

MAR 20140010: FIREBAG-MARGUERITE

Firebag-Marguerite - A report on dolomite exploration near Firebag-Marguerite, Northern Alberta.

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20140010

GRAYMONT WESTERN CANADA INC.
2014 EXPLORATION AND FIELDWORK
WITHIN THE FIREBAG-MARGUERITE
METALLIC AND INDUSTRIAL MINERALS PERMITS,
NORTHERN ALBERTA

PART B

Metallic and Industrial Minerals Permits
9302090611, 9302090612 and 9304091073

Geographic Coordinates

57°38' N to 57°45' N
110°52' W to 111°25' W

NTS Sheets
74E/10, 74E/11, 74E/14, 74E/15

Owner and Operator: MAIM Permits 9302090611, 9302090612 and 9304091073
Graymont Western Canada Inc.
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Date Submitted: November 7, 2014

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1.

SUMMARY

During August and September, 2014, areas along Marguerite River and within MAIM Permits 9302090611, 9302090612 and 9304091073 were explored for high quality dolomite rocks. Dolomite aggregate potential exists in the Middle Devonian Methy Formation, which outcrops east of Athabasca River along Firebag and Marguerite Rivers. The exploration conducted in 2014 was a follow-up to previous exploration conducted in the area in 2004 and 2006.

The banks of Marguerite River were prospected, and any identified outcrops were mapped and sampled. Helicopter landing spots were also recorded. A total of 10 samples were collected and sent to a laboratory for whole-rock analysis. Outcrop exposure was scarce and limited to the river banks.

Throughout this report attitudes of bedding and other planar features are given as A°/B° SW, where A° is the azimuth of the strike and B° is the amount of dip in the direction indicated (right-hand rule). A magnetic declination of $14^{\circ}10'$ east was used. Where bedding was not evident, stratigraphic thicknesses were calculated using orientations from adjacent units. Where more than one bedding orientation was measured, the mean orientation is used.

2.

INTRODUCTION

The 2014 exploration within the Firebag-Marguerite Permits was carried out by Dahrouge Geological Consulting Ltd. (Dahrouge), on behalf of Graymont Western Canada Inc. (Graymont). This assessment report describes the exploration conducted within MAIM Permits 9302090611, 9302090612 and 9304091073 near Marguerite River, north of Fort McMurray. Darren Anderson, geologist for Graymont Western Canada Inc., authorized this work.

The objectives of the 2014 exploration were to expand on the previously under-explored areas, and to locate and better define carbonate units along Marguerite River. This report includes information on the geology and quality of carbonates encountered while mapping and sampling outcrops within the permit area.

3. GEOGRAPHIC SETTING AND ACCESS

3.1 LOCATION AND ACCESS

The Firebag-Marguerite Property encompasses an area about 70 km north of Fort McKay. Fort McKay is located roughly 55 km west of the Alberta-Saskatchewan border and 50 km north of Fort McMurray. Fort McMurray is located at the confluence of Athabasca and Clearwater rivers in northeast Alberta (Fig. 3.1)

During the 2014 exploration, the property was accessed by helicopter, which was based out of Fort McMurray. During the summer, portions of the property are accessible by all-terrain vehicle along the winter road to Fort Chipewyan, which begins at the northern end of Highway 63, about 50 km north of Fort McKay (Fig. 3.2). During the winter, portions of the property are accessible by four wheel drive vehicles, utilizing the Athabasca Winter Road. A large portion of the property is only accessible by helicopter.

3.2 INFRASTRUCTURE

Accommodations, food, fuel and other necessary services are available in Fort McMurray. The local economy is primarily based on energy-based industries and forestry.

Fort McMurray, with a population of about 61,000, is accessed by traveling 435 km north of Edmonton along Highway 63. Fort McMurray airport is regularly serviced by Air Canada and Westjet with daily flights to and from Edmonton, Calgary, Saskatoon, Toronto, and Vancouver.

3.3 TOPOGRAPHY, VEGETATION AND CLIMATE

The permits include parts of the Athabasca, Firebag and Marguerite rivers, which create topographically lower valleys with slumping along their banks. The valley bottoms have gentle relief and are generally covered by a veneer of unconsolidated, fluvial silts, sands and gravels. Areas surrounding the river valleys are relatively flat with shallow slopes. Outcrop exposure within the area is poor, and is restricted to a few banks along the rivers. Most of the area is covered by Quaternary surficial deposits of preglacial, glacial and postglacial sediments.

Within well-drained areas, vegetation commonly consists of boreal forest cover, including white spruce, aspen and jack pine. Within lower areas along the river valleys and muskegs, vegetation includes a mix of deciduous and coniferous trees, including black spruce, willow, birch and sphagnum moss.

In the Fort McMurray area, mean annual snowfall is 47.2 inches and mean annual precipitation is 16.32 inches. River breakup generally occurs in the third week of April. Fort McMurray has an average summer temperature of 17° C and winter temperature of -19° C, with extremes of 37°C and -50°C.

3.4 FIELD OPERATIONS

Field operations were conducted by a two-person geological crew from Dahrouge, based in a hotel in Fort McMurray.

Transportation to, from and within the property was by helicopter. The remainder of the exploration was carried out on foot.

Garmin GPSmap 60Cx instruments were used to mark outcrop locations and record helicopter access information. Compasses were set to a magnetic declination of 14°10' east.

4. PROPERTY, EXPLORATION AND EXPENDITURES

4.1 PROPERTY SUMMARY

Graymont acquired MAIM Permits 9302090611 and 9302090612 north of Fort McKay in 2002 to cover Athabasca, Firebag and Marguerite rivers. A third MAIM Permit, 9304091073, was acquired directly north and east of MAIM permit 9302090611 in 2004. Following 2006 exploration on the property, portions of these permits were released. The total permit area is currently 9,344 hectares (Fig. 4.1).

Based on the 2014 exploration, the entirety of the Firebag-Marguerite permit group will be retained.

4.2 2014 EXPLORATION SUMMARY

From August 27th to September 1st, 2014, Dahrouge, on behalf of Graymont, conducted exploration for carbonate lithotypes within northeastern Alberta. The main target was the middle Devonian Methy Formation and the work was undertaken to determine the location, quality and extent of carbonate units along the banks of Marguerite River in the permit area.

During prospecting, carbonate outcrops were examined and a total of 10 rock samples were collected (Fig. 4.2). Geological observations were recorded, including lithologic information, and other pertinent details (Appendix 2). A solution of 10% HCl was used to assess carbonate quality in the field, and rock samples were shipped to Central Lab of Graymont Western U.S. Inc. in Utah

for analyses (Appendix 3). Additionally, prospecting and mapping were carried out on the property. In some instances, interval thicknesses were determined by measuring outcrops perpendicular to bedding, where it could be identified. Field maps were completed on 1:40,000 scale map sheets and concentrated on areas along Marguerite River.

4.3 EXPLORATION EXPENDITURES

Expenditures for 2014 totaled \$54,026.79 (Appendix 1). The entirety of the Firebag-Marguerite permit group (MAIM Permits 9302090611, 9302090612 and 9304091073) will be retained. Excess expenditures, totaling \$2,773.79, are to be assigned to a future exploration period of permit 9302090611. The current permit area includes:

TABLE 4.1 LAND DESCRIPTION AND ALLOCATION OF EXPENDITURES

MAIM Permit	Land Description	Size (ha)	Assessment Period*	Expiry Date	Required Expenditures	Previous Credit	Assigned Expenditures
9302090611	4-8-100: 25L1-4; 26L1-4; 27L1-4; 28L1-4; 29L1-4; 30L1-4 4-7-100: 25-27; 28L1-4; 29L1-4; 30L1-4; 34-36	3,648	4	12/09/2018	\$54,720	\$26,961	\$30,532
9302090612	4-9-100: 2L3-6, 11-14; 3; 4L1-3, 6-11, 14-16; 10-11; 12L4-5, 12-13; 13L2-7, 10-15; 14-15; 22L1, 8-9, 16; 23-24; 25L1-4	2,496	4	12/09/2018	\$37,440	\$30,177	\$7,263
9304091073	4-7-101: 1-3; 10L1-8; 11L1-8; 12L1-8 4-6-101: 3-6; 7L1-8; 8L1-8; 9L1-8; 10L1-8 6-4-100: 37; 34	3,200	3	24/09/2018	\$32,000	\$15,769	\$16,231
Total:					\$124,160	\$72,907	\$54,026

*These permits were granted a long-term extension/reprieve due to L.A.R.P (Lower Athabasca Regional Plan).

5. REGIONAL GEOLOGY

The geology and stratigraphy of northeastern Alberta has previously been described by Carrigy (1959), Norris (1963), Holter (1976), and Cotterill and Hamilton (1995).

In northeastern Alberta, the sedimentary cover consists primarily of Paleozoic carbonates, evaporites and clastics, overlain unconformably by Mesozoic siliciclastics (Table 5.1). Devonian and Cretaceous stratigraphy thins to the north-east, as it onlaps with the Precambrian basement. In the Fort McMurray area, the Precambrian basement is at depths of 250 to 300 m and has a southeasterly regional slope of about 5.5 m per km (Halferdahl, 1985). The Precambrian basement is overlain by middle Devonian strata of the Elk Point Group, followed by the Beaverhill

Lake Group, and further west, the Woodbend Group. In turn, the Devonian is unconformably overlain by Cretaceous sediments of the Mannville, La Biche and Smoky Groups. The oil-sands of the McMurray Formation are within the lowest part of the Mannville Group.

Above the Cretaceous siliciclastics is a variety of unconsolidated Quaternary sediments. Near Fort McMurray there is a basal diamicton derived from the Laurentide Ice Sheet, which is overlain by gravel, sand and clay from glacial Lake McMurray (Fisher and Smith, 1993). Spillway deposits, common in the river valleys, consist of poorly sorted boulder-gravel-sand, with blocks of oil-sands and glacio-lacustrine sediments. Fisher and Smith (1993) interpret the spillway deposits as a result of a high-velocity flood, sourced from Glacial Lake Agassiz in northern Saskatchewan.

5.1 QUATERNARY GEOLOGY

Within the vicinity of Firebag River, the landscape has been shaped by glacial and post-glacial activity with the majority of surficial cover as the result of outwash sands, and some minor aeolian dune sands and meltwater sediments. The outwash sands are generally medium- to coarse-grained with pebbles and small gravel lenses; the aeolian sands are described as medium-grained quartz-rich sands. Meltwater channel sands and gravels are present along Athabasca River, consisting of medium- to coarse-grained sand, and various gravels. McPherson and Kathol (1977) created a drift thickness map of the Fort McKay area. Data was compiled from existing holes that were drilled for coal, petroleum and groundwater. Although the data was sparse for the Firebag River area, the map provides useful estimates for drift thickness.

5.2 STRATIGRAPHY

The sedimentary succession of northeastern Alberta comprises a lithologically diverse suite of Devonian carbonates, clastics and evaporates, which are unconformably overlain by Cretaceous siliciclastics. Of the stratigraphic units in Table 5.1, carbonates are present within the Methy Formation, the Slave Point Formation, the Waterways Formation, and the Woodbend Group (Fig. 5.1).

**TABLE 5.1 GENERALIZED PALEOZOIC STRATIGRAPHY OF THE FORT MCMURRAY
AREA, NORTHEASTERN ALBERTA***

System or Subsystem	Group	Formation	Member
Quaternary			
Upper Cretaceous	Smoky		
	La Biche	La Biche	
		Shaftesbury	
Lower Cretaceous	Mannville	Grand Rapids	
		Clearwater	Wabiskaw
		McMurray	
	Woodbend	Grosmont	
Ireton			
Cooking Lake			
Upper Devonian	Beaverhill Lake	Waterways	Mildred
			Moberly
			Christina
			Calumet
			Firebag
Middle Devonian	Upper Elk Point	Slave Point/ Fort Vermillion	
		Watt Mountain	
		Prairie Evaporite	
		Methy/Winnipegosis	
	Lower Elk Point	Meadow Lake/ McLean River/Contact Rapids	
Lower Paleozoic		La Loche/ Granite Wash	
Precambrian			

*Modified after Halferdahl (1985); Cotteril and Hamilton (1995)

5.2.1 Methy Formation

The Methy Formation is within the upper Elk Point Group of the Middle Devonian. The formation is a reefal to non-reefal unit containing massive to bedded dolostone, dolomitic limestone and minor anhydrite and gypsum (Cotterill and Hamilton, 1995). The Methy outcrops along Clearwater River valley, and sparsely along Firebag and Marguerite rivers. It is generally a dolomitic unit with interbedded anhydrite that has been described as calcareous or strongly calcareous (Norris, 1963).

5.2.2 Slave Point Formation

The age of the Slave Point Formation has been debated in the past, placed within the Middle (Norris, 1963; Halferdahl, 1985) and Upper Devonian (Carrigy, 1973; Cotterill and Hamilton, 1995). Upper and lower contacts of the unit are defined by paraconformities. The Slave Point generally consists of limestone, siltstone and dolomitic limestone. It is characterized by brownish-grey, skeletal wackestones and argillaceous lime mudstones with interbedded dark-brown shale laminations (Cotterill and Hamilton, 1995). The Slave Point Formation is generally less than several metres thick near Fort McMurray.

5.2.3 Waterways Formation

Members within the Waterways Formation consist of the Firebag, Calumet, Christina, Moberly, and Mildred. The carbonates of the Waterways Formation reach a thickness of over 250 m in western Alberta, and thin toward the Precambrian exposure. The Firebag Member is at the base of the Waterways Formation, and consists of an olive-green calcareous shale. Sequences of interbedded olive-green limestone, argillaceous limestone and shale are also present; Norris (1963) notes several thin brachiopod-rich beds throughout. The Firebag maintains a relatively uniform thickness of about 50 m in the Fort McMurray area.

The Calumet Member conformably overlies the Firebag Member, and consists dominantly of limestone. Other units within the member include variable amounts of argillaceous, skeletal nodular lime mudstones and wackestones interbedded with grey-green calcareous shale (Cotterill and Hamilton, 1995). Norris (1963) notes significant brachiopod-rich beds in the Calumet Member. In the Fort McMurray area, the Calumet Member maintains a thickness of about 30 m.

The Christina Member consists dominantly of green-grey calcareous shale and conformably overlies the Calumet Member. Other lithologies within the upper section of the Christina Member include minor interbeds of argillaceous lime mudstone and occasional thin, skeletal wackestone

and packstone beds. In the Fort McMurray area, the Christina Member attains a thickness of approximately 25 m.

Conformably overlying the Christina is the Moberly Member. The lower one-third of the Moberly Member, labelled units 28 to 37 by Norris (1963), consists of an alternating sequence of light olive green, rubbly, thinly-interbedded, variably argillaceous limestones and shales, and hard beds of pale-brown, cryptocrystalline limestones. The upper two-thirds, units 38 to 57, consist of thicker units of light- to dark-olive-green, variably calcareous shale, and thinner units of rubbly, variably argillaceous fragmental limestone. The Moberly Member attains a thickness of about 60 m in the Fort McMurray area.

The uppermost member of the Waterways Formation is the Mildred Member. This unit is characterized by variably argillaceous, nodular lime mudstone and calcareous shales. The Mildred Member is typically 40-45 m thick.

5.2.4 Woodbend Group

The Woodbend Group consists of limestones from the Grosmont, Ireton, and Cooking Lake formations. The majority of examined Grosmont Formation limestones in the Fort McMurray area are dolomitic with minor anhydrite (Halferdahl, 1985). The underlying Ireton Formation has been described as an argillaceous, medium- to coarse-grained limestone accompanied by limey shale. Some limestones of the Cooking Lake Formation have been noted as dolomitic and argillaceous (Halferdahl, 1985).

5.3 STRUCTURE

The Devonian and Cretaceous sedimentary sequences onlap onto the Precambrian cratonic platform, forming two eastwardly converging sedimentary wedges. The southwest regional dip of the Devonian strata follows the contour of the underlying Precambrian basement, which has an apparent northwest strike and southwest dip. Near Fort McMurray the Precambrian basement is at depths of between 250 to 300 m and has a southwesterly regional slope of about 5½ m per km (Halferdahl, 1985).

The westward dipping wedge of Devonian and underlying sediments rest unconformably on the Precambrian basement. The Devonian sediments are younger to the west. The top of the wedge is marked by an erosional surface that is overlain by Lower Cretaceous strata. Structural complexities within the sedimentary succession are thought to be due to salt dissolution of the Lower Devonian evaporites. The result is a set of small scale domes, basins and folds, with

amplitudes of between 15 and 30 m. Topographic structures of the sub-Cretaceous unconformity are due to differential erosion of the underlying Devonian sediments. The result is a generally northward trending set of ridges and valleys.

6.

RESULTS

Five days were spent checking property access and outlining carbonate outcrops along the banks of Marguerite River. The 2014 exploration consisted of prospecting and sampling of any identified outcrops.

Carbonate lithologies of the Methy Formation were examined and sampled along Marguerite River, east of Athabasca River (Fig. 4.2). A total of 10 outcrops were identified and sampled (three chip samples and seven grab samples), all of which were within the Methy Formation (Appendix 2). These samples generally consisted of cryptocrystalline to fine grained, light brown to light grey, vuggy and resistant dolomite to wackestone, and had a weak reaction to 10% hydrochloric acid when powdered.

Outcrop exposure on the property was scarce and limited to the banks of Marguerite River. The river bed and banks consisted of mostly clean fine grained unconsolidated sands, and in situ dolomite outcrop was limited to the banks of fast-flowing sections of the river. Using a helicopter, an aerial search for outcrops was completed, and potential outcrop locations were recorded and later visited on foot. Additionally, regularly spaced helicopter landing spots along the river were visited and the surrounding area prospected for outcrop (Fig. 4.2).

The ten samples of Methy Formation yielded favorable analytical results for high-quality dolomite. Nine of the ten samples returned $MgCO_3$ values between 44% or 46%, while SiO_2 values ranged between 0.09% and 0.79% (Appendix 2). In addition, the dolomite outcrops were extremely hard and resistant.

7.

CONCLUSIONS

Several outcrops of the Methy Formation were identified and sampled along Marguerite River. Outcrop exposure is sparse and is restricted to the river banks. A total of 10 outcrops were identified, sampled and described in detail. Based on the samples collected during the 2014 exploration and overall property assessment, the entirety of the property will be retained.

Helicopter landing spots were identified and noted, which provide limited access to the interior of the property, primarily along the Marguerite River. ATV's, extensive hiking and/or helicopter support are required to reach much of the property.

Due to the lack of outcrop, diamond drilling is recommended as the next phase of exploration to accurately determine the depth of overburden to the underlying dolomite, and the thickness and quality of the Methy Formation.

8.

REFERENCES

- Carrigy, M.A. (1959) Geology of the McMurray Formation: Part III General Geology of the McMurray Area; Research Council of Alberta, Geological Division, Memoir 1, 130p.
- Carrigy, M.A. (1973) Introduction and General Geology *in* Guide to Athabasca Oil Sand Area; Alberta Research Council Information Series 65, p. 1-13.
- Cotterill, D. K. and Hamilton, W. N. (1995) Geology of Devonian Limestones in Northeastern Alberta; Alberta Research Council, Open File 1995-07.
- Dahrouge, J.R. and Kluczny, P. (2006) 2006 Exploration and Fieldwork at the Firebag River Metallic and Industrial Mineral Permits, Northern Alberta; ass. rept. for Graymont Western Canada Inc., Dahrouge Geological Consulting Ltd., Edmonton, 9p.
- Dahrouge, J.R. and Tanton, J. (2004) 2004 Exploration and Fieldwork at the Firebag River Metallic and Industrial Minerals Permits Near Fort MacKay, Northeast Alberta; ass. rept. for Graymont Western Canada Inc., Dahrouge Geological Consulting Ltd., Edmonton, 12p.
- Fisher, T.G. and Smith, D.G. (1993) Exploration for Pleistocene Aggregate Resources using Process-Depositional Models in the Fort McMurray Region, NE Alberta, Canada. *Quaternary International*, v. 20, p71-80.
- Halferdahl, L. B. (1985) Limestone Near Fort McMurray Northeastern Alberta and Northwestern Saskatchewan; private report by Halferdahl & Assoc. Ltd. for Steel Brothers Canada Ltd.
- Holter, M.E. (1976) Limestone Resources of Alberta; Alberta Research Council Economic Geological Report 4, p. 30-33.
- McPherson, R.A. and Kathol, C.P. (1977) Surficial Geology of Potential Mining Areas in the Athabasca Oil Sands Region; Alberta Research Council, Open File 1977-4, 180 pp.
- Norris, A.W. (1963) Devonian Stratigraphy of Northeastern Alberta and Northwestern Saskatchewan; Geological Survey of Canada, Memoir 313, 168p.

9. **STATEMENT OF QUALIFICATIONS**

I, Patrick Kluczny, [REDACTED] do hereby certify that:

- I am a geologist of Dahrouge Geological Consulting Ltd., Suite 18, 10509 - 81 Ave., Edmonton, Alberta, T6E 1X7.
- I am a 2006 graduate of the University of Alberta, Edmonton, Alberta with a B.Sc. in Geology.
- I have practiced my profession as a geologist continuously since 2006.
- I am a registered Professional Geologist with the Association of Professional Engineers and Geoscientists of Alberta, member M81985.
- I hereby consent to the copying or reproduction of this Assessment Report following the one-year confidentiality period.
- I am the author of the report entitled "2014 Exploration and Fieldwork within the Firebag-Marguerite Metallic and Industrial Minerals Permits, Northern Alberta" and accept responsibility for the veracity of technical data and results.

Dated this 7th day of November, 2014.

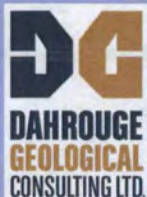
A circular professional seal for the Association of Professional Engineers and Geoscientists of Alberta (APEGA). The seal features a central emblem with a mountain, a river, and a sun. The text "PROFESSIONAL GEOLOGIST ALBERTA" is written around the perimeter, and "PATRICK KLUCZNY" is written across the center. A handwritten signature in blue ink is written over the seal.

Patrick Kluczny, B.Sc., P.Geol.

APEGA M81985

**APPENDIX 1: COST STATEMENT FOR THE 2014 EXPLORATION WITHIN THE
FIREBAG-MARGUERITE MAIM PERMITS**

a) <u>Personnel</u>		\$ 11,300.60
b) <u>Food and Accommodation</u>		\$ 3,138.61
c) <u>Transportation</u>		\$ 33,625.22
d) <u>Instrument Rental</u>		\$ 240.00
e) <u>Drilling</u>	n/a	\$ -
f) <u>Analyses</u>		\$ 295.00
g) <u>Other</u> (Software Rental, Data, Field maps, Courier & Shipping)		<u>\$ 515.84</u>
<u>Total</u>		<u>\$ 49,115.27</u>
<u>Administration (10%)</u>		<u>\$ 4,911.53</u>
<u>Total + Administration</u>		<u>\$ 54,026.79</u>



APPENDIX 2: SAMPLE DESCRIPTIONS AND ASSAY RESULTS FROM THE MARGUERITE PROPERTY



Notes: Stratigraphic thicknesses are based on measured attitudes of bedding listed below, with appropriate interpolations. Attitudes are strike and dip (right-hand rule). Sections are listed in numerical order of samples, which does not necessarily represent stratigraphic order. Most samples consist of chips at 30 cm intervals. UTM coordinates are NAD83, Zone 12N. Sample locations are shown in Figure 4.2. Stratigraphy Abbreviations: Dm - Devonian Methy Formation

Sample	Strat Unit	Strat Tkns (m)	Description	CaCO ₃ (%)	MgCO ₃ (%)	SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	SrO (ppm)	MnO (ppm)	P ₂ O ₅ (ppm)
Isolated Samples											
78826	Dm		Dolomitic Wackestone , medium brown to light grey weathered, tan to light grey fresh, cryptocrystalline to fine-grained, fossils: crinoid ossicle, rare; brachiopod, rare, hard, vuggy (open), no HCl reaction	58.72	40.21	0.58	0.160	0.141	91	149	50
78827	Dm	1.5	Dolomitic Wackestone , dark grey to very-dark grey weathered, tan fresh, cryptocrystalline to fine-grained, resistant, hard, sucrosic, no HCl reaction	54.15	44.87	0.60	0.079	0.097	65	344	50
78828	Dm		Dolomitic Mudstone to Dolomitic Wackestone , light cream weathered, very-light brown to light grey fresh, cryptocrystalline to very fine-grained, resistant, hard, vuggy (open), no HCl reaction	54.79	44.69	0.20	0.047	0.141	64	157	50
78829	Dm	2	Dolomitic Mudstone to Dolomitic Wackestone , tan to tan weathered, light brown fresh, cryptocrystalline to very fine-grained, resistant, hard, vuggy (open), no HCl reaction	54.24	45.31	0.13	0.062	0.131	77	128	50
78830	Dm		Dolomitic Wackestone , weathered, tan to light brown fresh, cryptocrystalline to fine-grained, vuggy (calcite-filled), weak HCl reaction	54.28	45.00	0.35	0.103	0.195	69	257	50
78831	Dm	2.5	Dolomitic Wackestone , very-light grey weathered, tan fresh, cryptocrystalline to fine-grained, resistant, moderate, vuggy (open), weak HCl reaction	54.22	45.00	0.47	0.059	0.151	63	178	50
78832	Dm		Dolomitic Wackestone , tan weathered, tan to light brown fresh, cryptocrystalline to fine-grained, very weak HCl reaction	54.29	45.08	0.34	0.055	0.115	80	143	50
78833	Dm		Dolomitic Wackestone , dark brown weathered, medium brown-grey fresh, cryptocrystalline to fine-grained, fossils: fragment (indeterminate), rare; crinoid stem, very rare; crinoid ossicle, common, no HCl reaction	53.94	44.64	0.79	0.198	0.221	66	510	50
78834	Dm		Dolomitic Wackestone , tan to medium brown weathered, tan to light brown fresh, cryptocrystalline to fine-grained, resistant, vuggy (open), no HCl reaction	54.33	45.08	0.17	0.053	0.215	68	189	50
78835	Dm		Dolomitic Mudstone to Dolomitic Wackestone , tan weathered, light brown to medium brown fresh, cryptocrystalline to fine-grained, hard, vuggy (open), no HCl reaction	54.19	45.33	0.09	0.043	0.193	72	176	50

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APPENDIX 3: ANALYTICAL LABORATORY INFORMATION AND TECHNIQUES

Name and Address of the Lab:

Graymont Western US Inc., Central Laboratory.
670 East 3900 South, Suite 200
Salt Lake City, Utah, 84107

Statement of Qualifications:

Jared Leikam obtained a B.S. in Chemistry from the University of Utah in the class of 2003. Jared started working for Graymont in February of 2004 and has been working with the ICP Spectrometer for two and a half years, under the direct supervision of Carl Paystrup (Lab Supervisor).

Vonda Stuart obtained a B.S. in Chemistry from Weber State University in 2004. Vonda started with Graymont in August of 2007 and started working in the ICP Lab the following September.

Sample Preparation, Procedures, Reagents, Equipment, etc.:

For the ICP sample preparation, 0.5 grams of the sample is mixed with 3 g of lithium carbonate. The sample and the lithium carbonate are then fused together in a muffle furnace at 850°C. Following the fusion process, the samples are dissolved in 1:1 HCl; a total of 40 mL 1:1 HCl is used in the dissolving process. The samples are then diluted to 200 mL and spiked with 10 ppm Co. Cobalt is used as an internal standard. At this point the samples are ready for analysis on the Perkin Elmer, Optima 7300V.

Mesh Size Fraction, Split and Weight of Sample:

Upon receiving the samples, the prep room technician riffles and then splits the stone down to a manageable size (roughly 200 g). The stone is then dried in an oven at 120°C. Once the samples have been dried they get pulverized to a -200 mesh size. A split of this pulverized material is then sent for testing in the main part of the lab.

Quality Control Procedures:

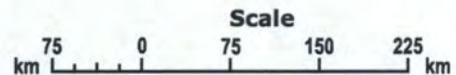
The ICP spectrometer is calibrated with two certified reference materials prior to analyzing a batch of samples. A batch typically contains 96 samples. Every 12th sample in a batch is a certified limestone reference sample. In addition to the 8 reference samples imbedded in the batch, there are 2 limestone reference samples analyzed at the beginning and at the end of the batch to ensure the accuracy of our Na and P numbers. Every element being analyzed in a sample is backed up by data from the certified reference materials. We also use an internal standard (10 ppm Co) to further ensure the quality and accuracy of the analysis.



Location of
 MAIM Permits
 9302090611,
 9302090612
 and
 9304091073

LEGEND

- Provincial capital
- Other populated places
- Trans-Canada Highway
- Major road
- International boundary
- Provincial boundary

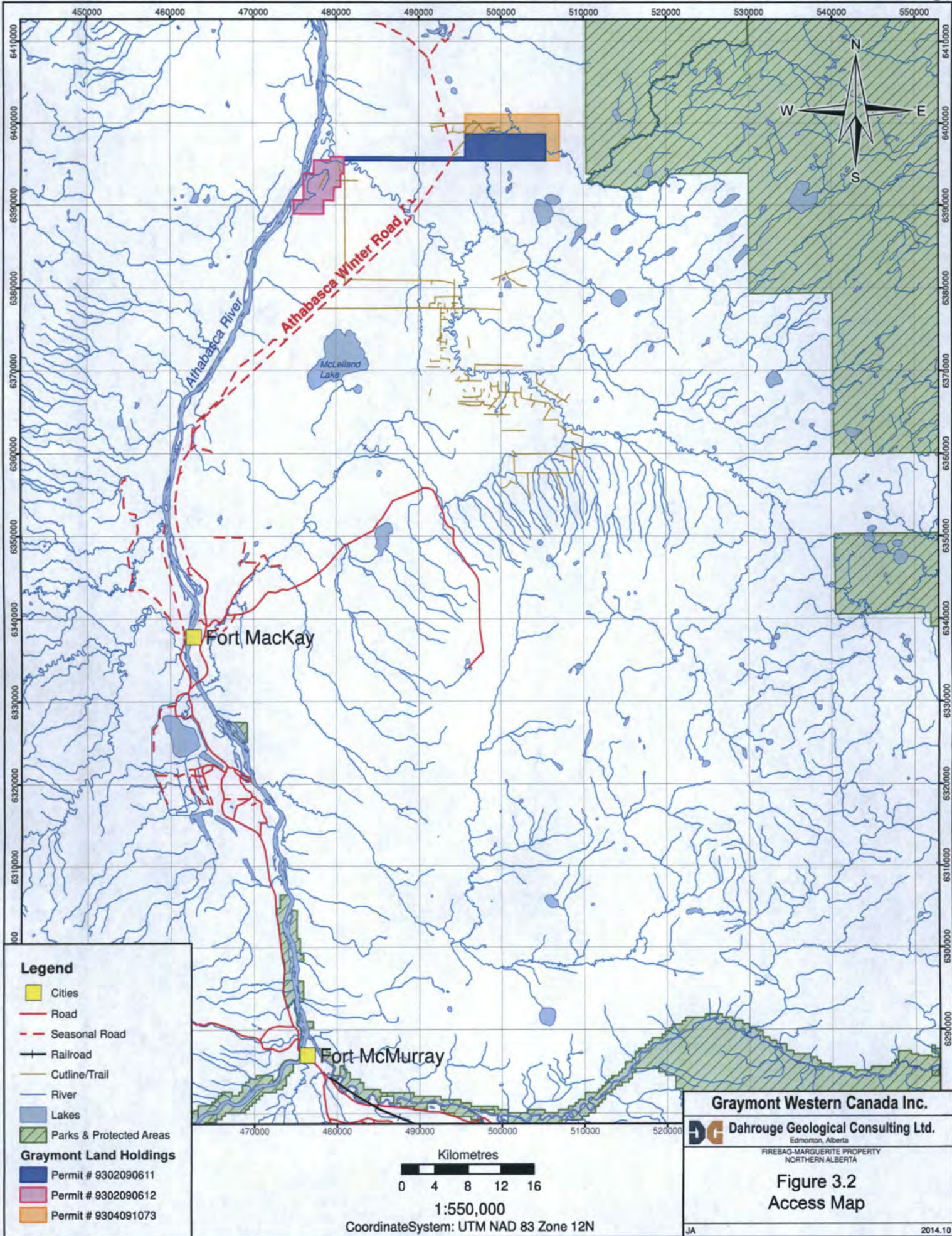


GRAYMONT WESTERN CANADA INC.

DG Dahrouge Geological Consulting Ltd.
 Edmonton, Alberta
 FIREBAG-MARGUERITE PROPERTY
 NORTHERN ALBERTA

Figure 3.1
 Property Location

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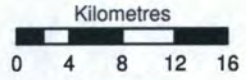


Legend

- Cities
- Road
- Seasonal Road
- Railroad
- Cutline/Trail
- River
- Lakes
- Parks & Protected Areas

Graymont Land Holdings

- Permit # 9302090611
- Permit # 9302090612
- Permit # 9304091073



1:550,000

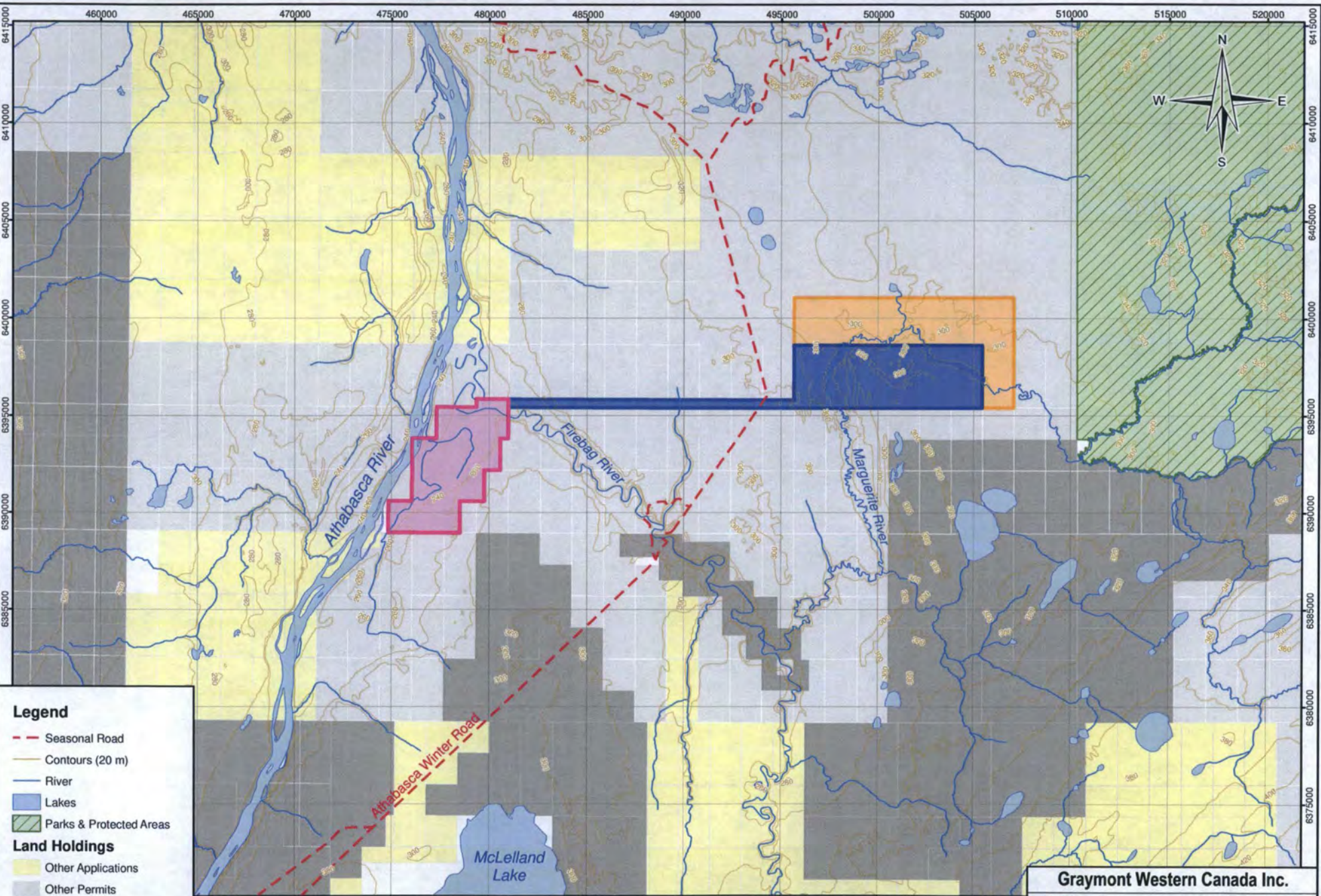
CoordinateSystem: UTM NAD 83 Zone 12N

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**Figure 3.2
Access Map**

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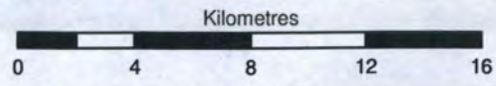


Legend

- - - Seasonal Road
- Contours (20 m)
- River
- Lakes
- ▨ Parks & Protected Areas
- Land Holdings**
- Other Applications
- Other Permits
- Other Leases

Graymont Land Holdings

- Permit # 9302090611
- Permit # 9302090612
- Permit # 9304091073



1:250,000

CoordinateSystem: UTM NAD 83 Zone 12N

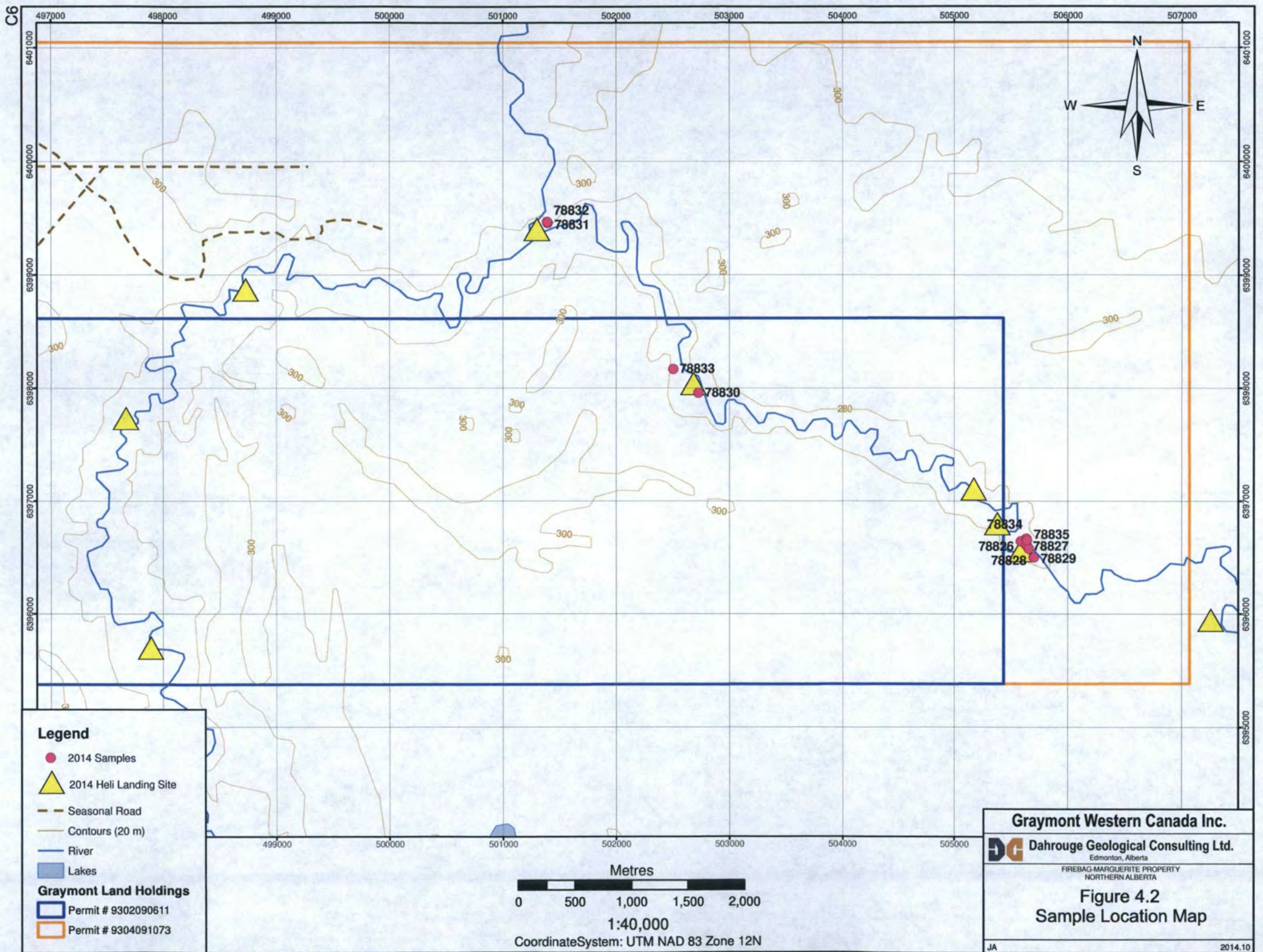
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Figure 4.1
Permit Map

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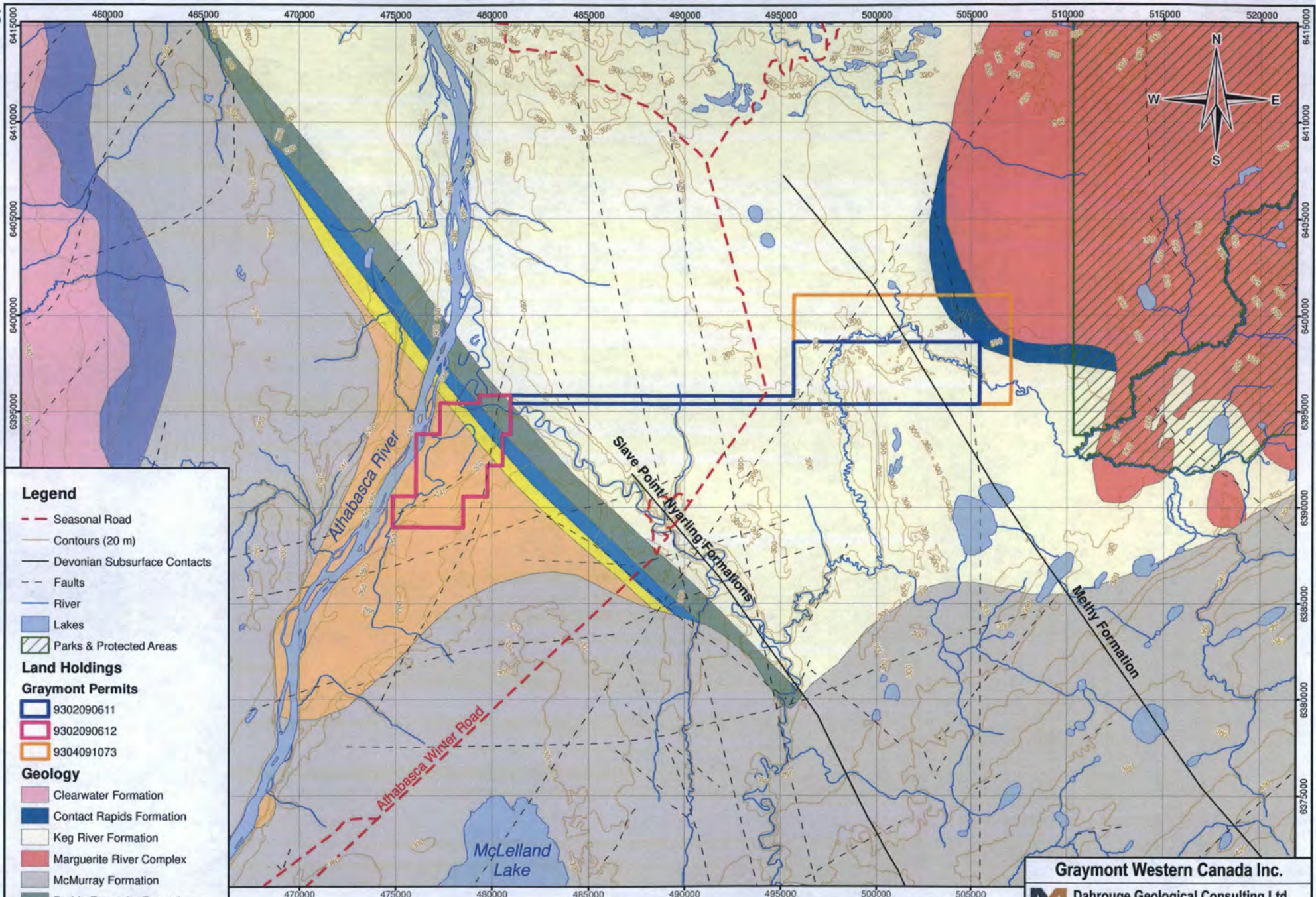
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Figure 4.2
Sample Location Map

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- Legend**
- - - Seasonal Road
 - Contours (20 m)
 - Devonian Subsurface Contacts
 - - - Faults
 - River
 - Lakes
 - ▨ Parks & Protected Areas

- Land Holdings**
- Graymont Permits**
- ▭ 9302090611
 - ▭ 9302090612
 - ▭ 9304091073

- Geology**
- ▭ Clearwater Formation
 - ▭ Contact Rapids Formation
 - ▭ Keg River Formation
 - ▭ Marguerite River Complex
 - ▭ McMurray Formation
 - ▭ Prairie Evaporite Formation
 - ▭ Slave Point Formation
 - ▭ Wabiskaw Member
 - ▭ Waterways Formation
 - ▭ Watt Mountain Formation

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Figure 5.1
Regional Geology

JA 2014.10

Kilometres
 0 4 8 12 16
 1:250,000
 CoordinateSystem: UTM NAD 83 Zone 12N