** The site will not be impacted by the planned Project development, but any new impacts in the vicinity should be preceded by systematic excavation of eight to ten square meters.

4.9 Site GaOp-2

First recorded in 1982 by the HRIA for planned Highways development, GaOp-2 was described as an intact campsite on the east bank of an unnamed creek in a meltwater channel near the outlet into Muriel Lake (Gryba 1982). All seven of Gryba's shovel tests yielded cultural materials, resulting in the recovery of a side-notched flake point (provisionally identified as Besant), a biface fragment, three cores, 56 pieces of debitage, and a single fragment of calcined bone. GaOp-2 was scheduled to be impacted by highway construction, and was revisited and test excavated in two stages later in 1982 (Pollock 1982). Pollock's excavations, consisting of an initial seven square meters, followed by a further 29 square meters, resulted in the recovery of a large and complex assemblage with fire broken rock (quantity not specified), fragmentary animal bone (quantity not specified), stone tools (n=58) and large quantities of lithic debitage (n=876).

This GaOp-2 site area was revisited in 2013 but could not be re-tested, as the landform appears to have been entirely removed by highway construction. Based upon the degree of previous impacts, **GaOp-2 is considered to have limited significance, and no further investigations are recommended**

4.10 Site GaOp-3

First recorded in 1982 by the HRIA for planned Highways development, GaOp-3 was described as an intact but "sparse" campsite on a high ridge along the western edge of the valley of a small creek (Gryba 1982). Two of eleven shovel tests yielded one retouched flake and two pieces of debitage. GaOp-3 was not scheduled to be directly impacted by highway construction, and Gryba recommended avoidance of the area with any borrow pits. During follow-up mitigation excavations (Pollock 1982), a surface site with two lithic artifacts in an entirely different location on a small south-facing flat area near a large slough was identified as GaOp-3 and evaluated with five subsurface tests. Pollock's excavations did not result in the recovery of any additional cultural materials, and Pollock recommended no further

investigations. Pollock's GaOp-3 site area was subsequently removed by highway construction. This second GaOp-3 has now been assigned a new Borden designation of GaOp-29 (see below).

Gryba's original GaOp-3 site location was revisited in 2013 as part of the HRIA activities. It was successfully re-identified and the landform was retested with 14 shovel tests; one of which was positive yielding a single quartzite flake. Based on the sparse nature of the cultural materials recovered, **GaOp-3 is considered to have limited significance, and no further investigations are recommended.**

4.11 Site GaOp-4

GaOp-4 was first recorded in 2011 as a small Precontact bone scatter on a low knoll/ridge landform in the bottom of the north-south running, major glacial spillway (Hanna 2011). It is near the base of the west wall of the spillway, west of the northward draining creek which drains the valley. A fragmented left bison mandible was recovered in a single positive shovel test. Six other shovel tests on this small knoll-top failed to recover any additional materials. No other cultural materials were observed. The site was not revisited in 2013. GaOp-4 is undisturbed and no disturbances are expected at this site stemming from Project development. **Neither avoidance nor further investigations are recommended at GaOp-4 in the context of the current Project or any future developments.**

4.12 Site GaOp-5

GaOp-5 was first recorded in 2011 as an isolated find in a cleared trail in the bottom of the north-south running, major glacial spillway (Hanna 2011). The site is at the base of the east wall of the spillway, north of North Garner Lake, east of the northward draining creek exiting the lake. GaOp-5 consists of a single black chert flake found in an incised and cleared cattle trail in this otherwise forested area. Five shovel tests nearby revealed mottled sediments with frequent charcoal fragments, indicating relatively heavy local disturbances. No additional cultural materials were encountered. GaOp-5 was not revisited during the 2013 HRIA because it was recently recorded by the author, and no new disturbances are expected stemming from Project development. **GaOp-5 is considered to be of has limited significance and neither avoidance nor further investigations are recommended in the context of the current Project or any future projects.**

4.13 Site GaOp-6

Originally recorded in 2011, GaOp-6 is a partly disturbed surface and subsurface campsite scatter in the bottom of the major glacial spillway, north of the shoreline of Garnier Lake (Hanna 2011). The site lies near the base of the steeply sloping east wall of the spillway, east of the northward flowing drainage outlet of Garnier Lake. GaOp-6 was identified on the basis of a well-defined surficial scatter of calcined bone, fire-broken rock, lithic debitage, and stone tools exposed in two incised and eroding cattle tracks. A well-defined concentration of small, calcined bone fragments (medium to large animal) and associated fire-broken rock fragments exposed in the edge of a track indicates the presence of a partially intact hearth feature. Other cultural materials observed include four fire-broken rock fragments and at least 50 lithic items. Raw materials noted included quartz, quartzite, siltstone, and pebble cherts. Three shovel tests were excavated adjacent to areas of concentrations of cultural materials exposed in the tracks. Shovel Tests #1 and #2 yielded three quartz and two quartzite flakes respectively.

GaOp-6 was incidentally revisited during the 2013 studies while gaining access to other areas. Its condition was found to be much as described in 2011, and a quartzite Besant side-notched projectile point was identified on the surface and collected. This find indicates that the site was likely in use approximately 2,000 years ago.

GaOp-6 is a partly disturbed surface and subsurface campsite scatter with diagnostic lithic tools, an intact hearth feature, preserved faunal materials, multiple stone tools, and significant quantities of debitage. Given the size and complexity of the assemblage, the presence of an intact feature and the association of this site with other significant sites identified in the near vicinity, **GaOp-6 is deemed to have moderate significance.** No new disturbances are expected at this site stemming from Project development. **Avoidance or further investigations are recommended at GaOp-6 for any future developments that may impact it. Prior to any site disturbances, a systematic shovel testing program to determine site limits and delineate intact sediments, coupled with the controlled excavation of up to 16 m² is recommended.**

4.14 Site GaOp-7

Originally recorded in 2011, GaOp-7 is a small lithic scatter in the bottom of the major glacial spillway, north of the current shoreline of Garnier Lake (Hanna 2011). It is a small subsurface lithic artifact scatter identified on the basis of two positive shovel tests near the southwestern end of the curving ridgetop. Shovel Test #1 contained two fragments of a nearly complete biface. Shovel Test #2, contained two quartz flakes. All cultural materials lay between 5-10 cm below surface. Twelve other shovel tests atop the ridge were all negative. GaOp-7 site appears to be completely intact. GaOp-7 was not revisited during the 2013 HRIA because it was recently recorded by the author, and no disturbances are expected at this site stemming from Project development. Given its undisturbed nature, the extremely localized distribution of the assemblage, the presence of other nearby significant sites, and the possibility of “capturing” a single event, **GaOp-7 is deemed have moderate significance. Avoidance or further investigations are recommended. Should future developments threaten GaOp-7, a controlled excavation of up to 8 m² is recommended.**

4.15 Site GaOp-8

Originally recorded in 2011, GaOp-8 is a small subsurface campsite in the bottom of a major glacial spillway, approximately 40 m north of the current shoreline of Garnier Lake (Hanna 2011). GaOp-8 is a small subsurface campsite scatter consisting of fire-broken rock, lithic tools and flakes, ceramic sherds, historic artifacts, and faunal remains. It was identified on the basis of six positive shovel tests. Shovel Test #1 contained two conjoining pieces of Precontact era pottery, identified as Narrows Fabric-impressed ware (Walde and Meyer 2003), two small bone fragments from a mid to large-sized mammal, two pieces of fire-broken rock, a quartz and a quartzite flake, and a small black pebble chert retouched flake fragment (likely part of a scraping tool). Shovel Test #2 yielded one piece of fire-broken rock, two small bone fragments from a mid to large-sized mammal, two quartzite flakes, one massive quartz flake, one grey chert flake, and one Swan River chert flake. Shovel Test #3 contained one small burned bone fragment from a mid to large-sized mammal. Shovel Test #4 contained one blue glass trade bead and one quartzite flake fragment. Shovel Test #5 contained a single petrified wood

fragment. Shovel Test #6 contained a piece of fire-broken rock and an unmodified ironstone nodule, likely of cultural origin.

The GaOp-8 site area appears completely intact. GaOp-8 was not revisited during the 2013 HRIA because it was recently recorded by the author, and no disturbances are expected from the Pengrowth-Lindbergh SAGD development, and no elements of the proposed Project footprint will affect this landform. Given its undisturbed nature, the extremely localized distribution of the assemblage, the presence of temporal and functionally diagnostic artifacts, the presence of preserved faunal remains, the unique nature of mixed Precontact and Fur Trade-era assemblage, and the presence of other nearby significant sites, **GaOp-8 is deemed have high significance**. In particular, the presence of Precontact Narrows Fabric-impressed pottery in close association with a trade bead, a varied lithic assemblage and datable faunal materials make this site relatively unique, and of high local importance. **Avoidance or further investigations are recommended. Should future developments threaten GaOp-8, a controlled excavation of up to 20 m² is recommended.**

4.16 Site GaOp-9

Originally recorded in 2011, GaOp-9 is a small subsurface lithic scatter in the bottom of the glacial spillway, west of the northward flowing creek emptying out of Garnier Lake (Hanna 2011). It is at the base of the west wall of the spillway, near the northern edge of a sandy ridge, possibly a remnant beach or bench. GaOp-9 is a small subsurface lithic scatter identified on the basis of two positive shovel tests. Shovel Test #1 yielded a grey siltstone flake and Shovel Test #2 yielded a single quartzite flake. Twelve other shovel tests in the immediate vicinity were all negative. GaOp-9 was not revisited during the 2013 HRIA. **GaOp-9 is a small, shallowly buried, undisturbed lithic scatter of limited significance and no disturbances are expected stemming from Project development. Neither avoidance nor further investigations are recommended at GaOp-9 in the context of the current or any future developments.**

4.17 Site GaOp-10

Originally recorded in 2011, GaOp-10 is an isolated find at the base of the east wall of the spillway, overlooking a creek/beaver pond on the northward draining creek exiting the lake (Hanna 2011). It consists of a single white quartzite biface preform recovered in an existing road/trail disturbance. No shovel tests were excavated as the landform has clearly been built up for the road/trail and the artifact transported with fill from elsewhere. GaOp-10 was not revisited during the 2013 HRIA because it was recently recorded by the author. **It is an isolated find in a disturbed context with limited significance. Neither avoidance nor further investigations are recommended at GaOp-10 in the context of the current or any future developments.**

4.18 Site GaOp-11

Originally recorded in 2011, GaOp-11 is a small campsite scatter on an elevated ridge in the bottom of the north-south running, major glacial spillway at the base of the east wall of the spillway, overlooking a creek/beaver pond on the northward draining creek exiting the lake (Hanna 2011). GaOp-11 is a partially disturbed, small surface and subsurface Precontact campsite scatter consisting of several artifacts observed on the surface of a road/trail, with other cultural materials recovered from an undisturbed context in shovel tests on either side of the trail. Observed cultural materials consist of

lithic debitage and faunal remains. Approximately 20 pieces of lithic detritus were observed on the surface along a stretch of the trail; including a Swan River chert core fragment, two quartzite flakes, a massive quartz flake fragment, and a black chert flake fragment. A single fish bone fragment was also collected. Shovel testing on either side of the trail crosscutting the landform resulted in two positive tests for a total of seven. Shovel Test #1 contained two grey quartzite flakes and 79 small fragments of calcined bone, clearly indicating the remains of a hearth. Shovel Test #2 yielded one Swan River chert flake. Portions of GaOp-11 area were disturbed during construction and use of the trail. The presence of a buried hearth feature, coupled with preserved faunal materials, moderate quantities of lithic debitage and observations of intact sediments in shovel tests on either side of the trail, indicates that portions of the site remain intact. No new disturbances are expected from Project development, although GaOp-11 is sensitive to on-going use of the trail by vehicles. The site was not revisited in 2013. **GaOp-11 is deemed have moderate significance. Avoidance or further investigations are recommended should future developments threaten GaOp-11. Investigations should include a systematic shovel testing program to determine site limits and delineate intact sediments, coupled with the controlled excavation of up to 12m² are recommended.**

4.19 Site GaOp-29

During mitigation excavations associated with Highway construction (Pollock 1982), a surface site with two lithic artifacts on a small south-facing flat area near a large slough was identified as GaOp-3 and evaluated with five subsurface tests. Pollock's excavations did not result in the recovery of any additional cultural materials, and Pollock recommended no further investigations. Pollock's GaOp-3 site area was subsequently obliterated by highway construction.

This GaOp-29 site area was revisited in 2013 but could not be re-tested, as the landform appears to have been entirely removed by highway construction. Based upon the degree of previous impacts, **GaOp-29 is considered to have limited significance, and no further investigations are recommended.**

4.20 GaOp-18 - Holyoke Cemetery (40277)

The Holyoke Cemetery was identified during background research studies for the current Project. Site records consisted of a single incomplete Historic Site form with no information beyond a name and a legal location. Investigations in 2013 confirmed the presence of a small cemetery at this location, as well as the foundation of a church nearby. Because of the presence of the church foundation, the site meets the criteria for recording as an archaeological site, and has been assigned the Borden Number GaOp-18. These are the remains of the Roman Catholic St. Therese Church and Cemetery, apparently in use between 1935 and 1961, and under the diocese of St. Paul. Additional descriptions of this site are found under GaOp-18 below, as considerable new information has been added to the site file. **The St. Therese Church and Cemetery site (GaOp-18) is considered to have moderate significance, and avoidance is recommended.** No elements of the site are at risk from the proposed Project development. **Should future developments threaten to impact the site, detailed recording, photography, and mapping should be undertaken.**

4.21 McGee Homestead (73696-736703)

First recorded in 1987, the McGee Homestead consists of the remains of a farm established in 1911 (Balcom 1987). A concrete foundation, the standing remains of a barn, two animal enclosures, a shed, a

privy, and another outbuilding were reported to present in an open pasture. Mixed aspen/poplar vegetation were noted as being clustered near the structures. Based on local informants, regional histories and land titles, Balcom determined that this site is the remains of the home of Robert “Sam” McGee, a character immortalized in the Robert Service poem “The Cremation of Sam McGee”. Unlike the character in the poem, McGee did not die in the Yukon, and he was not cremated at Lake Laberge. He left the Yukon in 1909, and homesteaded in the Lindbergh area in 1911, ultimately leaving the area in 1919. Service met McGee in Whitehorse in the late 1890s, and asked permission to use his name in his poem.

The site area was not directly revisited in 2013, as the landowner did not grant access for environmental studies at the time of work. The site was viewed from the nearby road allowance, and the current condition of the structures was evaluated. Although still standing, it is clear that the condition of these structures have significantly deteriorated since 1987, with collapse of some architectural elements clearly underway. Although the McGee homestead is important as it reflects upon a nationally known person, the site itself does not reflect upon the elements of Service’s or McGee’s tenure in the Yukon. None of the structures at the site are unique in character, and none appear to reflect upon local settlement trends. The structures are in poor condition, and likely cannot be developed for interpretive purposes. **The McGee Homestead site is determined to have moderate significance, and avoidance is recommended.** No elements of the site are at risk from the currently proposed Project development. **Should future developments threaten to impact the site, detailed structural recording, photography, and mapping should be undertaken.**

4.22 Scott Homestead (43552)

First recorded in 1987, the Scott Homestead consists of the remains of a farm established in 1915 by Harry Scott (Balcom 1987). Balcom reported a house, three animal enclosures, a barn, shed, shop, and pumphouse in a partly cleared aspen/pine forest. As with the McGee Homestead, The Scott site could not be directly revisited in 2013, as the landowner did not grant access for environmental studies at the time of work. Only one of the structures could be partially evaluated from across the fenceline, as other structures were entirely obscured by the overgrown vegetation. The visible structure (likely the Feature 7 home recorded by Balcom) appears to be in fair condition, but full evaluation of changes in condition was not possible.

Based on Balcom’s original report, the Scott homestead does not exhibit any unique, evocative, or other characteristics that would be regarded as significant, nor does there appear to be any association with a conspicuous person or historic event beyond the local level. **The Scott Homestead site is evaluated as having limited significance.** No elements of the site are at risk from the currently proposed Project development. **Should future developments threaten to impact the site, updated structural recording, photography, and mapping is recommended.**

4.23 Keichenger Homestead (43554)

First recorded in 1987, the Keichenger Homestead consists of the remains of a farm established in 1913 by Peter Keichenger (Balcom 1987). Balcom reported a single isolated structure, likely a dwelling, in a plowed field. The Keichenger site was revisited in 2013 as part of the investigation. The structure

recorded by Balcom is no longer standing at this location. The field has been completely plowed and it appears that the structure was demolished and pushed westward into the adjacent wooded area during the clearing process. All that remains is a small push pile consisting of some of the milled lumber and metal architectural fittings at some distance from the reported location. Based on the degree of previous disturbance and the lack of connection to a conspicuous person or historic event beyond the local level, the **Keichenger site is deemed to have limited significance and no further investigations are recommended.** The currently proposed Project development will not result in additional impacts to this site.

4.24 Thorsell Homestead (43555)

First recorded in 1987, the Thorsell Homestead consisted of the remains of a farm established in 1914 by Nels Thorsell (Balcom 1987). The Thorsell site was not revisited in 2013, as attempts to contact the landowner failed at the time of field studies. Without accessing the site, it was not possible to evaluate the current condition of the structure. However, based on the poor condition of the structure reported by Balcom, and the lack of association with a conspicuous person or historic event beyond the local level, the **Thorsell site is deemed to have limited significance and no further investigations are recommended.** The currently proposed Project development will not result in additional impacts to this site.

5.0 NEWLY IDENTIFIED SITES

During the 2013 HRIA field work, 24 target areas or landforms were subjected to visual surveys in the study area, in which a total of 743 shovel tests were excavated ([Figure 5.1](#)). Field investigations were carried out over a period of 13 days in mid-October 2013. Although in late fall, field conditions were ideal with good ground visibility, no snow-cover at any time during the investigations, and frozen ground not yet a factor during any of the investigations.

Nineteen previously unreported archaeological sites, including 16 Precontact Aboriginal sites and three Historic period sites, were discovered and recorded in the vicinity of the Project. [Table 4.2](#) lists the newly recorded sites in the study area. Historic sites include a churchyard and foundation and two trails. Precontact sites include: four isolated finds, nine small scatters, and three campsites. Each of the 19 newly recorded sites are described in detail below.

Table 4.2: Newly Recorded Sites in Study Area

Borden No.	Period	Site Type	Context	Condition	Significance	Impacted by Project	Recommendations
FIOp-54	Precontact	Isolated Find	Upland/ Creek	Cultivated/ Impacted	Limited	No	No further investigations
Flop-55	Precontact	Small Scatter	Upland/ Creek	Cultivated/ Impacted	Limited	No	No further investigations
Flop-56	Precontact	Small Scatter	Spillway/ Creek/Lake	Largely Undisturbed	Limited	Yes, Future Development	No further investigations
GaOp-14	Precontact	Isolated Find	Spillway/ Creek/Lake	Undisturbed	Moderate	No	Further investigations
GaOp-15	Precontact	Isolated Find	Lake	Undisturbed	Limited	No	No further investigations
GaOp-16	Precontact	Isolated Find	Lake	Undisturbed	Limited	No	No further investigations
GaOp-17	Precontact	Small Scatter	Spillway/ Lake	Undisturbed	Moderate	No	Avoidance, further investigations
GaOp-18	Historic	Church Foundation and Cemetery	Upland	Partly Intact	Moderate	No	Avoidance, further investigations
GaOp-19	Precontact	Campsite Scatter	Lake	Largely Intact	Moderate	No	Avoidance, further investigations
GaOp-20	Precontact	Small Scatter	Spillway/ Lake	Intact	Moderate	No	Avoidance, further investigations
GaOp-21	Precontact	Small Scatter	Spillway bottom/ Creek	Intact	Moderate	No	Avoidance, further investigations
GaOp-22	Precontact	Small Campsite Scatter	Spillway bottom/ Lake	Intact	Moderate	No	Avoidance, further investigations
GaOp-23	Precontact	Small Scatter	Lake	Partly Intact	Moderate	No	Avoidance, further investigations
GaOp-24	Precontact	Small Scatter	Upland	Disturbed	Limited	No	Further investigations
GaOp-25	Precontact	Small Scatter	Upland	Disturbed	Limited	No	No further investigations
GaOp-26	Historic	Trail	Upland	Partly Intact	Limited	No	No further investigations
GaOp-27	Precontact	Campsite Scatter	Spillway bottom/ Creek	Intact	Moderate	No	Avoidance, further investigations
GaOp-28	Precontact	Small Scatter	Lake	Disturbed/ Impacted	Limited	No	No further investigations
GaOo-4	Historic	Trail	Upland	Partly Intact	Limited	No	No further investigations

5.1 FIOp-54

FIOp-54 is an isolated find consisting of a quartzite flake in a cultivated upland setting overlooking a small stream valley to the west. Four shovel tests in the vicinity of these finds recovered no additional cultural materials, and there is little likelihood of intact buried cultural deposits. Based on the degree of

previous surface disturbance, the sparse nature of the identified cultural materials, and the limited possibility of intact sediments, **FIOp-54 is considered to have limited significance, and no further investigations are recommended.**

5.2 FIOp-55

FIOp-55 is a small, diffuse, surface lithic artifact scatter in a cultivated upland setting overlooking a small stream valley to the northwest. It consists of a single quartzite bifacially worked knife/scrapper and two pieces of quartz debitage recovered near the creek valley margin in a recently cultivated field. Four shovel tests in the vicinity of these finds recovered no additional cultural materials, and there is little likelihood of intact buried cultural deposits. Based on the degree of previous surface disturbance, the sparse nature of the identified cultural materials, and the limited possibility of intact sediments, **FIOp-55 is considered to have limited significance, and no further investigations are recommended.**

5.3 FIOp-56

FIOp-56 is a small, diffuse, surface lithic artifact scatter exposed in a bladed and rutted trail in a generally undisturbed mixed poplar and grassland upland setting. The site is on the east wall of the relict spillway above Bluet Lake and consists of a single quartzite bifacially worked knife (collected) and three pieces of quartzite debitage noted in the track. Four shovel tests in apparently undisturbed areas in the vicinity of these finds recovered no additional cultural materials, although shallow but intact sediments were encountered. Based on the sparse nature of the identified cultural materials and the limited possibility of deep intact sediments, **FIOp-56 is considered to have limited significance, and no further investigations are recommended.**

5.4 GaOp-14

GaOp-14 is an isolated find in an undisturbed, wooded, upland setting near the eastern margin of the ancient spillway overlooking Garnier Lake to the southwest. It consists of a single quartzite flake recovered in a shovel test near the southwestern margin of an undulating ridge/knoll near the spillway edge. Ten other shovel tests in the immediate vicinity of the find spot and a further 23 tests on other portions of the landform failed to recover any additional cultural materials. **Although the sparse nature of the identified cultural materials recovered at GaOp-14 suggests limited significance, there remains potential for additional cultural materials on this landform and additional, higher density testing is recommended prior to any ground disturbing developments in the immediate area of GaOp-14.**

5.5 GaOp-15

GaOp-15 is an isolated find in an undisturbed, wooded, upland setting west of Rieta Lake. It consists of a single siltstone split pebble flake recovered in a shovel test on a low rise near an ephemeral stream/wetland. Eight other shovel tests on the landform failed to recover any additional cultural materials. Given the sparse nature of the identified cultural materials recovered, **GaOp-15 is considered to have limited significance, and no further investigations are recommended.**

5.6 GaOp-16

GaOp-16 is an isolated find in an undisturbed, wooded, upland setting on the west margin of the ancient spillway overlooking Garnier Lake to the southeast. It consists of a single chert retouch flake

recovered in a shovel test on a well-defined ridge overlooking an ephemeral creek to the southwest. Fifteen other shovel tests on the landform failed to recover any additional cultural materials. Given the sparse nature of the identified cultural materials recovered, **GaOp-16 is considered to have limited significance, and no further investigations are recommended.**

5.7 GaOp-17

GaOp-17 is a lithic debitage and core fragments scatter in an undisturbed, wooded, upland setting on the west margin of the ancient spillway overlooking Garnier Lake to the southeast. The site consists of eleven artifacts recovered in three shovel test on the south end a well-defined ridge overlooking an ephemeral creek to the south. Six artifacts were recovered in (ST) #1, four in ST#2 and, one in ST#3. Massive quartz dominates the assemblage (n=10), with a single quartzite flake fragment also represented. Thirteen other shovel tests on the landform failed to recover any additional cultural materials. Given the concentrated nature of the materials recovered in Shovel Tests #1 and #2, and the unusually high proportion of massive quartz in this assemblage, **GaOp-17 is considered to have moderate significance, and avoidance or further investigations are recommended. If avoidance is not feasible, then further investigations in the form of six to ten square metres (6-10 m²) are recommended.**

5.8 GaOp-18 - Holyoke St. Therese Church and Cemetery

GaOp-18 is the remains of a Roman Catholic church and cemetery near the historic locality/post office of Holyoke. The site consists of the remains of the churchyard, the church foundations, associated structural debris, and the sporadically maintained cemetery. The cemetery was not registered with the Provincial Director of Cemeteries, but there was an incomplete historic structure form for the "Holyoke Cemetery" in provincial Historic site files, with no information beyond a name and a legal location. Our 2013 HRIA confirmed the presence of a small cemetery at this location, as well as the foundation of the church nearby.

The presence of the church foundation results in the site meeting the criteria for recording it as an archaeological site. It has been assigned the Borden Number GaOp-18. This site consists of the remains of the Roman Catholic St. Therese Church and Cemetery, apparently in use between 1935 and 1961, and under the diocese of St. Paul. Although the St. Therese Church and Cemetery site is clearly significant insofar as they reflect upon a local settlement and history, the lack of a surviving structure impacts the site's value. Nevertheless, **the St. Therese Church and Cemetery site (GaOp-18) is considered to have moderate significance, and avoidance is recommended.** No elements of the site are at risk from the proposed Project development. **Should future developments threaten to impact the site, detailed recording, photography, and mapping should be undertaken.**

5.9 GaOp-19

GaOp-19 is a Precontact campsite scatter of lithic artifacts, fire-broken rock, and animal bone fragments in a partially disturbed, partly wooded, upland setting on a prominent knoll-top overlooking Muriel Lake to the north. It consists of a discontinuous but relatively extensive scatter of cultural materials exposed in a scraped and rutted vehicle trail that traverses portions of the landform. Approximately 70 pieces of lithic debitage were observed, with massive quartz and quartzite dominating the assemblage. Smaller

quantities of siltstone and chert were also observed. In terms of technology, core reduction is dominant, although bifacial tool production is well represented. Also noted in a surface exposure was a small, localized concentration of calcined bone fragments (n=15). Shovel testing in undisturbed site areas resulted in the identification of additional cultural materials in five of 18 tests from a depth of approximately 5 to 15 cm. Other recovered materials include fire-broken rock (n=4) in ST#4, unburned long bone fragments in ST#3 (n=5), and single pieces of quartzite debitage in each of 3 other tests. **GaOp-19 is deemed to have moderate significance, and avoidance or further investigations are recommended.** It will not be impacted by the proposed Project development. **If future avoidance is not feasible, then further investigations in the form of sixteen to twenty square meters (16-20 m²) in undisturbed site areas is recommended.**

5.10 GaOp-20

GaOp-20 is a small Precontact artifact scatter in a partially disturbed, wooded setting on an elevated relict beach landform on the east margin of Garnier Lake. It consists of two siltstone flakes and two burned bone fragments identified in a vehicle track traversing the margin of the landform. Four shovel tests in apparently undisturbed areas in the vicinity of these finds recovered no additional cultural materials, although shallow, intact sandy sediments were encountered. Given the presence of significant sites in similar nearby lakeshore settings, the topographical complexity of the surrounding area, and the relatively limited testing carried out in the vicinity, **GaOp-20 is considered to have moderate significance, and avoidance or further investigations are recommended.** It will not be impacted by the proposed Project development. **If future avoidance is not feasible, then further investigations in the form of a systematic shovel testing is recommended.**

5.11 GaOp-21

GaOp-21 is a small Precontact scatter in a largely undisturbed, wooded setting on an elevated relict beach landform near the northwestern margin of Bluet Lake. It consists of one quartzite utilized spall tool and a quartzite flake and three fragments of fire-broken rock widely scattered in a snowmobile trail that follows the highest portion of this ridge-like landform alongside a small creek. Nine shovel tests in apparently undisturbed areas in the vicinity of these finds recovered a single quartz core. Intact sandy sediments were identified in all tests. Given the presence of significant sites in similar lakeshore settings on Garnier Lake, the topographical complexity of the surrounding area, and the relatively limited testing carried out in the vicinity, **GaOp-21 is considered to have moderate significance, and avoidance or further investigations are recommended.** The site will not be impacted by the proposed Project development. **If future avoidance is not feasible, then further investigations in the form of systematic shovel testing relative to the development footprint is recommended.**

5.12 GaOp-22

GaOp-22 is a small Precontact campsite scatter in a largely undisturbed, wooded setting on an elevated relict beach landform near the northwest margin of Bluet Lake. The site consists of one quartzite utilized spall tool and a quartzite flake and three fragments of fire-broken rock widely scattered in a snowmobile trail that follows the highest portion of this ridge-like landform alongside a small creek. Nine shovel tests in apparently undisturbed areas in the vicinity of these finds recovered a single quartz core, and intact sandy sediments were identified in all tests. Given the presence of significant sites in

similar lakeshore settings on Garnier Lake, the topographical complexity of the surrounding area and the relatively limited testing carried out in the vicinity, **GaOp-22 is considered to have moderate significance, and avoidance or further investigations are recommended.** The will not be impacted by the proposed Project development. **If future avoidance is not feasible, then further investigations in the form of systematic shovel testing relative to the development footprint is recommended.**

5.13 GaOp-23

GaOp-23 is a small Precontact lithic scatter in a partly disturbed, mixed wooded and open setting on a slightly elevated dune or relict beach landform south of Muriel Lake. It consists of one quartzite biface fragment and four pieces of quartzite and quartz debitage noted on the surface in a sandy area traversed by vehicle trails, pipeline right-of-ways, small pit excavations, and other disturbances. Seven shovel tests in the vicinity revealed undifferentiated sands, indicating extensive previous disturbances. Given the presence of significant sites in similar lakeshore settings near Muriel Lake, the topographical complexity of the surrounding area, and the relatively limited testing carried out in the vicinity, **GaOp-23 is considered to have moderate significance, and avoidance or further investigations are recommended.** The site will not be impacted by the proposed Project development. **If future impacts become possible, then further investigation in the form of systematic shovel testing relative to the development footprint is recommended.**

5.14 GaOp-24

GaOp-24 is a small Precontact lithic scatter in a disturbed, cultivated field in an elevated upland setting, overlooking both a small creek and Muriel Lake to the northwest. Six widely scattered lithic artifacts were noted in surface exposures, consisting of three chert, two quartzite, and one siltstone flakes or flake fragments. Seven shovel tests in the vicinity did not reveal any intact deposits or additional subsurface cultural materials. Given the degree of previous disturbance due to cultivation, **GaOp-24 is considered to have limited significance. However, given the topographical complexity of the surrounding area and the relatively limited testing carried out in the vicinity, further investigations in the site vicinity are warranted.** The site will not be impacted by the proposed Project development. **If future impacts in this area become possible, then further investigations in the form of systematic shovel testing relative to the development footprint is recommended.**

5.15 GaOp-25

GaOp-25 is a small Precontact lithic scatter on a well-defined knoll in an otherwise flat, poorly-drained area in an upland setting. The knoll has been previously disturbed by an access road which slices through the landform. It consists of six scattered lithic artifacts exposed in the roadside cut and includes four quartzite and two massive quartz flakes or flake fragments. Eighteen shovel tests on intact portions of the knoll yielded single chert, quartzite and quartz flakes in three separate shovel tests. Given the degree of previous disturbance due to the access road and the limited returns from shovel testing, **GaOp-25 is considered to have limited significance.** Given that this knoll is the only well-defined landform in the immediate vicinity, further investigations in the site vicinity are not warranted. The site will not be impacted by the proposed Project development.. **No further investigations are recommended.**

5.16 GaOp-26

GaOp-26 likely represents the partial remains of an early historic trail indicated on the 1908 Dominion of Canada Township Plan. On the Plan this unnamed trail is indicated as a meandering, east-west track through Sections 19-24, described as “rolling country covered with spruce, birch, tamarack, willow, and poplar”. At the GaOp-26 locality, an overgrown but cleared and flattened trail-way with noticeable side-bank berms is apparent. The site will not be impacted by the proposed Project development. **GaOp-26 is considered to have limited significance and no further investigations are recommended.**

5.17 GaOp-27

GaOp-27 is a Precontact campsite scatter of lithic artifacts and fire-broken rock fragments in an undisturbed, wooded, setting on a low, creekside bench overlooking the confluence of two creeks near Muriel Lake. The site consists of a relatively dense of subsurface cultural materials recovered in shovel tests. Surface disturbances in the area are minimal, and no cultural materials were noted in any exposures. Of 41 shovel tests excavated in the site area, ten were positive yielding one quartzite bifacial tool, 11 quartzite flakes, and seven pieces of fire-broken rock. **GaOp-27 is deemed to have moderate significance, and avoidance or further investigations are recommended.** The site will not be impacted by the proposed Project development. **If future avoidance is not feasible, then further investigations in the form of sixteen to twenty square meters (16-20 m²) is recommended.**

5.18 GaOp-28

GaOp-28 is a small Precontact lithic scatter in a largely disturbed, mixed wooded and open setting on a slightly elevated dune or relict beach landform south of Muriel Lake. It consists of six pieces of quartzite and quartz debitage noted on the surface in a roadside cut. The landform has been cut on both the north and south aspect by road construction, and appears to have been artificially flattened. Surface visibility across the site is extremely good and it appears that the site area has been totally disturbed. Consequently no shovel tests were excavated here. Based on the degree of previous disturbance, **GaOp-28 is considered to have limited significance, and no further investigations are recommended.** The site will not be impacted by the proposed Project development.

5.19 GaOo-4

GaOo-4 likely represents the partial remains of an early historic trail indicated on the 1908 Dominion of Canada Township Plan. On the Plan this unnamed trail is indicated as a meandering, east-west track through Sections 19-24, described as “rolling country covered with spruce, birch, tamarack, willow and poplar. At the GaOo-4 locality, an overgrown but cleared and flattened trail-way, with noticeable side-bank berms is apparent. The trail may be impacted by elements of Project development, but **the GaOo-4 trail is deemed to have limited significance and no further investigations are recommended.**

6.0 PROJECT-SPECIFIC AND CUMULATIVE IMPACTS

Development in the immediate areas in which archaeological sites are located would result in negative and high impacts to the condition of the sites themselves, although the impacts to archaeological knowledge not necessarily so. Impacts are mitigated during Project design by the use of constraints

mapping so as to avoid development at site locations. The evaluation of impacts is closely related to the assessment of site significance, based on interpretation.

The construction of Project components located on, or immediately adjacent to any of the archaeological sites recorded, would disturb or impact those sites. The removal of vegetation will result in subsurface disturbance of sediments, which results in the modification of the internal structure of archaeological sites. Any disturbance to the original context of artifacts within a site causes information about the manufacture and use of those artifacts to be lost or compromised. That being the case, the seriousness of the loss of information on any individual site correlates with the significance of that site with respect to the regional understanding of past human settlement.

Eighteen sites within the study area have been deemed significant enough to warrant mitigative measures should avoidance not be possible (see [Tables 4.1 and 4.2](#)). These sites are all relatively small and localized, although each has characteristics which suggests it may contain more significant data upon further examination.

Further archaeological examination of these sites is recommended if they cannot be permanently avoided during the construction and operation of the Project. The number of archaeological sites identified during the most recent studies in the area indicates a relatively high density of sites in the area, contrary to the results predicted based upon previous linear development HRIAs that traverse the area.

Given the above noted density of archaeological sites, and the preliminary nature of impact assessment activities in much of the study area, additional examinations in relatively undisturbed high potential lands that have not been subject to previous examination are recommended. These lands are indicated in [Figure 6.1](#). HRIA level examination in these lands should precede any ground-disturbing construction activities.

7.0 IMPACT OF PROJECT UPSETS ON HISTORIC RESOURCES

Historic sites identified in the study area are very localized in extent. Because of this, there would be no impact upon historic resources unless upsets occur in the immediate area of a historic resource site. Spills and leaks are the most likely type of upset condition to occur as a result of Project construction and operation.

If a spill or leak is confined to areas that have been previously disturbed by development (e.g., on well pads or pipeline right-of-ways), historic resources will not be a concern, as they will have been mitigated previous to development. If the spill is more widespread and contacts historic resource sites listed as moderate potential, the impact of the spill itself will be minimal, although materials hazardous to human health could require modification of excavation methods and could damage the site.

8.0 SUMMARY OF IMPACTS

The objectives of this HRIA were the identification and assessment of historical resources. These were achieved through baseline research centred on the collection of archaeological site data for the study area and a literature review of sedimentary and geomorphological information. The location and field assessment of new sites was achieved through the examination of exposed surface sediments and subsurface excavations in the form of shovel tests in target areas at regular intervals.

The study area is large, and a reasonably high number of significant archaeological sites are known from previous studies or were recorded during this HRIA. Twenty-four sites had been previously recorded within the study area. Precontact sites ranged from isolated finds (n=5), to small artifact scatters (n=5), to campsites (n=8). Previously recorded Historic sites consisted of a trail (n=1), cemetery (n=1), and early homestead/farmsteads (n=4). In 2013 a total of 24 target areas were surveyed in the study area in which a total of 746 shovel prospects were excavated. Nineteen archaeological sites, including 16 Precontact Aboriginal sites and three Historic sites were newly recorded.

The Lindbergh SAGD Expansion Project will avoid most of the identified significant historic sites, therefore impacts to historical resources are expected to be low. Impacts to individual sites will be reviewed by Alberta Culture upon receipt of final development plans, and appropriate site mitigation requirements will be issued. No cumulative effects are anticipated.

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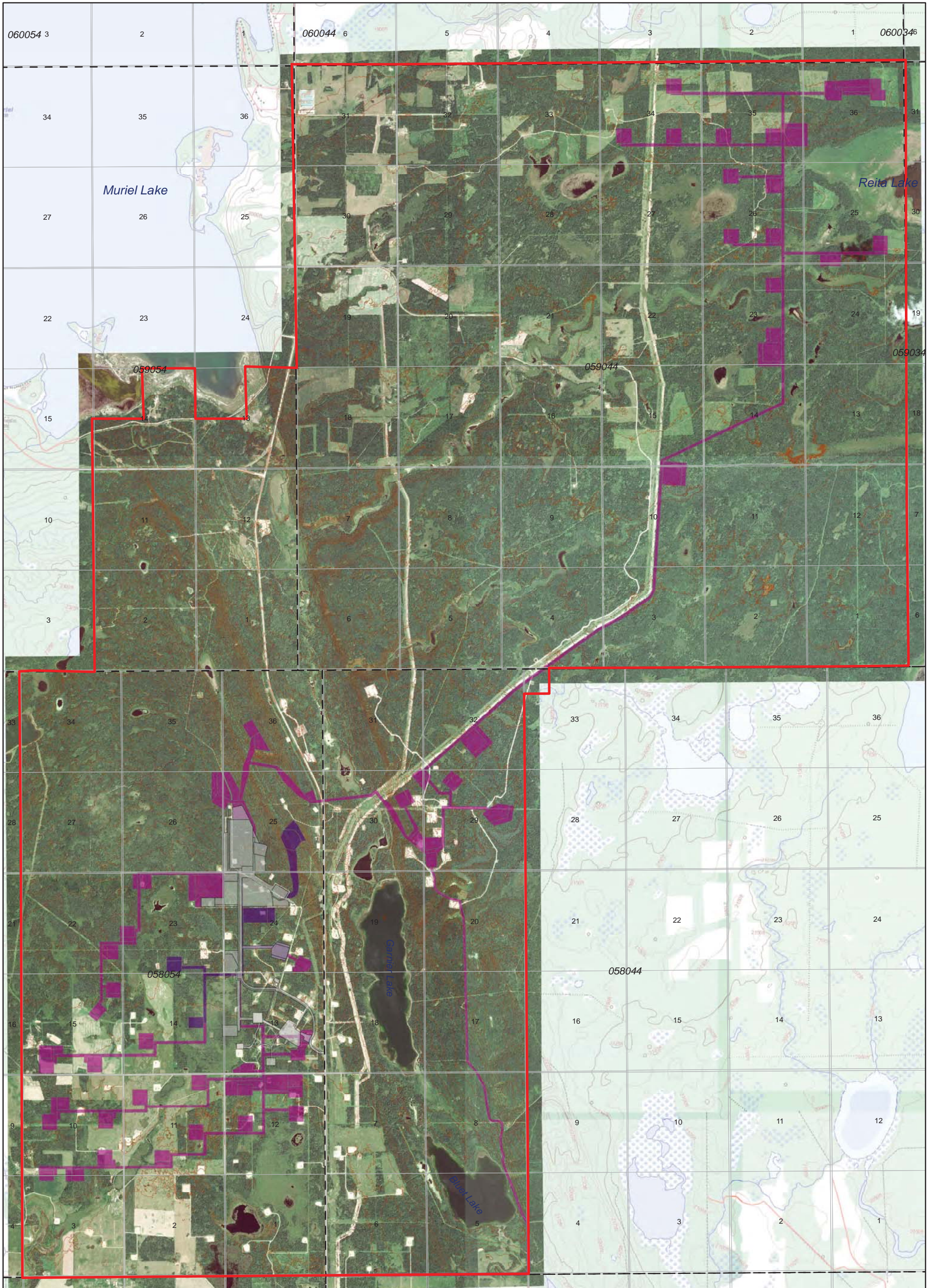


Figure 2.1: Study Area and Development Plans



1:57,000

Legend

- Study Area
 - Existing and Approved Development
 - Proposed Footprint**
 - Future Development
 - Initial Development
- Townships 058044

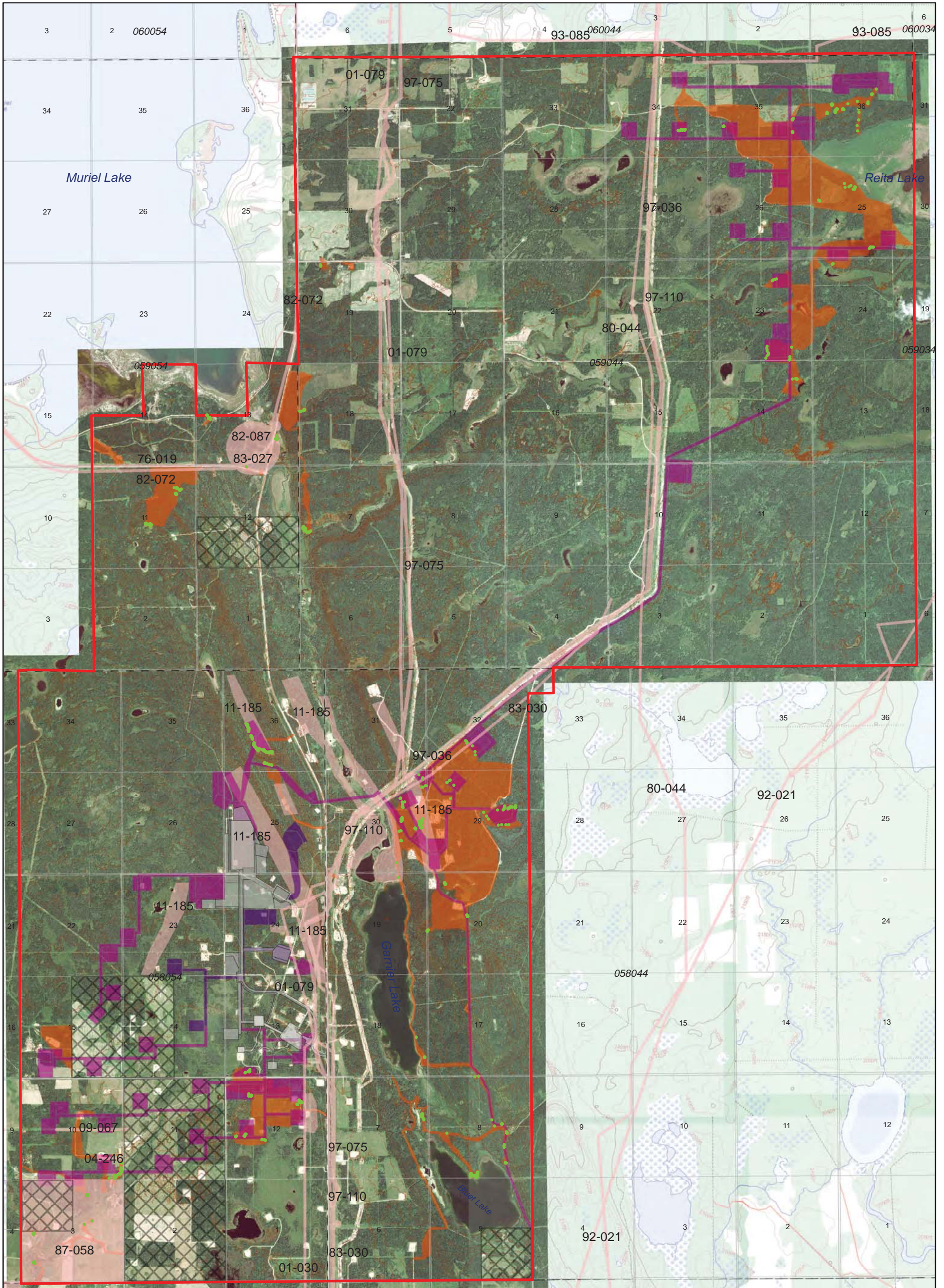


Figure 3.1: Baseline Conditions: Previous Studies and Concerns



0 0.5 1 2 3 4 Kilometers 1:57,000

Legend

- Areas Examined 2013
- Shovel Tests
- Access Denied
- Previous HRIA
- Study Area
- Existing and Approved Development
- Proposed Footprint**
- Future Development
- Initial Development

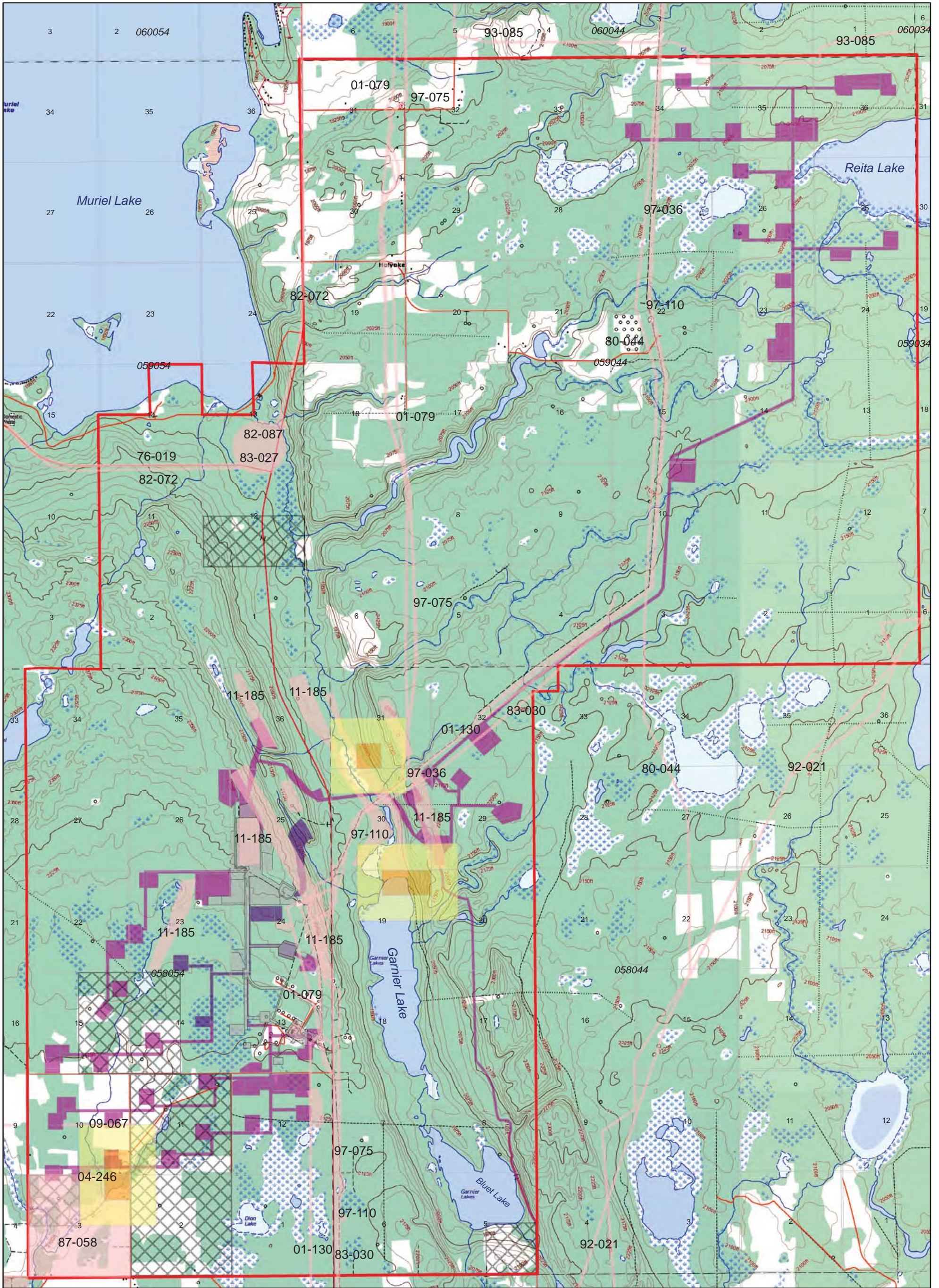


Figure 5.1: Areas Examined during HRIA



1:57,000

Legend

Listing of Historic Resources Sep 2013

- HRV**
- 1
 - 2
 - 3
 - 4
 - 5
- Access Denied

- Study Area
- Existing and Approved Development
- Proposed Footprint**
 - Future Development
 - Initial Development
 - Previous HRIA
- Townships 58044

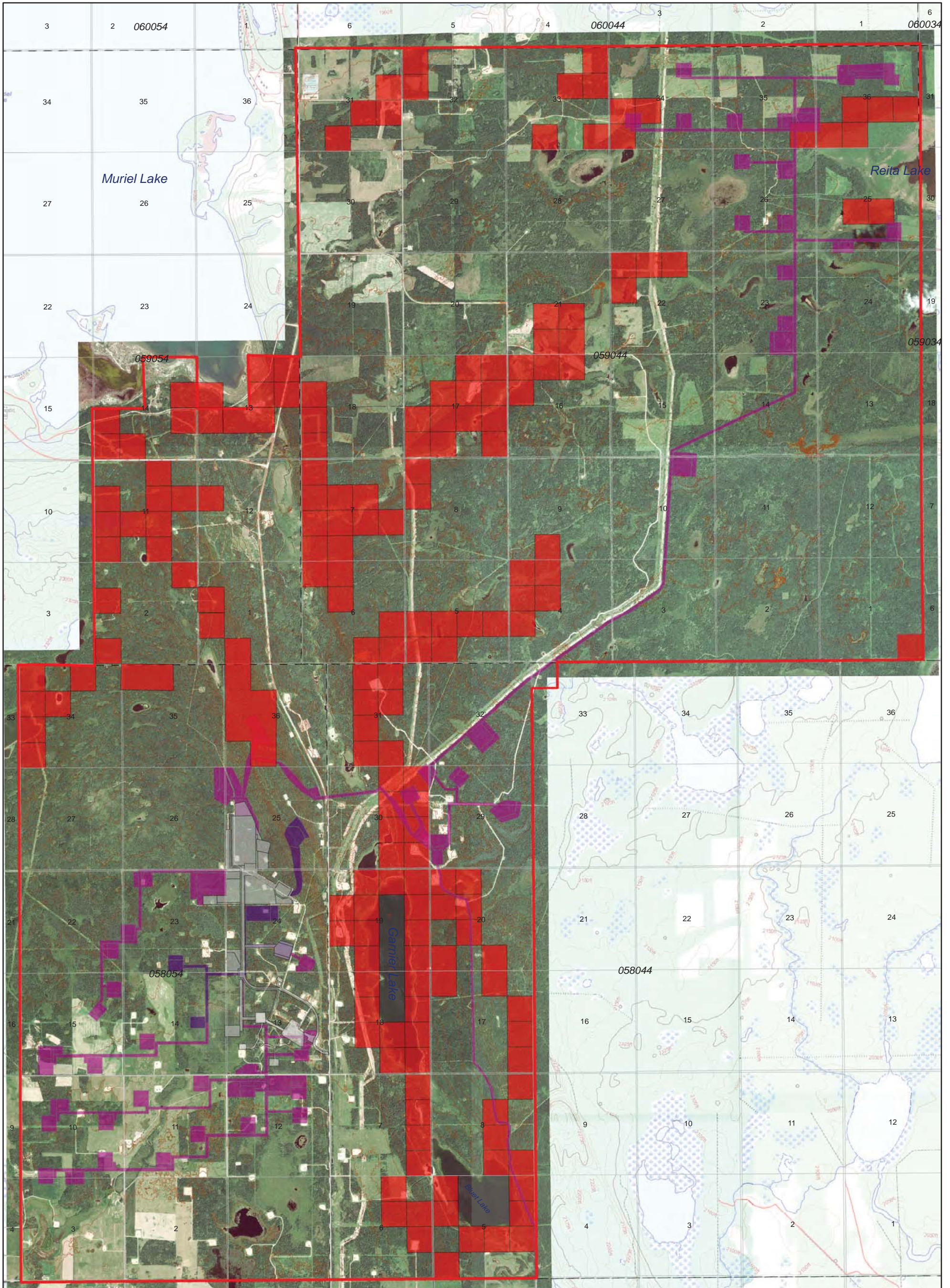



Figure 6.1: Areas Recommended for Future Study




 Kilometers

1:57,000

Legend

- Study Area
- High Potential Areas
- Existing and Approved Development
- Proposed Footprint**
- Future Development
- Initial Development
- Townships 058044

Appendix A – Correspondence and Schedule Letters from Alberta Culture

HISTORICAL RESOURCES ACT (HRA) REQUIREMENTS

**PENGROWTH ENERGY CORPORATION
LINBERGH SAGD EXPANSION PROJECT
TOWNSHIPS 58 & 59, RANGES 4 & 5, W4M**

**HRA REQUIREMENTS 4750130012-001
(Schedule "A")**

The following requirements are based upon the premise that Pengrowth Energy Corporation is sponsoring archaeological resources studies as part of future submissions to the Government of Alberta. For the purposes of this schedule, Pengrowth Energy Corporation shall be referred to as the "Proponent", the Lindbergh Expansion Project shall be referred to as the "Project", and the lands included within the boundaries of the Project shall be referred to as the "Project area." The Project area and footprints associated with the Project's initial developments and future developments are illustrated on the attached copy of Figure: 1 *Proposed Disturbance Footprint*.

1.0 ARCHAEOLOGICAL RESOURCES

The potential for the Project to affect archaeological resources is high.

1.1 Historic Resources Impact Assessment

Pursuant to Section 37(2) of the *Historical Resources Act (HRA, or Act)*, a Historic Resources Impact Assessment (HRIA) for archaeological resources and any work resulting from this assessment is to be conducted on behalf of the Proponent by an archaeologist qualified to hold an Archaeological Research Permit within the Province of Alberta. In order to conduct the HRIA, the archaeological consultant must submit "An Application for an Archaeological Research Permit - Mitigative Research Project" to the Historic Resources Management Branch, Heritage Division, Alberta Culture. Please allow ten working days for the permit to be processed. An approved permit must be issued prior to the initiation of any archaeological field investigations.

1.1.1 Alberta Regulation 254/2002

Archaeological investigations conducted under permit in Alberta are subject to the conditions stated within Alberta Regulation 254/2002, *Archaeological and Palaeontological Research Permit Regulation*, conditions set forth in the approved permit, and any other conditions that the Minister imposes under Section 30 of the Act.

1.1.2 Contacting the Archaeological Survey

For further information regarding the acquisition of a Permit to Excavate Archaeological Resources and/or archaeological consultant obligations under Alberta Regulation 254/2002,

HRA REQUIREMENTS 4750130012-001 PENGROWTH LINDBERGH SAGD EXPANSION PROJECT

please contact Martina Purdon (Head, Archaeological Information & Regulatory Approvals) at 780-431-2331 (toll-free by dialing 310-0000), or by e-mail at martina.purdon@gov.ab.ca.

1.1.3 Coverage

The coverage of the field studies for archaeological resources takes into account the information and recommendations contained within Lifeways of Canada Limited's (Lifeways') "*Statement of Justification for Historical Resources Act Requirements projects other than small-scale oil and gas*" (Statement of Justification) submitted as an attachment to "Application for Historical Resources Act Clearance" (HRA application) No. 4385043.

The footprint of the initial development components of the Project is to be the subject of HRIA level studies. Additional studies may include "high" and "moderate" potential portions of the Project area, focusing upon the prospective footprint of future development components. Any studies which do not focus upon the footprint of initial development components are considered as "baseline" studies. Baseline studies provide an archaeological consultant with flexibility in sampling the Project area, including areas considered to possess "low" archaeological potential.

1.1.4 Relationship to known sites in Project area

Seven prehistoric archaeological sites (GaOp 1, GaOp 6, GaOp 7, GaOp 8, GaOp 11, FIOp 14 and FIOp 15) requiring avoidance or the conduct of additional archaeological studies have been recorded within the Project area. During the conduct of the archaeological studies, the Proponent's archaeological consultant is to confirm the status of those sites (FIOp 14 and FIOp 15) situated within the same sections as the footprint of Project components illustrated on Figure 1.

1.1.5 Recording and reporting the presence of historic structures

Several historic sites, mainly the remains of farmsteads, have been recorded within the Project area. One of these sites, consisting of a log dwelling, is located in the SE ¼ of Section 10-58-5-W4M within the vicinity of future Project developments. During the conduct of the archaeological resources studies, the Proponent's archaeological consultant is to confirm the current status of this dwelling. If this dwelling and other historic structures are encountered during the archaeological studies, the directions included in the *Requirements for recording and reporting historic structures within the context of archaeological HRIAs* (February 12, 2012) will apply. The final report must address these historic structures and include Heritage Survey Site forms, photographs and supporting documents for any potentially impacted standing or partly standing structures thought to be constructed prior to 1960.

HRA REQUIREMENTS 4750130012-001 PENGROWTH LINDBERGH SAGD EXPANSION PROJECT

1.1.6 Timing

The archaeological studies are to be carried out under snow-free, unfrozen ground conditions. Should the Project require field studies under winter conditions, directions in the Archaeological Survey's *Survey Notes and Instructions: Information Bulletin Regarding Winter HRIA Work* must be followed.

1.1.7 Deep Testing

A deep testing program may be required in areas of significant sedimentation.

1.2 Reporting the results of archaeological resources studies

1.2.1 Submission of "Archaeological Site Inventory Data" forms

The Proponent's archaeological consultant is required to submit "Archaeological Site Inventory Data" forms for each prehistoric and historic archaeological site recorded or re-examined during the conduct of the archaeological studies. While the discovery of a site must be reported within 30 days following the date of discovery, site data forms are to be submitted within 30 days of the date on which the permit period ends, or at the same time or prior to the submission of the final report, whichever comes first.

1.2.2 Submission of final report

Three copies of the final report are to be submitted to the Historic Resources Management Branch, Heritage Division, Alberta Culture, Old St. Stephen's College, 8820 – 112 Street, Edmonton, Alberta, T6G 2P8. The final report must be submitted within 180 days after the expiration of the permit, at the same time or prior to the filing of Environmental Impact Assessment documents, whichever comes first.

1.2.3 Location of baseline studies

Within the final report, the location of pedestrian surveys, deep testing program(s) and the location and number of shovel tests must be discussed and clearly illustrated. The relationship between the archaeological studies and the conceptualized footprint(s) of Project components must also be clearly illustrated and discussed. Within the final report the Proponent's archaeological consultant must also confirm the relationship of potential impact zones associated with the Project versus the log dwelling in the SE ¼ of Section 10-58-5-W4M, FIOp 14, FIOp 15, and any other relevant sites.

HRA REQUIREMENTS 4750130012-001 PENGROWTH LINDBERGH SAGD EXPANSION PROJECT

1.2.4 Archaeological sensitivity

Within the final report, the Proponent's archaeological consultant must discuss the environmental and/or cultural attributes used to divide the Project area into archaeological resource potential zones and discuss the rationale for physically examining specific components / areas of the Project while excluding other components / areas. The archaeological consultant must also provide a discussion evaluating the efficacy of the archaeological resource sensitivity model used to direct the archaeological studies. These modifications should incorporate the results of archaeological resources studies and/or any other newly available data. If modifications are made to these zones, they should be illustrated in a map(s) in the final report. A GIS compatible version of the archaeological resource potential model should be submitted to Robin Woywitka, (Cultural Land Use Analyst) at robin.woywitka@gov.ab.ca.

2.0 ABORIGINAL TRADITIONAL USE SITES

There are currently no anticipated impacts to known Aboriginal Traditional Use Sites associated with the Project area. However, Alberta Culture is aware that local First Nations generally use the area and may have Traditional Use Sites within the proposed Project area. There are no First Nations consultation requirements at this time, but it is recommended that the Aboriginal Traditional Use Sites referred to in Lifeways' Statement of Justification be avoided and reported to the Aboriginal Heritage Section of Alberta Culture following instructions in Attachment 1 *Standard Requirements under the Historical Resources Act, Reporting the Discovery of Historic Resources*.

During the conduct of continuing consultation processes associated with the EIA, representatives and/or agents acting on behalf of the Proponent may become aware of and/or encounter additional Aboriginal Traditional Use Sites *e.g.* trails (FIOP 44), which Alberta Culture may consider as historic resources under the Act. Under these circumstances, the Proponent's archaeological consultant should attempt to include the results of Traditional Land Use studies in the field strategy associated with the archaeological studies. These studies must not include any site disturbance activities. This condition only applies to those types of sites described in Attachment 2, *Aboriginal Traditional Use Sites*.

2.1 Contacting the Aboriginal Heritage Section

For further information regarding Aboriginal Traditional Use Sites which Alberta Culture may consider as historic resources under the Act, please contact Valerie Knaga (Director, Aboriginal Heritage) at 780-431-2371 (toll-free by dialing 310-0000) or by e-mail at valerie.k.knaga@gov.ab.ca.

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3.0 REPORTING THE DISCOVERY OF HISTORIC RESOURCES

During the conduct of historic resources studies, a consultant may encounter historic resources that are not the subject of their field of expertise. Under this circumstance, the consultant must follow the instructions included in Attachment 1.

4.0 FURTHER SALVAGE, PRESERVATIVE OR PROTECTIVE MEASURES

Based upon the results of baseline HRIA studies and reporting of the discovery of historic resources in accordance with the instructions included within Attachment 1, the Proponent may be ordered to undertake further salvage, preservative or protective measures or take any other actions that the Minister responsible for the *Historical Resources Act* considers necessary.

5.0 HISTORICAL RESOURCES AND ENVIRONMENTAL IMPACT ASSESSMENTS

5.1 HRIA summary within EIA documents

Representatives of the Proponent and/or agents acting on the Proponent's behalf must ensure that the conditions stated in the *Historical Resources* section of the EIA final Terms of Reference are addressed within the EIA submission documents. The EIA submission documents must include a section dedicated to historic resources, including those types of Aboriginal Traditional Use Sites considered as historic resources under the *Historical Resources Act*. This section should contain a summary of the HRIA studies carried out for the Project. Within the EIA document, the precise location of historic resource sites is to be masked by the use of appropriate sized icons and mapping scales.

5.2 HRA clearance for projects requiring the submission of EIAs

For projects requiring the submission of EIAs, *Historical Resources Act* approval is not granted until after the completion of the public participation processes *i.e.* after the Alberta Energy Regulator (AER) has granted project approval. Alberta Culture will consider requests for clearance after AER approval has been granted, or should AER approval be pending.

6.0 PRE-EMINENCE OF CONDITIONS OF HRA REQUIREMENTS

Should the contents of conditions included within this schedule be at variance with any instructions associated with the *Listing of Historic Resources* and/or the permit application, the conditions of the schedule take precedence. Following instructions as outlined in this schedule should result in the granting of *Historical Resources Act* approval and/or the issuance of requirements regarding further historic resources studies in a timely manner.

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7.0 COMPLIANCE IS MANDATORY

These conditions shall be considered directions of the Minister of Alberta Culture under the *Act*. The Proponent and agents acting on behalf of the Proponent are required to become knowledgeable of the conditions. Failure to abide by the conditions will result in Historical Resources Act approval not being granted, or delayed.