

# MAR 20120019: SOUTH BRAZEAU

Brazeau Range - A report on limestone exploration in the Brazeau range, west-central Alberta.

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**GRAYMONT WESTERN CANADA INC.**  
**2012 EXPLORATION AND FIELDWORK**  
**WITHIN THE BRAZEAU RANGE**  
**METALLIC AND INDUSTRIAL MINERALS PERMIT,**  
**WEST-CENTRAL ALBERTA**

**PART B**

Metallic and Industrial Mineral Permit  
9302090596

Geographic Coordinates

52°20' N to 52°30' N  
115°44' W to 116°01' W

NTS Sheets 83 B/5, C/8

|                     |  |
|---------------------|--|
| Owner and Operator: | MAIM Permit 9302090596<br>Graymont Western Canada Inc.<br>260, 4311 - 12 Street NE<br>Calgary, Alberta T2E 4P9 |
| Consultant:         | Dahrouge Geological Consulting Ltd.<br>18, 10509 - 81 Avenue<br>Edmonton, Alberta T6E 1X7                      |
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| Date Submitted:     | November 2, 2012   |

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## **1. SUMMARY**

During July 2012, the southern parts of Brazeau Range, south of Nordegg and within Metallic and Industrial Minerals (MAIM) Permit 9302090596, were explored for high-quality carbonate rocks. Exploration conducted in 2012 was a follow-up to previous exploration conducted along Brazeau Range during the summers of 2002-2004, 2006-2007 and 2010.

Access routes and outcrops were mapped, and a total of 201 rock samples were collected within the Brazeau Range Permit, representing approximately 520 m of stratigraphy. Samples were sent to a laboratory for whole-rock analysis.

Throughout this report attitudes of bedding and other planar features are given as  $A^{\circ}/B^{\circ}$  SW, where  $A^{\circ}$  is the azimuth of the strike and  $B^{\circ}$  is the amount of dip in the direction indicated (right-hand rule). A magnetic declination of  $16^{\circ}17'$  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 2012 exploration within the Brazeau Range Permit was conducted by Dahrouge Geological Consulting Ltd. (Dahrouge), on behalf of Graymont Western Canada Inc. (Graymont). This assessment report describes the exploration conducted within MAIM Permit 9302090596, which encompasses southern parts of Brazeau Range of the Alberta Foothills. Bob Robison, exploration manager for Graymont Western U.S. Inc., authorized this work.

The objectives of the 2012 exploration were to expand on the previously explored areas, and to locate and better define carbonate units throughout the property. 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**

MAIM Permit 9302090596 encompasses the southern part of Brazeau Range south of North Saskatchewan River and parts of the northeast side of Brazeau Range north of North Saskatchewan River, near Nordegg, Alberta (Fig. 3.2).

The southern portion of MAIM Permit 9302090596 is accessible via Highway 752, which branches southwest from Rocky Mountain House and North Fork Road 3 km west of Strachan, or 23 km east on a secondary road branching from Forestry Trunk Road about 28 km south of Highway 11. Access to and throughout the property is by all-terrain vehicle or helicopter, and extensive hiking.

Several creeks, mountains, and other features presently without names on published maps have been assigned informal names in this report to facilitate references to geographic locations.

### **3.2 INFRASTRUCTURE**

Accommodations, food, fuel and other necessary services are available in Rocky Mountain House or Nordegg. The local economy is primarily based on agriculture, forestry, and energy-based industries.

Rocky Mountain House, with a population of about 7,000, is accessed by traveling 67 km west of Red Deer along the David Thompson Highway (Highway 11), and then 12 km north along Highway 22.

The Hamlet of Nordegg is about 85 km west of Rocky Mountain House, along Highway 11 (Fig. 3.2). Nordegg has a population of about 100.

### **3.3 TOPOGRAPHY, VEGETATION AND CLIMATE**

The Brazeau Range Permit is included in the Eastern-Slope Montane Forest Ecological Region, and lies within the Rocky-Clearwater District of the Alberta Forest Reserve. In the subalpine zone, vegetation consists of stunted subalpine fir and Englemann Spruce, and alpine foliage above the treeline. Vegetation in areas of rugged limestone outcroppings is generally sparse, and commonly consists of junipers, other low brush, and grasses. Below the treeline, vegetation consists of dense stands of Aspen, Lodgepole Pine, White Spruce, and less frequent stands of Douglas Fir.

The property is comprised of northwest-trending ridges cut by northeast-trending valleys and drainages. Elevations range from approximately 1,160 m at 'The Gap' along North Saskatchewan River to about 2,130 m atop Spider Mountain. The property is cut by a number of drainages, including Dizzy Creek, Lundine Creek, Storm Creek, Trout Creek, and most notably, North Saskatchewan River, which cuts through the middle of the property.

Climate is sub-alpine with average summer temperatures of 20° to 25°C and winter temperatures of -15° to -20°C, with extremes of 35°C and -40°C. Rainfall averages about 40 cm per year; snowfall averages about 180 cm with the majority falling in December and January.

### **3.4 FIELD OPERATIONS**

Field operations were conducted by a four-person geological crew from Dahrouge Geological Consulting Ltd., based in a hotel in Rocky Mountain House.

Transportation to and from the property was by four-wheel-drive truck. ATV's were utilized to explore access and outline carbonate outcrops within the property. In addition, four days of helicopter support were utilized to explore remote portions of the property.

Garmin GPSmap 60Cx instruments were used to mark outcrop locations and record access information. Compasses were set at a magnetic declination of 16°17' east.

## **4. PROPERTY, EXPLORATION AND EXPENDITURES**

### **4.1 PROPERTY SUMMARY**

Graymont Western Canada Inc. acquired MAIM Permit 9302090596 (Brazeau Range) in 2002 to cover Paleozoic limestones along the eastern flank of Brazeau Range north of North Saskatchewan River and the southern part of Brazeau Range, south of North Saskatchewan River (Fig. 1.2). The Brazeau Range Permit encompasses 5,056 hectares and is contiguous to the Nordegg South MAIM Lease (9410010456).

Based on the 2012 exploration, the entirety of the Brazeau Range Permit will be retained (Section 4.3, Fig. 4.1).

### **4.2 2012 EXPLORATION SUMMARY**

From July 9 to 24, 2012, Dahrouge Geological Consulting Ltd., on behalf of Graymont Western Canada Inc., conducted exploration for carbonate lithotypes within west-central Alberta. The work was undertaken to determine the location, quality and extent of carbonate units in the permit area.

Carbonate outcrops were examined and a total of 201 samples were collected (Fig. 4.2). Geological observations were recorded, including lithologic information, measurements of structural elements, 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). In some instances, interval thicknesses were determined by measuring outcrops perpendicular to bedding, where it could be identified. Field maps were completed on 1:20,000 and 1:30,000 scale map sheets and concentrated on areas along Brazeau Range south of North Saskatchewan River, and north of the river, along the northeastern side of the range.

#### 4.3 EXPLORATION EXPENDITURES

Expenditures for 2012 totaled \$82,739.89 (Appendix 1). The entirety of the Brazeau Range Permit (MAIM Permit 9302090596) will be retained. Excess expenditures are to be assigned to a future exploration period of the Brazeau Range Permit. The current permit area includes:

| Land Description<br>(Mer-Rg-Tp)  | Current Size<br>(Ha) |
|--|----------------------|
| <b>5-13-39:</b> 9L14, L15; 10NE, L11, L13, L14; 11L13-L16; 12L13, L14; 13W; 14-16; 17NE, L7, L8, L14; 19NE, L7, L8, L11, L13, L14; 20-22; 23S, NW, L9, L10, L15; 27SW; 28S, L10-L13; 29; 30; 31S; 32L1-L5; and | 5,056                |
| <b>5-14-39:</b> 24L15, L16; 25N, SE, L6; 36NW, L1-L3, L8; and  |                      |
| <b>5-14-40:</b> 1L4, L5, L12; 2L9, L16; 11L1, L2, L5-L7, L11-L13; 15NW, L1, L2, L6, L7; 16L16; 20L16; 21NW, SE, L3, L5, L6, L10; 22L4; 28L3-L5; 29; 30N, L1, L4-L8; 31SE, L3, L4, L9, L10; 32SW, L2.           |                      |

Expenditures are allocated to MAIM Permit 9302090596 as follows:

| Assessment Period<br>MAIM Permit 9302090596 | Expiry<br>Date | Required<br>Expenditures | Assigned<br>Expenditures |
|---|----------------|--------------------------|--------------------------|
| Years 9 and 10                              | Sept. 04, 2012 | \$64,897.81              | \$64,897.81              |
| Years 11 and 12                             | Sept. 04, 2014 | \$75,840.00              | \$17,842.08              |

#### 5.

#### REGIONAL GEOLOGY

In west-central Alberta, Paleozoic limestones are known to occur within the Middle Cambrian Eldon Formation, the Upper Devonian Mount Hawk Formation, the Upper Devonian Palliser Formation, the Upper Devonian to Lower Carboniferous Banff Assemblage and the Lower Carboniferous Rundle Assemblage (Table 5.1, Fig. 4.2).

Descriptions of the stratigraphy of the Mount Hawk, Palliser Formation, Banff Assemblage and Rundle Assemblage, are from a prior assessment report by Pana and Dahrouge (1998). A detailed review of the regional stratigraphy is provided by Stott and Aitken (1993), Mossop and Shetsen (1994), Halbertsma (1994), and Richards et al. (1994).

## **5.1 STRATIGRAPHY**

### **5.1.1 Mount Hawk Formation**

Along the Front Ranges of the Rocky Mountains, the Upper Devonian Fairholme Group was transgressively deposited on eroded Upper Cambrian strata, and consists of two carbonate reef formations, the Cairn and the overlying Southesk formations (Table 5.1). Both are replaced basinward by the laterally equivalent argillaceous beds of the Flume, Maligne, Perdrix, and Mount Hawk formations (Mountjoy et al., 1992).

The Upper Devonian Southesk Formation at its type section on Mount Dalhousie, near the confluence of Southesk and Brazeau rivers, is 161 m thick and divided into the Peechee, Grotto, and Arcs members (MacKenzie, 1966; Mountjoy et al., 1992). To the west it thins into argillaceous dolomites and dolomitic shales of the Mount Hawk Formation. Where Highway 11 crosses Brazeau Range, the upper part of the Mount Hawk Formation, consists of cryptocrystalline, black, medium-bedded, argillaceous limestone (Douglas, 1956).

### **5.1.2 Palliser Formation**

In west-central Alberta, the Upper Devonian Palliser Formation consists mainly of outer shelf and basinal carbonates of the Sassenach Basin (Halbertsma, 1994). The Palliser Formation is divisible into the Morro and overlying Costigan members, which are separated by an unconformity. The Morro Member comprises a lithologic suite dominated by carbonates with significant lateral facies variations. The Costigan Member consists of open-marine fossiliferous limestones and shales, with local evaporitic sedimentation. Within Foothills and Front Ranges of Alberta, limestones of the Palliser Formation vary from less than 180 m to more than 270 m in thickness (Holter, 1976).

The Palliser Formation is overlain by shales of the Exshaw Formation, and siliciclastics and carbonates of the Banff Assemblage.

### **5.1.3 Banff Assemblage**

In west-central Alberta, the Exshaw, Banff and Yohin formations comprise the Banff Assemblage (Richards et al. 1994). The Upper Famennian to Lowermost Tournaisian Exshaw Formation is dominated by fine-grained siliciclastics deposited in euxinic basin to shallow-neritic environment. In general, it is unconformably overlain by the Lower to Upper Tournaisian Banff

Formation, which is a heterogeneous association of carbonates and fine-grained siliciclastics deposited on poorly differentiated carbonate platforms. Westward, the uppermost Banff Formation grades laterally into the Rundle Assemblage.

#### **5.1.4 Rundle Assemblage**

The Lower Carboniferous Rundle Assemblage extends from MacKenzie Mountains in the Arctic south through the Peace River Embayment to southeastern British Columbia. In west-central Alberta, it comprises shallow-marine platform and ramp carbonates which prograded westward over deeper water shales and carbonates of the Banff Assemblage. The lower Rundle Assemblage is subdivided into the transgressive carbonate Pekisko Formation, and two regressive successions of restricted-marine carbonates and subordinate anhydrite assigned to the Shunda and Turner Valley formations (Richards et al. 1994). In southern Alberta the Pekisko grades laterally into the uppermost Banff Formation. The Turner Valley Formation extends from east-central British Columbia to southwest Alberta. According to Richards et al. (1994), the Turner Valley Formation thickens to the southwest and for most of its length is 50 m to 120 m thick. The type section near Turner Valley is 152 m thick and divisible into four beds.

Earlier work by Douglas (1958), and MacQueen and Bamber (1968) indicate that the eastern peritidal sequences of the uppermost Pekisko, Shunda and lower Turner Valley grade south and southwestward into the more open-marine sequence of the Livingstone Formation (Table 5.1).

The upper Rundle Assemblage includes the transgressive Mount Head Formation.

## **5.2 STRUCTURE**

In Front Ranges and Foothills of west-central Alberta, Paleozoic and Mesozoic strata have been repeated along several major thrust faults. Displacements along these faults are interpreted to be tens of kilometres. Within individual thrust sheets, regional-scale folds exhibit a spatial relation to their leading edges. Near Nordegg, the main structural discontinuity is the northwest to southeast trending Brazeau Thrust. The leading edge of the thrust sheet is folded into the asymmetrical to recumbent Brazeau Anticline.

**TABLE 5.1**                      **GENERALIZED PALEOZOIC STRATIGRAPHY**  
**OF FOOTHILLS AND FRONT RANGES, WEST-CENTRAL ALBERTA\***

| System or Subsystem | Stratigraphic Unit              |                            |               |
|---------------------|---------------------------------|----------------------------|---------------|
|                     | Assemblage<br>Group             | Formation                  |               |
|                     |                                 | S                          | N             |
| Lower Carboniferous | Rundle<br>Assemblage            | Mount Head                 |               |
|                     |                                 | 1 <sup>†</sup> Livingstone | Turner Valley |
|                     |                                 |                            | Shunda        |
|                     |                                 |                            | Pekisko       |
|                     | Banff<br>Assemblage             | Banff                      |               |
| Upper Devonian      |                                 | Exshaw                     |               |
|                     |                                 | 1 <sup>†</sup> Palliser    |               |
|                     |                                 | Alexo                      |               |
|                     | Fairholme<br>Group <sup>°</sup> | Southesk                   | Mount Hawk    |
| Cambrian            |                                 | Cairn                      |               |
|                     |                                 | Pika                       |               |
|                     |                                 | Eldon                      |               |
|                     |                                 | Stephen                    |               |
|                     |                                 | Cathedral                  |               |

\*Compiled from MacKenzie 1969, Richards et al. 1994, Switzer et al., 1994., and Holter, 1994.

<sup>°</sup> Fairholme Group of MacKenzie (1969) is partly equivalent to the Woodbend Group (Switzer et al., 1994).

<sup>†</sup> Current limestone production (from Holter, 1994)

## 6.

## RESULTS

Fourteen days were spent checking property access and outlining carbonate outcrops in detail. The 2012 exploration concentrated on defining stratigraphic unit locations and contacts within previously under-explored areas of the property.

Carbonate lithologies of the Palliser, Banff, Pekisko, and Turner Valley formations were examined and sampled within Brazeau Range, north and south of North Saskatchewan River (Fig. 4.2). A total of 201 intervals were examined and sampled, representing approximately 520 m of stratigraphy (Appendix 2). Where bedding could not be identified, stratigraphic measurements were based on the previously determined regional trend or deduced from surrounding measurements where possible.

The majority of the outcrops visited in 2012 were within the Palliser Formation. Twelve outcrops of the Palliser Formation were examined in 2012, to test the potential for high-calcium limestone in the upper part of the unit and high-quality dolomite in the lower part of the unit (Fig. 4.2). Section

2012-15, located along a ridge northwest of the Brazeau Fire Tower and south of North Saskatchewan River, tested a 65 metre interval within the lower part of the formation (Morro Member) and averaged 55.66%  $\text{CaCO}_3$ , 42.79%  $\text{MgCO}_3$  and 1.09%  $\text{SiO}_2$ . Section 2012-05, located west of the Brazeau Fire Tower, tested the upper part of the formation (the Costigan Member) and averaged 92.95%  $\text{CaCO}_3$ , 4.63%  $\text{MgCO}_3$  and 1.55%  $\text{SiO}_2$  over 25 metres. The lower part of the formation generally consists of medium- to dark-grey, variably dolomitic mudstones. The upper part of the formation consists of weakly dolomitic, medium- to dark-brownish-grey lime mudstone to wackestone. The Palliser Formation continues to display highly variable composition and further work is required before a conclusion can be made regarding its potential for high-calcium limestone or high-quality dolomite.

No significant intervals of the Banff Formation were examined in 2012. The Banff Formation consists of tan weathered, medium-brownish-grey fresh, micritic to fine-grained (with minor coarse-grained bioclasts) lime mudstone to wackestone. The Banff Formation is not considered a unit of interest due to its low  $\text{CaCO}_3$  values and high  $\text{SiO}_2$  content.

Seven outcrops of the Pekisko Formation were examined in 2012. Analytical results were variable, presumably due to the fact that different members within the formation were sampled. The best sample section was 2012-22, which averaged 98.56%  $\text{CaCO}_3$ , 0.92%  $\text{MgCO}_3$  and 0.09%  $\text{SiO}_2$  over approximately 25 metres, and was collected from a resistant limestone cliff south of North Saskatchewan River (Fig. 4.2). Several other sample sections and isolated intervals returned values in excess of 95%  $\text{CaCO}_3$  over several metres, however  $\text{MgCO}_3$ , and less commonly  $\text{SiO}_2$ , impurities were common in many of these sections. The high-quality Pekisko intervals generally consist of resistant and massive, light- to medium-brownish-grey, fine- to coarse-grained crinoidal lime wackestone to grainstone. Lower quality intervals generally consist of less resistant, medium- to dark-brownish-grey, micritic to fine-grained lime mudstone to packstone. Overall, the Pekisko Formation has the greatest high-calcium limestone potential in the area.

Several outcrops of Turner Valley Formation were examined in 2012, to test for potential high-quality dolomite. The best dolomite interval was part of sample section 2012-23 (Fig. 4.2). It averaged 58.40%  $\text{CaCO}_3$  and less than 0.6%  $\text{SiO}_2$  over approximately 13 metres. Other intervals of the Turner Valley Formation examined in 2012 were less dolomitic and/or returned elevated  $\text{SiO}_2$  concentrations. Intervals generally consisted of vuggy, medium-brown to medium-grey, moderately to strongly dolomitic mudstone to wackestone. The Turner Valley Formation has the greatest potential for high-quality dolomite in the permit area, although more work is required to constrain its extent and overall quality.

## 7.

**CONCLUSIONS**

Carbonate units of the Palliser, Banff, Pekisko and Turner Valley formations were examined and measured along Brazeau Range north and south of North Saskatchewan River. A total of 201 discrete intervals were sampled and described in detail. Based on the samples collected during the 2012 exploration and overall property assessment, the entirety of the permit will be retained.

Access roads and trails were noted, which provide limited access to the exterior of the property. Extensive hiking and/or helicopter support are required to reach much of the property.

Future exploration will expand on previously conducted work in the area, confirming or redefining past geological interpretations and determining the potential for high-calcium limestone and/or high-quality dolomite within the permit area.

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9.

**STATEMENT OF QUALIFICATIONS**

I, Patrick Kluczny, residing at [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 "2012 Exploration and Fieldwork within the Brazeau Range Metallic and Industrial Minerals Permit, West-Central Alberta" and accept responsibility for the veracity of technical data and results.

Dated this 2<sup>nd</sup> day of November, 2012.



*Patrick Kluczny*

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


APEGA M81985

B

# **APPENDIX 1: COST STATEMENT FOR THE 2012 EXPLORATION AT THE BRAZEAU RANGE PERMIT**

|   |     |                     |
|---|-----|---------------------|
| a) <u>Personnel</u>   |     | \$ 36,667.60        |
| b) <u>Food and Accommodation</u>                              |     | \$ 7,432.27         |
| c) <u>Transportation</u>                                      |     | \$ 22,270.87        |
| d) <u>Instrument Rental</u>                                   |     | \$ 658.27           |
| e) <u>Drilling</u>  | n/a | \$ -                |
| f) <u>Analyses</u>  |     | \$ 5,929.50         |
| h) <u>Other</u> (Misc. supplies, Software rental, Field maps) |     | \$ 2,259.58         |
| <u>Total</u>  |     | <u>\$ 75,218.09</u> |
| <u>Administration (10%)</u>                                   |     | \$ 7,521.81         |
| <u>Total + Administration</u>                                 |     | \$ 82,739.89        |

Edmonton, Alberta  
November 2, 2012

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

C

## APPENDIX 2: SAMPLE DESCRIPTIONS AND ASSAY RESULTS FROM BRAZEAU RANGE



Notes: Stratigraphic thicknesses are based on measured attitudes of bedding listed below, with appropriate interpolations. Altitudes 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 11N. Section locations are shown in Figure 4.2. Stratigraphy Abbreviations: Dpa - Devonian Palliser Formation; Mbf - Mississippian Banff Formation; Mpk - Mississippian Pekisko Formation; Msh - Mississippian Shunda Formation; Mtv - Mississippian Turner Valley Formation

| Sample                  | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|-------------------------|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Isolated Samples</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76814                   | Mtv        | 2              | <b>Dolomitic Mudstone</b> , tan to light brown weathered, very-light brown to very-light grey fresh, very fine-grained, well-bedded, slightly resistant, weak (powder) HCl reaction, structure(s): bedding (definite) 76/18 S  | 40.69                 | 24.20                 | 23.99                | 1.925                              | 0.719                              | 137       | 281       | 516                                 |
| 76815                   | Mbf        | 3              | <b>Lime Mudstone to Lime Wackestone</b> , light brown weathered, light brown to dark brown-grey fresh, micritic to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle; brachiopod, well-bedded; slaty, recessive, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 96/8 S | 73.96                 | 8.89                  | 11.84                | 2.096                              | 1.011                              | 360       | 258       | 331                                 |
| 76835                   | Mbf        | 3              | <b>Lime Mudstone to Lime Wackestone</b> , medium brown-grey weathered, medium grey fresh, micritic, fossils: solitary rugose coral, abundant; brachiopod, abundant, alteration: oxide, 40-60% intensity, hard, resistant, very strong HCl reaction, structure(s): bedding (approximate) 50/20 SE                     | 85.42                 | 5.67                  | 5.84                 | 1.418                              | 0.612                              | 376       | 141       | 102                                 |
| 76836                   | Dpal       | 3              | <b>Dolomitic Mudstone</b> , light tan-grey weathered, light brown-grey fresh, very fine-grained, fossils: fragment (indeterminate), vuggy; pockety, slightly resistant, weak (powder) HCl reaction, structure(s): calcite vein moderate  | 58.52                 | 39.41                 | 0.64                 | 0.185                              | 0.128                              | 89        | 47        | 50                                  |
| 76849                   | Mpkc       | 3              | <b>Calcareous Dolomitic Mudstone</b> , light grey weathered, light brown-grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite vein weak; bedding (definite) 300/30 NE   | 90.58                 | 8.14                  | 1.08                 | 0.105                              | 0.064                              | 298       | 25        | 50                                  |
| 76850                   | Mpkc       | 2.5            | <b>Calcareous Dolomitic Mudstone</b> , light grey weathered, light grey to medium grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, hard, resistant, strong HCl reaction, structure(s): calcite vein weak  | 97.75                 | 1.15                  | 0.60                 | 0.042                              | 0.059                              | 332       | 19        | 50                                  |
| 76851                   | Dpau       | 2              | <b>Lime Mudstone</b> , light grey weathered, medium grey fresh, cryptocrystalline to micritic, fossils: fragment (indeterminate), rare, well-bedded; vuggy; moderately-bedded, very strong HCl reaction, structure(s): calcite veinlet moderate; bedding (definite) 104/24 S   | 96.06                 | 2.30                  | 1.42                 | 0.186                              | 0.088                              | 319       | 25        | 50                                  |
| 76852                   | Dpa        | 0.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey fresh, cryptocrystalline to micritic, fossils: fragment (indeterminate), rare, well-bedded; vuggy; moderately-bedded, very strong HCl reaction, structure(s): calcite veinlet moderate  | 92.31                 | 5.38                  | 1.90                 | 0.245                              | 0.098                              | 278       | 31        | 50                                  |
| 76853                   | Dpa        | 1              | <b>Lime Mudstone</b> , light grey weathered, medium grey fresh, cryptocrystalline to micritic, fossils: fragment (indeterminate), rare, well-bedded; vuggy; moderately-bedded, very strong HCl reaction, structure(s): calcite veinlet moderate; bedding (definite) 130/28 SW  | 92.47                 | 5.25                  | 1.36                 | 0.187                              | 0.221                              | 257       | 44        | 50                                  |
| 76854                   | Dpal       | 1              | <b>Calcareous Dolomitic Mudstone</b> , tan to light grey weathered, medium brown-grey fresh, very fine-grained, thickly-bedded; pockety, moderate HCl reaction, structure(s): fracture; calcite veinlet weak   | 54.76                 | 43.56                 | 1.14                 | 0.217                              | 0.194                              | 107       | 80        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-01 (UTM 583195E, 5801862N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76801  | Dpau       | 3              | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic, thickly-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate; bedding (possible)  | 86.55                 | 11.17                 | 1.69                 | 0.302                              | 0.158                              | 311       | 67        | 50                                  |
| 76802  | Dpau       | 2.5            | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic, thickly-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate  | 91.33                 | 5.56                  | 2.17                 | 0.238                              | 0.142                              | 352       | 73        | 50                                  |
| 76803  | Dpal       | 1.75           | <b>Lime Mudstone to Dolomitic Lime Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, cryptocrystalline, well-bedded; nodular; laminated, slightly resistant, moderate HCl reaction, structure(s): bedding (definite) 86/12S   | 72.75                 | 23.22                 | 2.87                 | 0.477                              | 0.357                              | 245       | 203       | 50                                  |
| 76804  | Dpau       | 2.25           | <b>Lime Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, cryptocrystalline, well-bedded; nodular; moderately-bedded, slightly resistant  | 97.29                 | 1.09                  | 0.92                 | 0.127                              | 0.178                              | 274       | 71        | 50                                  |
| 76805  | Dpau       | 1.5            | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to cryptocrystalline, vuggy; thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): fracture moderate  | 97.49                 | 1.17                  | 0.91                 | 0.126                              | 0.089                              | 332       | 58        | 50                                  |
| 76806  | Dpau       | 2.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to cryptocrystalline, fossils: brachiopod, very rare, vuggy; thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): fracture moderate  | 94.04                 | 4.00                  | 0.98                 | 0.174                              | 0.143                              | 344       | 112       | 50                                  |
| 76807  | Dpau       | 2              | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, medium grey to dark grey fresh, micritic to cryptocrystalline, fossils: fragment (indeterminate), rare; brachiopod, rare; bivalve, rare, vuggy; thickly-bedded; moderately-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate; bedding (undulatory) 32/18 SE | 94.54                 | 2.22                  | 2.17                 | 0.379                              | 0.273                              | 347       | 215       | 50                                  |
| <b>Section 2012-02 (UTM 583399E, 5801737N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76808  | Dpa        | 2.75           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic, well-bedded; thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 34/9 SE  | 79.48                 | 17.74                 | 1.65                 | 0.341                              | 0.231                              | 298       | 92        | 50                                  |
| 76809  | Dpau       | 3              | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic, fossils: brachiopod, rare, well-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet very weak  | 92.38                 | 5.56                  | 1.43                 | 0.259                              | 0.204                              | 335       | 70        | 50                                  |
| 76810  | Dpal       | 3.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic, fossils: brachiopod, rare, well-bedded; moderately-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet very weak   | 89.90                 | 7.11                  | 2.48                 | 0.241                              | 0.162                              | 320       | 76        | 50                                  |
| 76811  | Dpau       | 3.5            | <b>Lime Mudstone to Dolomitic Lime Mudstone</b> , tan to light grey weathered, tan to medium grey fresh, micritic to very fine-grained, well-bedded; laminated, slightly resistant, weak HCl reaction, structure(s): calcite veinlet weak  | 73.96                 | 21.30                 | 3.57                 | 0.485                              | 0.267                              | 251       | 147       | 50                                  |
| 76812  | Dpau       | 4.5            | <b>Lime Mudstone</b> , light grey weathered, medium brown-grey fresh, cryptocrystalline, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet very weak  | 95.18                 | 3.22                  | 1.03                 | 0.151                              | 0.084                              | 251       | 79        | 50                                  |
| 76813  | Dpau       | 3.75           | <b>Lime Mudstone</b> , light grey weathered, medium brown-grey fresh, cryptocrystalline, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 54/8 SE  | 93.84                 | 4.00                  | 1.36                 | 0.290                              | 0.233                              | 345       | 210       | 104                                 |

| Sample   | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-03 (UTM 584464E, 5802494N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76816  | Mpkg       | 1.5            | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, light grey fresh, micritic to medium-grained, fossils: solitary rugose coral, rare; fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): joint; fracture; calcite veinlet very weak                         | 86.31                 | 12.72                 | 0.60                 | 0.082                              | 0.080                              | 205       | 59        | 50                                  |
| 76817  | Mpkg       | 2.75           | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, light grey to medium grey fresh, micritic to medium-grained, fossils: solitary rugose coral, rare; fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): joint; fracture; calcite veinlet very weak          | 88.35                 | 10.56                 | 0.69                 | 0.073                              | 0.063                              | 254       | 47        | 50                                  |
| 76818  | Mpkc       | 2              | <b>Lime Wackestone to Lime Packstone</b> , light grey weathered, medium grey fresh, micritic to fine-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, hard, resistant, very strong HCl reaction, structure(s): calcite veinlet very weak  | 92.22                 | 6.65                  | 0.89                 | 0.090                              | 0.073                              | 370       | 30        | 50                                  |
| 76819  | Mpkc       | 2.25           | <b>Lime Wackestone to Lime Packstone</b> , light grey weathered, medium grey fresh, micritic to fine-grained, fossils: solitary rugose coral, rare; fragment (indeterminate); crinoid ossicle, thickly-bedded, hard, resistant, strong HCl reaction, structure(s): calcite veinlet very weak  | 98.31                 | 1.28                  | 0.25                 | 0.018                              | 0.049                              | 337       | 22        | 50                                  |
| 76820  | Mpkc       | 3.25           | <b>Lime Wackestone to Lime Packstone</b> , light grey weathered, medium grey fresh, micritic to fine-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, hard, resistant, very strong HCl reaction, structure(s): calcite veinlet very weak  | 84.71                 | 14.46                 | 0.65                 | 0.051                              | 0.073                              | 244       | 31        | 50                                  |
| 76821  | Mpkq       | 3.75           | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, light grey to medium grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): bedding (possible) 126/11 SW; bedding (possible) 121/8 SW                        | 91.22                 | 8.58                  | 0.23                 | 0.022                              | 0.060                              | 277       | 26        | 50                                  |
| <b>Section 2012-04 (UTM 584689E, 5802482N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76822  | Mtv        | 2.25           | <b>Carbonaceous Dolomitic Mudstone to Calcareous Dolomitic Packstone</b> , light grey weathered, light brown-grey to dark brown-grey fresh, very fine-grained to medium-grained, fossils: ooid; fragment (indeterminate); crinoid ossicle, moderately-bedded, resistant, weak HCl reaction, structure(s): bedding (definite) 324/21NE | 77.60                 | 19.94                 | 1.64                 | 0.260                              | 0.135                              | 140       | 52        | 50                                  |
| 76823  | Mtv        | 2.5            | <b>Calcareous Dolomitic Mudstone to Calcareous Dolomitic Packstone</b> , light grey weathered, light brown-grey to dark brown-grey fresh, very fine-grained to medium-grained, fossils: ooid; fragment (indeterminate); crinoid ossicle, moderately-bedded, resistant   | 85.37                 | 13.62                 | 0.62                 | 0.098                              | 0.081                              | 124       | 43        | 50                                  |
| 76824  | Mtv        | 3.25           | <b>Carbonaceous Dolomitic Mudstone to Calcareous Dolomitic Packstone</b> , light grey weathered, light brown-grey to dark brown-grey fresh, very fine-grained to medium-grained, fossils: ooid; fragment (indeterminate); crinoid ossicle, moderately-bedded, resistant   | 84.30                 | 14.90                 | 0.69                 | 0.064                              | 0.100                              | 141       | 40        | 50                                  |
| 76825  | Mtv        | 3              | <b>Dolomitic Lime Wackestone to Dolomitic Lime Packstone</b> , light grey weathered, light brown-grey to dark brown-grey fresh, very fine-grained to medium-grained, fossils: ooid; fragment (indeterminate); crinoid ossicle, moderately-bedded, resistant, strong HCl reaction, structure(s): bedding (definite) 351/10 E           | 89.04                 | 9.33                  | 1.24                 | 0.061                              | 0.055                              | 176       | 66        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-05 (UTM 582246E, 5801375N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76826  | Dpau       | 4              | <b>Lime Mudstone</b> , very-light grey weathered, medium grey to dark grey fresh, cryptocrystalline to micritic, well-bedded; vuggy; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite vein; bedding (undulatory) 44/10 SE   | 89.65                 | 8.26                  | 1.22                 | 0.230                              | 0.177                              | 336       | 67        | 50                                  |
| 76827  | Dpau       | 2.25           | <b>Lime Mudstone</b> , very-light grey weathered, dark grey to medium grey fresh, cryptocrystalline to micritic, well-bedded; vuggy; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite vein  | 91.74                 | 5.56                  | 1.78                 | 0.248                              | 0.161                              | 307       | 65        | 50                                  |
| 76828  | Dpa        | 3.25           | <b>Lime Mudstone</b> , very-light grey weathered, medium grey to dark grey fresh, cryptocrystalline to micritic, well-bedded; vuggy; massive, resistant, moderate HCl reaction, structure(s): calcite vein  | 90.69                 | 6.19                  | 2.31                 | 0.240                              | 0.132                              | 315       | 63        | 50                                  |
| 76829  | Dpau       | 1.75           | <b>Lime Mudstone</b> , tan to very-light grey weathered, light brown-grey to medium brown-grey fresh, cryptocrystalline, well-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet moderate; bedding (definite) 47/8 SE   | 86.96                 | 9.75                  | 2.10                 | 0.387                              | 0.262                              | 288       | 147       | 50                                  |
| 76830  | Dpau       | 2.5            | <b>Lime Mudstone</b> , tan to very-light grey weathered, light brown-grey to medium brown-grey fresh, cryptocrystalline, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet moderate  | 97.47                 | 1.03                  | 0.85                 | 0.160                              | 0.112                              | 306       | 70        | 50                                  |
| 76831  | Dpau       | 2.5            | <b>Lime Mudstone</b> , tan to very-light grey weathered, light brown-grey to medium brown-grey fresh, cryptocrystalline, moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet   | 97.50                 | 1.13                  | 0.77                 | 0.100                              | 0.078                              | 377       | 46        | 50                                  |
| 76832  | Dpau       | 4.25           | <b>Lime Mudstone</b> , tan to very-light grey weathered, light brown-grey to medium brown-grey fresh, cryptocrystalline, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet moderate   | 97.00                 | 1.74                  | 0.80                 | 0.116                              | 0.113                              | 346       | 88        | 50                                  |
| 76833  | Dpau       | 1.75           | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, medium grey to dark grey fresh, cryptocrystalline to coarse-grained, fossils: fragment (indeterminate); bivalve, very rare, thickly-bedded; moderately-bedded, resistant  | 92.61                 | 3.41                  | 2.64                 | 0.468                              | 0.284                              | 329       | 226       | 229                                 |
| 76834  | Mbf        | 3.25           | <b>Lime Mudstone to Lime Wackestone</b> , tan to light brown-grey weathered, dark grey fresh, micritic to fine-grained, well-bedded; vuggy; nodular; moderately-bedded, slightly resistant, strong HCl reaction, structure(s): calcite vein weak; bedding (undulatory) 345/30E                            | 89.49                 | 4.71                  | 5.17                 | 0.267                              | 0.159                              | 411       | 295       | 50                                  |
| <b>Section 2012-06 (UTM 583307E, 5802942N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76837  | Mpkc       | 1.25           | <b>Lime Mudstone to Lime Packstone</b> , light grey to medium grey weathered, medium grey fresh, micritic to coarse-grained, fossils: solitary rugose coral; fragment (indeterminate); crinoid ossicle, moderately-bedded, hard, resistant, very strong HCl reaction, structure(s): calcite vein moderate | 80.12                 | 14.27                 | 4.67                 | 0.235                              | 0.111                              | 264       | 33        | 100                                 |
| 76838  | Mpkc       | 2.5            | <b>Lime Mudstone to Lime Grainstone</b> , light grey to medium grey weathered, light grey to medium grey fresh, micritic to coarse-grained, fossils: fragment (indeterminate), abundant; crinoid ossicle, abundant, very strong HCl reaction, structure(s): calcite vein moderate                         | 95.75                 | 3.64                  | 0.52                 | 0.035                              | 0.069                              | 308       | 21        | 50                                  |
| 76839  | Mpkc       | 1.5            | <b>Lime Wackestone to Lime Grainstone</b> , light grey to medium grey weathered, light grey to medium grey fresh, micritic to coarse-grained, fossils: fragment (indeterminate), abundant; crinoid ossicle, abundant, very strong HCl reaction, structure(s): calcite vein moderate                       | 95.02                 | 4.64                  | 0.33                 | 0.029                              | 0.099                              | 327       | 29        | 50                                  |
| 76840  | Mpkc       | 2.25           | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium grey to dark grey fresh, micritic, hard, resistant, very strong HCl reaction, structure(s): fault; calcite vein moderate   | 97.99                 | 1.13                  | 0.60                 | 0.055                              | 0.095                              | 338       | 21        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-07 (UTM 583207E, 5803127N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76841  | Mtv        | 2              | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium brown-grey fresh, micritic, alteration: oxide, fracture-related, 60-80% intensity, vuggy; moderately-bedded   | 96.59                 | 1.36                  | 1.01                 | 0.180                              | 0.431                              | 379       | 90        | 107                                 |
| 76842  | Mtv        | 2.25           | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium brown-grey fresh, micritic, alteration: oxide, fracture-related, 60-80% intensity, vuggy; moderately-bedded, strong HCl reaction, structure(s): calcite veinlet weak  | 95.45                 | 1.19                  | 2.10                 | 0.314                              | 0.150                              | 306       | 82        | 167                                 |
| 76843  | Mtv        | 3              | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium grey to medium brown-grey fresh, micritic, alteration: oxide, fracture-related, 60-80% intensity, vuggy; moderately-bedded, strong HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 44/10 SE  | 94.27                 | 2.57                  | 2.06                 | 0.368                              | 0.112                              | 272       | 72        | 209                                 |
| 76844  | Mtv        | 5.5            | <b>Dolomitic Lime Packstone to Dolomitic Lime Grainstone</b> , light grey weathered, light grey fresh, fine-grained to coarse-grained, fossils: crinoid ossicle, resistant, very strong HCl reaction, structure(s): vein very weak   | 89.01                 | 9.60                  | 0.45                 | 0.036                              | 0.100                              | 161       | 44        | 50                                  |
| 76845  | Mtv        | 3.25           | <b>Dolomitic Lime Packstone to Dolomitic Lime Grainstone</b> , light grey weathered, light grey fresh, fine-grained to coarse-grained, fossils: crinoid ossicle, vuggy, resistant, strong HCl reaction, structure(s): vein very weak   | 91.35                 | 7.89                  | 0.54                 | 0.040                              | 0.059                              | 190       | 32        | 50                                  |
| <b>Section 2012-08 (UTM 583164E, 5802802N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76846  | Mpk        | 3.75           | <b>Dolomitic Lime Grainstone</b> , light grey to medium grey weathered, light tan-grey fresh, medium-grained to coarse-grained, fossils: solitary rugose coral, rare; fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, thickly-bedded; moderately-bedded, strong HCl reaction, structure(s): bedding (definite) 296/40 NE | 95.77                 | 3.54                  | 0.36                 | 0.054                              | 0.060                              | 297       | 40        | 50                                  |
| 76847  | Mpk        | 4              | <b>Dolomitic Lime Grainstone</b> , light grey to medium grey weathered, light tan-grey fresh, medium-grained to coarse-grained, fossils: solitary rugose coral, very rare; fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, thickly-bedded; moderately-bedded, resistant  | 90.70                 | 8.41                  | 0.71                 | 0.066                              | 0.099                              | 254       | 40        | 50                                  |
| 76848  | Mpk        | 6.75           | <b>Dolomitic Lime Grainstone</b> , light grey to medium grey weathered, light tan-grey fresh, medium-grained to coarse-grained, fossils: solitary rugose coral, very rare; fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, thickly-bedded; moderately-bedded, resistant  | 78.03                 | 19.71                 | 1.69                 | 0.166                              | 0.092                              | 201       | 46        | 50                                  |
| <b>Section 2012-09 (UTM 570192E, 5812278N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76855  | Dpal       | 2.25           | <b>Dolomitic Mudstone</b> , tan weathered, medium brown-grey fresh, very fine-grained, alteration: oxide, 20-40% intensity, moderately-bedded, hard, resistant   | 58.33                 | 34.20                 | 6.04                 | 0.596                              | 0.351                              | 130       | 266       | 50                                  |
| 76856  | Dpau       | 2.25           | <b>Lime Mudstone</b> , tan to light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak   | 84.97                 | 12.13                 | 1.84                 | 0.297                              | 0.186                              | 265       | 156       | 50                                  |
| 76857  | Dpau       | 1.25           | <b>Lime Mudstone</b> , tan to light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: fragment (indeterminate), very rare, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 105/30 SW   | 91.19                 | 5.79                  | 2.11                 | 0.261                              | 0.209                              | 305       | 123       | 50                                  |
| 76858  | Dpau       | 0.75           | <b>Lime Mudstone</b> , tan to light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak   | 92.47                 | 4.46                  | 1.81                 | 0.275                              | 0.178                              | 270       | 202       | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-10 (UTM 570973E, 5811913N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76859  | Dpal       | 3.25           | <b>Dolomitic Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; massive, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak   | 53.65                 | 45.15                 | 0.51                 | 0.157                              | 0.100                              | 69        | 42        | 50                                  |
| 76860  | Dpal       | 2.5            | <b>Dolomitic Mudstone to Calcareous Dolomitic Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; massive, resistant, weak HCl reaction, structure(s): calcite veinlet very weak   | 60.25                 | 38.37                 | 0.64                 | 0.182                              | 0.129                              | 79        | 46        | 50                                  |
| 76861  | Dpal       | 4              | <b>Calcareous Dolomitic Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; massive, resistant, very weak HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 144/44 SW  | 58.11                 | 40.67                 | 0.75                 | 0.215                              | 0.204                              | 71        | 52        | 50                                  |
| 76862  | Dpal       | 0.75           | <b>Dolomitic Lime Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; massive, resistant, moderate HCl reaction, structure(s): calcite veinlet very weak   | 73.69                 | 25.25                 | 0.59                 | 0.190                              | 0.103                              | 154       | 29        | 50                                  |
| 76863  | Dpau       | 1.5            | <b>Dolomitic Lime Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; massive, resistant, strong HCl reaction, structure(s): calcite veinlet very weak   | 73.14                 | 25.71                 | 0.61                 | 0.175                              | 0.107                              | 157       | 36        | 50                                  |
| 76864  | Dpau       | 0.75           | <b>Dolomitic Lime Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; massive, resistant, strong HCl reaction, structure(s): calcite veinlet very weak   | 81.39                 | 17.15                 | 0.70                 | 0.212                              | 0.115                              | 232       | 34        | 50                                  |
| 76865  | Dpau       | 0.5            | <b>Calcareous Dolomitic Mudstone</b> , tan to medium grey weathered, medium brown-grey fresh, very fine-grained to fine-grained, vuggy; moderately-bedded, resistant, weak HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 136/37 SW   | 76.73                 | 22.03                 | 0.84                 | 0.219                              | 0.134                              | 175       | 45        | 50                                  |
| <b>Section 2012-11 (UTM 582398E, 5800938N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76866  | Dpau       | 2.5            | <b>Calcareous Dolomitic Mudstone</b> , tan to light grey weathered, medium grey fresh, cryptocrystalline to very fine-grained, well-bedded; moderately-bedded; laminated, resistant, weak HCl reaction, structure(s): calcite veinlet moderate; bedding (definite) 110/26 SW                           | 69.14                 | 25.42                 | 3.64                 | 0.566                              | 0.408                              | 250       | 210       | 50                                  |
| 76867  | Dpau       | 0.75           | <b>Dolomitic Lime Mudstone</b> , tan to light grey weathered, medium grey fresh, cryptocrystalline to very fine-grained, well-bedded; moderately-bedded; laminated, resistant, moderate HCl reaction, structure(s): calcite veinlet moderate   | 96.90                 | 1.57                  | 0.97                 | 0.213                              | 0.117                              | 278       | 76        | 50                                  |
| 76868  | Dpau       | 2.25           | <b>Lime Mudstone</b> , light grey weathered, light grey to medium grey fresh, cryptocrystalline to micritic, thickly-bedded; massive, resistant, strong HCl reaction, structure(s): calcite veinlet weak   | 97.41                 | 1.34                  | 0.68                 | 0.158                              | 0.095                              | 341       | 71        | 50                                  |
| 76869  | Dpau       | 1.5            | <b>Lime Mudstone</b> , light grey weathered, medium grey fresh, cryptocrystalline to micritic, thickly-bedded; massive, resistant, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 83/25 S   | 95.59                 | 2.07                  | 1.50                 | 0.218                              | 0.109                              | 404       | 83        | 50                                  |
| 76870  | Dpau       | 2.5            | <b>Lime Mudstone</b> , medium grey weathered, medium grey to dark grey fresh, cryptocrystalline to micritic, alteration: oxide, fracture-related, 20-40% intensity, vuggy; thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite vein strong; calcite vein moderate | 94.36                 | 2.85                  | 1.88                 | 0.373                              | 0.158                              | 376       | 121       | 50                                  |
| 76871  | Dpau       | 0.5            | <b>Lime Mudstone</b> , light grey weathered, medium grey fresh, cryptocrystalline to micritic, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak  | 96.61                 | 1.97                  | 0.92                 | 0.174                              | 0.130                              | 393       | 94        | 50                                  |
| 76872  | Dpau       | 3.75           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: fragment (indeterminate), rare, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 82/19 S                                    | 94.92                 | 2.38                  | 1.68                 | 0.325                              | 0.189                              | 371       | 159       | 130                                 |

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| Sample   | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-12 (UTM 582532E, 5800967N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76873  | Mbf        | 1.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite vein weak   | 97.13                 | 1.57                  | 0.83                 | 0.137                              | 0.103                              | 489       | 70        | 50                                  |
| 76874  | Mbf        | 0.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: fragment (indeterminate), rare, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite vein weak; bedding (definite) 116/31 SW                   | 95.93                 | 1.34                  | 1.40                 | 0.244                              | 0.153                              | 472       | 284       | 470                                 |
| 76875  | Mbf        | 0.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, vuggy; thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite vein weak; bedding (definite) 106/27 SW  | 96.49                 | 1.78                  | 1.02                 | 0.177                              | 0.156                              | 460       | 79        | 50                                  |
| <b>Section 2012-13 (UTM 583281E, 5800793N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76876  | Dpal       | 1.25           | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, well-bedded; moderately-bedded; laminated, hard, resistant, very weak HCl reaction, structure(s): calcite vein weak; calcite vein moderate                  | 64.61                 | 29.89                 | 4.08                 | 0.577                              | 0.357                              | 252       | 188       | 50                                  |
| 76877  | Dpal       | 1.75           | <b>Lime Mudstone</b> , light grey weathered, light grey to medium grey fresh, cryptocrystalline to micritic, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak   | 84.49                 | 12.78                 | 1.85                 | 0.306                              | 0.263                              | 243       | 157       | 50                                  |
| 76878  | Dpau       | 2.75           | <b>Lime Mudstone</b> , light grey weathered, light grey to medium grey fresh, cryptocrystalline to micritic, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 34/18 SE                                      | 97.38                 | 1.15                  | 0.67                 | 0.186                              | 0.114                              | 290       | 53        | 50                                  |
| 76879  | Dpau       | 2              | <b>Lime Mudstone to Dolomitic Mudstone</b> , light grey weathered, light grey to medium grey fresh, cryptocrystalline to micritic, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak   | 96.06                 | 2.20                  | 0.93                 | 0.198                              | 0.159                              | 362       | 82        | 50                                  |
| 76880  | Dpau       | 4              | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, cryptocrystalline to micritic, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 348/12 NE                                      | 96.56                 | 1.57                  | 0.90                 | 0.213                              | 0.090                              | 470       | 63        | 50                                  |
| 76881  | Dpau       | 1.25           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, cryptocrystalline to micritic, thickly-bedded; moderately-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak  | 97.18                 | 1.53                  | 0.69                 | 0.164                              | 0.117                              | 466       | 72        | 50                                  |
| 76882  | Mbf        | 1              | <b>Lime Mudstone to Lime Wackestone</b> , tan weathered, medium brown-grey fresh, cryptocrystalline to micritic, fossils: fragment (indeterminate); brachiopod, rare, well-bedded, recessive, moderate HCl reaction, structure(s): calcite veinlet very weak                         | 87.69                 | 5.17                  | 4.67                 | 1.011                              | 0.408                              | 421       | 478       | 459                                 |
| <b>Section 2012-14 (UTM 581077E, 5802012N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76883  | Dpal       | 2.25           | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey fresh, very fine-grained, well-bedded; moderately-bedded; laminated, hard, resistant, weak (powder) HCl reaction, structure(s): bedding (definite) 163/21 SW   | 58.77                 | 36.80                 | 3.26                 | 0.517                              | 0.276                              | 150       | 157       | 50                                  |
| 76884  | Dpau       | 3.5            | <b>Dolomitic Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak   | 90.97                 | 6.40                  | 1.57                 | 0.254                              | 0.204                              | 335       | 84        | 50                                  |
| 76885  | Dpau       | 1.75           | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: stromatoporoid, abundant; fragment (indeterminate), rare, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak | 81.62                 | 13.97                 | 3.47                 | 0.209                              | 0.200                              | 327       | 119       | 50                                  |

| Sample | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--------|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 76886  | Dpau       | 2.5            | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: stromatoporoid, common; fragment (indeterminate), rare, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 120/23 SW | 91.49                 | 6.15                  | 1.81                 | 0.286                              | 0.183                              | 282       | 122       | 50                                  |
| 76887  | Dpau       | 1.75           | <b>Lime Mudstone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: stromatoporoid, common; fragment (indeterminate), rare, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak  | 97.18                 | 1.13                  | 0.76                 | 0.116                              | 0.224                              | 377       | 92        | 50                                  |
| 76888  | Dpau       | 3.5            | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: stromatoporoid, common; fragment (indeterminate), rare, thickly-bedded, resistant, strong HCl reaction, structure(s): calcite veinlet weak                               | 92.45                 | 3.08                  | 3.15                 | 0.365                              | 0.430                              | 353       | 204       | 130                                 |

**Section 2012-15 (UTM 581223E, 5802160N)**

|       |      |      |   |       |       |      |       |       |     |    |    |
|-------|------|------|---|-------|-------|------|-------|-------|-----|----|----|
| 76889 | Dpal | 2.25 | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak; bedding (definite) 120/40 SW  | 54.13 | 44.92 | 0.73 | 0.191 | 0.189 | 82  | 56 | 50 |
| 76890 | Dpal | 2.5  | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 53.74 | 44.96 | 0.85 | 0.244 | 0.206 | 93  | 61 | 50 |
| 76891 | Dpal | 5    | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 53.69 | 44.96 | 0.72 | 0.207 | 0.123 | 93  | 44 | 50 |
| 76892 | Dpal | 2.25 | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak; bedding (approximate) 93/10 S | 53.69 | 44.29 | 1.30 | 0.313 | 0.154 | 112 | 48 | 50 |
| 76893 | Dpal | 2.75 | <b>Dolomitic Mudstone</b> , light grey to tan weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 55.85 | 42.40 | 1.19 | 0.268 | 0.148 | 93  | 49 | 50 |
| 76894 | Dpal | 2.75 | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 55.81 | 42.03 | 1.47 | 0.325 | 0.172 | 99  | 44 | 50 |
| 76895 | Dpal | 2    | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 55.79 | 41.57 | 1.77 | 0.454 | 0.196 | 103 | 44 | 50 |
| 76896 | Dpal | 2    | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 56.22 | 41.57 | 1.46 | 0.387 | 0.190 | 101 | 49 | 50 |
| 76897 | Dpal | 2.75 | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 55.17 | 43.53 | 0.82 | 0.209 | 0.133 | 97  | 45 | 50 |
| 76898 | Dpal | 2.75 | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet very weak                                | 55.63 | 43.24 | 0.78 | 0.140 | 0.097 | 93  | 37 | 50 |

| Sample | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--------|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 76899  | Dpal       | 2.75           | <b>Dolomitic Mudstone</b> , tan to light grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, very weak HCl reaction, structure(s): calcite veinlet very weak                | 55.74                 | 43.51                 | 0.47                 | 0.107                              | 0.087                              | 103       | 41        | 50                                  |
| 76900  | Dpal       | 1.75           | <b>Dolomitic Mudstone</b> , light grey to tan weathered, light brown-grey to medium brown-grey fresh, vuggy; thickly-bedded; pockety; moderately-bedded, resistant, weak HCl reaction, structure(s): calcite veinlet very weak  | 56.22                 | 42.57                 | 0.81                 | 0.179                              | 0.111                              | 99        | 37        | 50                                  |
| 76901  | Dpal       | 3.25           | <b>Calcareous Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak HCl reaction, structure(s): calcite veinlet weak                             | 56.63                 | 41.82                 | 0.79                 | 0.161                              | 0.093                              | 92        | 36        | 50                                  |
| 76902  | Dpal       | 4              | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                               | 59.24                 | 40.10                 | 0.34                 | 0.073                              | 0.118                              | 106       | 36        | 50                                  |
| 76903  | Dpal       | 2.5            | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 120/23 SW | 56.04                 | 42.72                 | 0.98                 | 0.093                              | 0.089                              | 96        | 38        | 50                                  |
| 76904  | Dpal       | 2              | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                               | 56.20                 | 42.72                 | 0.87                 | 0.072                              | 0.082                              | 78        | 48        | 50                                  |
| 76905  | Dpal       | 2              | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, hard, resistant   | 55.58                 | 43.79                 | 0.48                 | 0.046                              | 0.068                              | 68        | 36        | 50                                  |
| 76906  | Dpau       | 3.5            | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                               | 55.81                 | 43.60                 | 0.39                 | 0.080                              | 0.062                              | 73        | 33        | 50                                  |
| 76907  | Dpal       | 3.5            | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 97/22 S   | 56.45                 | 42.82                 | 0.47                 | 0.101                              | 0.082                              | 75        | 40        | 50                                  |
| 76908  | Dpal       | 2.75           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                               | 56.63                 | 42.57                 | 0.51                 | 0.086                              | 0.126                              | 72        | 42        | 50                                  |
| 76909  | Dpal       | 3.75           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                    | 56.72                 | 42.70                 | 0.36                 | 0.073                              | 0.075                              | 82        | 39        | 50                                  |
| 76910  | Dpal       | 1.25           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                               | 54.45                 | 39.12                 | 5.83                 | 0.151                              | 0.104                              | 73        | 41        | 50                                  |
| 76911  | Dpal       | 2.25           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 110/18 SW | 54.63                 | 43.74                 | 1.34                 | 0.116                              | 0.078                              | 67        | 33        | 50                                  |
| 76912  | Dpal       | 2.75           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety, hard, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                               | 55.78                 | 41.88                 | 1.61                 | 0.296                              | 0.135                              | 121       | 41        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| <b>Section 2012-16 (UTM 580715E, 5803832N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76913  | Mpkc       | 0.75           | <b>Lime Mudstone</b> , light brown-grey weathered, medium grey to dark grey fresh, micritic, fossils: fragment (indeterminate); crinoid ossicle, rare, well-bedded; moderately-bedded, slightly resistant, very strong HCl reaction, structure(s): fracture strong; calcite veinlet strong; calcite vein strong; bedding (definite) 148/17 SW | 65.86                 | 18.95                 | 10.82                | 1.419                              | 0.580                              | 272       | 221       | 215                                 |
| 76914  | Mpkg       | 1.25           | <b>Lime Packstone to Lime Grainstone</b> , very-light grey weathered, medium brown-grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet strong  | 97.43                 | 1.51                  | 0.28                 | 0.039                              | 0.088                              | 307       | 44        | 50                                  |
| 76915  | Mpkg       | 2              | <b>Lime Packstone</b> , very-light grey weathered, medium brown-grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet strong   | 93.56                 | 4.94                  | 0.95                 | 0.147                              | 0.108                              | 325       | 58        | 50                                  |
| 76916  | Mpkg       | 2.5            | <b>Lime Packstone</b> , very-light grey weathered, medium brown-grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, alteration: oxide, localized, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet strong   | 93.17                 | 5.46                  | 1.07                 | 0.118                              | 0.140                              | 323       | 74        | 50                                  |
| 76917  | Mpkg       | 1.5            | <b>Lime Packstone</b> , very-light grey weathered, medium brown-grey fresh, micritic to medium-grained, alteration: oxide, localized, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet strong   | 90.53                 | 6.53                  | 2.12                 | 0.198                              | 0.162                              | 341       | 88        | 50                                  |
| <b>Section 2012-17 (UTM 580673E, 5803951N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76918  | Mpkc       | 1.75           | <b>Lime Mudstone</b> , tan to light grey weathered, medium brown-grey fresh, micritic, fossils: fragment (indeterminate); crinoid ossicle, rare, well-bedded; moderately-bedded, slightly resistant, very strong HCl reaction, structure(s): calcite veinlet moderate; bedding (definite) 236/8 NW  | 73.61                 | 15.59                 | 7.40                 | 1.176                              | 0.565                              | 312       | 163       | 155                                 |
| 76919  | Mpkg       | 1.25           | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, medium brown-grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet moderate   | 98.34                 | 1.13                  | 0.15                 | 0.024                              | 0.080                              | 318       | 46        | 50                                  |
| 76920  | Mpkg       | 1.5            | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, medium brown-grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet moderate   | 94.83                 | 4.58                  | 0.27                 | 0.035                              | 0.210                              | 272       | 87        | 50                                  |
| <b>Section 2012-18 (UTM 580593E, 5803971N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76921  | Dpal       | 2              | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, thickly-bedded; pockety; massive, hard, resistant, weak (powder) HCl reaction, structure(s): bedding (possible)   | 74.30                 | 23.77                 | 0.95                 | 0.243                              | 0.218                              | 146       | 57        | 50                                  |
| 76922  | Dpal       | 1.75           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, thickly-bedded; pockety; massive, hard, resistant   | 60.92                 | 37.47                 | 0.68                 | 0.222                              | 0.127                              | 95        | 40        | 50                                  |
| 76923  | Dpal       | 2.75           | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, thickly-bedded; pockety; massive, hard, resistant, weak (powder) HCl reaction, structure(s): bedding (undulatory) 220/19 NW   | 55.20                 | 42.99                 | 1.14                 | 0.304                              | 0.152                              | 87        | 45        | 50                                  |
| 76924  | Dpal       | 2.25           | <b>Dolomitic Mudstone</b> , light brown weathered, light brown-grey fresh, very fine-grained, thickly-bedded; pockety; massive, hard, resistant   | 55.97                 | 42.24                 | 0.83                 | 0.309                              | 0.128                              | 80        | 39        | 50                                  |
| 76925  | Dpal       | 2.5            | <b>Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey to medium brown-grey fresh, very fine-grained, thickly-bedded; pockety; massive, hard, resistant   | 59.61                 | 39.06                 | 0.52                 | 0.221                              | 0.092                              | 92        | 36        | 50                                  |

| Sample | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--------|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 76926  | Dpal       | 2.25           | <b>Dolomitic Lime Mudstone</b> , light brown-grey weathered, light grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; massive, resistant, moderate HCl reaction, structure(s): calcite vein weak  | 62.66                 | 36.30                 | 0.70                 | 0.214                              | 0.077                              | 100       | 47        | 50                                  |
| 76927  | Dpal       | 3              | <b>Calcareous Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; massive, resistant, weak (powder) HCl reaction, structure(s): calcite vein weak                           | 56.33                 | 42.72                 | 0.55                 | 0.162                              | 0.128                              | 95        | 53        | 50                                  |
| 76929  | Dpal       | 2.75           | <b>Calcareous Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; massive, resistant, weak (powder) HCl reaction, structure(s): calcite vein weak                           | 56.79                 | 42.24                 | 0.54                 | 0.176                              | 0.135                              | 103       | 55        | 50                                  |
| 76930  | Dpal       | 2              | <b>Dolomitic Lime Mudstone</b> , light brown-grey weathered, light brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; massive, resistant, moderate HCl reaction, structure(s): calcite vein weak                                      | 55.36                 | 43.45                 | 0.45                 | 0.125                              | 0.535                              | 88        | 113       | 50                                  |
| 76931  | Dpal       | 2              | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 55.94                 | 42.66                 | 0.83                 | 0.248                              | 0.165                              | 95        | 50        | 50                                  |
| 76932  | Dpal       | 2.75           | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 55.33                 | 43.56                 | 0.61                 | 0.199                              | 0.189                              | 96        | 63        | 50                                  |
| 76933  | Dpal       | 3              | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 54.88                 | 44.16                 | 0.54                 | 0.177                              | 0.115                              | 88        | 49        | 50                                  |
| 76934  | Dpal       | 3              | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak; bedding (definite) 215/20 NW   | 54.86                 | 44.16                 | 0.54                 | 0.170                              | 0.142                              | 84        | 52        | 50                                  |
| 76935  | Dpal       | 5.75           | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 55.45                 | 43.53                 | 0.56                 | 0.184                              | 0.143                              | 84        | 49        | 50                                  |
| 76936  | Dpal       | 3.25           | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 56.77                 | 41.59                 | 0.63                 | 0.189                              | 0.129                              | 84        | 43        | 50                                  |
| 76937  | Dpal       | 2.5            | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 55.19                 | 43.33                 | 0.93                 | 0.231                              | 0.178                              | 84        | 50        | 50                                  |
| 76938  | Dpal       | 2.5            | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 54.97                 | 43.10                 | 1.21                 | 0.331                              | 0.191                              | 89        | 46        | 50                                  |
| 76939  | Dpal       | 2.25           | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 227/12 NW | 54.79                 | 43.97                 | 0.70                 | 0.198                              | 0.188                              | 80        | 42        | 50                                  |
| 76940  | Dpal       | 3              | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak                                 | 54.83                 | 43.93                 | 0.73                 | 0.218                              | 0.163                              | 84        | 50        | 50                                  |
| 76941  | Dpal       | 2.5            | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, vuggy; thickly-bedded; pockety, resistant, no HCl reaction, structure(s): calcite veinlet weak  | 55.99                 | 42.09                 | 1.25                 | 0.310                              | 0.189                              | 90        | 50        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 76942  | Dpal       | 3              | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, alteration: oxide, 20-40% intensity, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak  | 54.44                 | 42.22                 | 1.84                 | 0.444                              | 0.607                              | 94        | 111       | 50                                  |
| 76943  | Dpal       | 4              | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, alteration: oxide, 20-40% intensity, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak  | 55.99                 | 42.13                 | 1.23                 | 0.308                              | 0.161                              | 97        | 46        | 50                                  |
| 76944  | Dpal       | 4.25           | <b>Dolomitic Mudstone</b> , medium brown-grey weathered, medium brown to dark brown fresh, very fine-grained, alteration: oxide, 20-40% intensity, vuggy; thickly-bedded; pockety, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak  | 56.76                 | 41.92                 | 0.91                 | 0.172                              | 0.118                              | 87        | 45        | 50                                  |
| <b>Section 2012-19 (UTM 576305E, 5804567N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 76945  | Mpkg       | 3.25           | <b>Lime Grainstone</b> , light grey weathered, medium brown-grey fresh, medium-grained to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate; bedding (undulatory) 145/42 SW     | 98.41                 | 1.26                  | 0.14                 | 0.022                              | 0.054                              | 320       | 29        | 50                                  |
| 76946  | Mpkg       | 2.25           | <b>Lime Grainstone</b> , light grey weathered, medium brown-grey fresh, medium-grained to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate                                     | 98.34                 | 1.19                  | 0.13                 | 0.020                              | 0.056                              | 317       | 29        | 50                                  |
| 76947  | Mpkg       | 0.25           | <b>Lime Grainstone</b> , light grey weathered, medium brown-grey fresh, medium-grained to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate                                     | 98.70                 | 0.98                  | 0.16                 | 0.018                              | 0.054                              | 315       | 25        | 50                                  |
| 76948  | Mpkg       | 1.5            | <b>Lime Wackestone to Lime Grainstone</b> , light grey weathered, light brown-grey to medium brown-grey fresh, micritic to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle, alteration: oxide, 20-40% intensity, moderately-bedded, resistant, very strong HCl reaction, structure(s): fracture moderate | 82.17                 | 0.88                  | 16.52                | 0.034                              | 0.039                              | 284       | 20        | 50                                  |
| 76949  | Mpkc       | 1.25           | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, light grey to medium grey fresh, micritic to very fine-grained, alteration: oxide, 20-40% intensity, resistant, very strong HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 159/37 SW  | 79.08                 | 1.19                  | 17.16                | 0.040                              | 0.064                              | 272       | 28        | 50                                  |
| 76950  | Mpkg       | 3.5            | <b>Lime Grainstone</b> , light grey weathered, light grey to medium grey fresh, micritic to very fine-grained, alteration: oxide, 20-40% intensity, resistant, very strong HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 140/39 SW   | 98.29                 | 0.96                  | 0.29                 | 0.019                              | 0.046                              | 309       | 25        | 50                                  |
| <b>Section 2012-20 (UTM 576666E, 5805025N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 74551  | Dpal       | 3.75           | <b>Dolomitic Mudstone</b> , very-light grey to tan weathered, light tan-grey fresh, very fine-grained to fine-grained, alteration: oxide, 20-40% intensity, well-bedded; silty; pockety; laminated, hard, resistant, weak (powder) HCl reaction, structure(s): bedding (definite) 138/30 SW                                 | 60.09                 | 38.81                 | 0.61                 | 0.120                              | 0.082                              | 92        | 34        | 50                                  |
| 74552  | Dpal       | 3.75           | <b>Dolomitic Mudstone</b> , very-light grey to tan weathered, light tan-grey fresh, very fine-grained to fine-grained, alteration: oxide, 20-40% intensity, well-bedded; vuggy; silty; pockety; laminated, hard, resistant  | 56.36                 | 39.75                 | 3.08                 | 0.437                              | 0.189                              | 87        | 51        | 50                                  |
| 74553  | Dpal       | 2.75           | <b>Dolomitic Mudstone</b> , very-light grey to tan weathered, light tan-grey fresh, very fine-grained to fine-grained, alteration: oxide, 20-40% intensity, well-bedded; silty; pockety; laminated, hard, resistant, weak (powder) HCl reaction, structure(s): fracture strong  | 55.24                 | 43.07                 | 1.17                 | 0.232                              | 0.118                              | 100       | 36        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 74554  | Dpal       | 2              | <b>Dolomitic Mudstone</b> , very-light grey to tan weathered, light tan-grey fresh, very fine-grained to fine-grained, alteration: oxide, 20-40% intensity, well-bedded; vuggy; silty; pockety; laminated, hard, resistant   | 54.65                 | 43.74                 | 1.13                 | 0.201                              | 0.111                              | 89        | 41        | 50                                  |
| 74555  | Dpal       | 3.25           | <b>Dolomitic Mudstone</b> , very-light grey to tan weathered, light tan-grey fresh, very fine-grained to fine-grained, alteration: oxide, 20-40% intensity, well-bedded; silty; pockety; laminated, hard, resistant  | 54.65                 | 43.22                 | 1.46                 | 0.267                              | 0.183                              | 95        | 56        | 50                                  |
| 74556  | Dpal       | 2.5            | <b>Dolomitic Mudstone</b> , very-light grey to tan weathered, light tan-grey fresh, very fine-grained to fine-grained, alteration: oxide, 20-40% intensity, well-bedded; silty; pockety; laminated, hard, resistant, weak (powder) HCl reaction, structure(s): bedding (undulatory) 145/31 SW            | 55.13                 | 43.79                 | 0.76                 | 0.115                              | 0.084                              | 98        | 51        | 50                                  |
| 76928  | Dpal       | 1.75           | <b>Calcareous Dolomitic Mudstone</b> , light brown-grey weathered, light brown-grey fresh, very fine-grained, vuggy; thickly-bedded; pockety; massive, resistant, weak (powder) HCl reaction, structure(s): calcite vein weak; calcite vein moderate   | 56.94                 | 42.20                 | 0.49                 | 0.159                              | 0.105                              | 87        | 56        | 50                                  |
| <b>Section 2012-21 (UTM 576654E, 5804899N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 74557  | Dpa        | 2.5            | <b>Dolomitic Mudstone to Lime Mudstone</b> , light grey to tan weathered, very-light grey to very-dark grey fresh, micritic to very fine-grained, alteration: oxide, 20-40% intensity, well-bedded; thickly-bedded; laminated, resistant, weak (powder) HCl reaction, structure(s): calcite veinlet weak | 85.53                 | 11.82                 | 1.56                 | 0.285                              | 0.173                              | 325       | 92        | 50                                  |
| 74558  | Dpau       | 3              | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium grey to dark grey fresh, micritic, alteration: oxide, 20-40% intensity, thickly-bedded, very strong HCl reaction, structure(s): calcite veinlet weak  | 88.65                 | 5.90                  | 4.27                 | 0.325                              | 0.290                              | 323       | 90        | 50                                  |
| 74559  | Dpau       | 3.25           | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium grey to dark grey fresh, micritic, alteration: oxide, 20-40% intensity, thickly-bedded, very strong HCl reaction, structure(s): calcite veinlet weak; bedding (undulatory) 137/31 SW  | 85.51                 | 11.49                 | 2.05                 | 0.357                              | 0.204                              | 306       | 116       | 50                                  |
| 74560  | Dpau       | 3              | <b>Lime Mudstone</b> , light grey to medium grey weathered, very-light grey fresh, micritic, fossils: stromatolite; fragment (indeterminate), well-bedded; stromatolitic; laminated, resistant, very strong HCl reaction, structure(s): fracture moderate; bedding (definite) 126/32 SW                  | 79.25                 | 17.64                 | 2.64                 | 0.224                              | 0.164                              | 192       | 363       | 50                                  |
| 74561  | Dpau       | 5              | <b>Lime Mudstone</b> , light grey to medium grey weathered, very-light grey fresh, micritic, fossils: stromatolite; fragment (indeterminate), well-bedded; stromatolitic; nodular; laminated, resistant, very strong HCl reaction, structure(s): fracture moderate                                       | 92.93                 | 3.93                  | 1.74                 | 0.303                              | 0.179                              | 342       | 192       | 50                                  |
| 74562  | Dpau       | 2.25           | <b>Lime Mudstone</b> , light grey to medium grey weathered, medium grey fresh, micritic, fossils: stromatolite; fragment (indeterminate), well-bedded; vuggy; stromatolitic; laminated, resistant, very strong HCl reaction, structure(s): fracture moderate   | 83.67                 | 8.83                  | 4.73                 | 0.971                              | 0.736                              | 300       | 444       | 620                                 |
| <b>Section 2012-22 (UTM 579204E, 5805354N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 74563  | Mpk        | 2.25           | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, light grey fresh, micritic to fine-grained, fossils: crinoid ossicle, rare, thickly-bedded, resistant, very strong HCl reaction, structure(s): joint strong; calcite veinlet weak; bedding (undulatory) 113/78 SW                        | 98.34                 | 0.96                  | 0.15                 | 0.043                              | 0.060                              | 321       | 32        | 50                                  |
| 74564  | Mpk        | 3.5            | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, light grey fresh, micritic to fine-grained, fossils: crinoid ossicle, rare, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): joint strong; calcite veinlet weak                   | 98.47                 | 0.88                  | 0.13                 | 0.040                              | 0.102                              | 320       | 30        | 50                                  |

| Sample   | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 74565  | Mpk        | 2.75           | <b>Lime Mudstone to Lime Wackestone</b> , light grey weathered, light grey fresh, micritic to fine-grained, fossils: crinoid ossicle, rare, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): joint strong; calcite veinlet weak                        | 98.43                 | 0.86                  | 0.08                 | 0.034                              | 0.105                              | 311       | 19        | 50                                  |
| 74566  | Mpk        | 3.5            | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, light grey fresh, fine-grained to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle, abundant, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet weak | 98.52                 | 0.94                  | 0.04                 | 0.017                              | 0.034                              | 339       | 19        | 50                                  |
| 74567  | Mpkg       | 4.5            | <b>Lime Packstone to Lime Grainstone</b> , light grey weathered, light grey fresh, fine-grained to coarse-grained, fossils: fragment (indeterminate); crinoid ossicle, abundant, alteration: oxide, 20-40% intensity, thickly-bedded, resistant, very strong HCl reaction, structure(s): calcite veinlet weak | 99.06                 | 0.77                  | 0.08                 | 0.016                              | 0.049                              | 252       | 25        | 50                                  |
| 74568  | Mpkg       | 3              | <b>Lime Grainstone</b> , light grey weathered, light grey fresh, coarse-grained, fossils: fragment (indeterminate), abundant; crinoid ossicle, abundant, resistant  | 98.66                 | 0.92                  | 0.09                 | 0.018                              | 0.054                              | 340       | 23        | 50                                  |
| 74569  | Mpkg       | 3              | <b>Lime Grainstone</b> , light grey weathered, light grey fresh, coarse-grained, fossils: fragment (indeterminate), abundant; crinoid ossicle, abundant, resistant  | 98.50                 | 1.00                  | 0.09                 | 0.016                              | 0.039                              | 348       | 21        | 50                                  |
| 74570  | Mpkg       | 2.75           | <b>Lime Grainstone</b> , light grey weathered, light grey fresh, coarse-grained, fossils: fragment (indeterminate), abundant; crinoid ossicle, abundant, resistant  | 98.54                 | 1.09                  | 0.11                 | 0.017                              | 0.174                              | 337       | 35        | 50                                  |
| 74571  | Mpkg       | 2              | <b>Dolomitic Mudstone to Lime Grainstone</b> , light grey to light brown-grey weathered, light brown-grey to medium grey fresh, micritic to medium-grained, alteration: oxide, thickly-bedded, resistant, weak (powder) HCl reaction, structure(s): bedding (definite) 280/63 NE                              | 80.33                 | 18.33                 | 0.74                 | 0.096                              | 0.074                              | 255       | 32        | 50                                  |
| 74572  | Mpkc       | 2              | <b>Dolomitic Mudstone to Lime Wackestone</b> , light brown-grey weathered, light brown-grey to medium grey fresh, micritic to fine-grained, fossils: crinoid ossicle, alteration: oxide, thickly-bedded, hard, resistant  | 81.37                 | 17.30                 | 0.98                 | 0.137                              | 0.078                              | 271       | 31        | 50                                  |
| <b>Section 2012-23 (UTM 579201E, 5805444N)</b> |            |                |   |                       |                       |                      |                                    |                                    |           |           |                                     |
| 74573  | Mtv        | 3              | <b>Lime Mudstone</b> , light brown-grey weathered, light brown-grey to light grey fresh, micritic, alteration: oxide, thickly-bedded; pockety; moderately-bedded  | 90.44                 | 5.42                  | 2.43                 | 0.560                              | 0.382                              | 253       | 177       | 181                                 |
| 74574  | Mtv        | 3.5            | <b>Lime Mudstone to Wackestone</b> , light grey weathered, light grey to medium grey fresh, micritic, vuggy; thickly-bedded, strong HCl reaction, structure(s): bedding (definite) 288/88 NE  | 93.27                 | 2.64                  | 2.45                 | 0.485                              | 0.219                              | 296       | 92        | 50                                  |
| 74575  | Mtv        | 3.5            | <b>Lime Mudstone to Wackestone</b> , light grey weathered, light grey to medium grey fresh, micritic, vuggy; thickly-bedded   | 91.19                 | 7.32                  | 1.05                 | 0.143                              | 0.107                              | 256       | 65        | 50                                  |
| 74576  | Mpk        | 3.5            | <b>Lime Mudstone to Grainstone</b> , light grey weathered, light grey to medium grey fresh, micritic to coarse-grained, fossils: solitary rugose coral; fragment (indeterminate); crinoid ossicle; brachiopod, resistant  | 83.96                 | 13.72                 | 1.75                 | 0.260                              | 0.113                              | 221       | 72        | 50                                  |
| 74577  | Mpk        | 2.5            | <b>Lime Mudstone to Grainstone</b> , light grey weathered, light grey to medium grey fresh, micritic to coarse-grained, fossils: solitary rugose coral; fragment (indeterminate); crinoid ossicle; brachiopod, resistant  | 95.79                 | 3.37                  | 0.57                 | 0.035                              | 0.060                              | 234       | 44        | 50                                  |
| 74578  | Mtv        | 3.5            | <b>Dolomitic Mudstone</b> , light grey to light brown weathered, light tan-grey fresh, very fine-grained, vuggy; nodular, hard, resistant   | 58.27                 | 40.84                 | 0.59                 | 0.070                              | 0.116                              | 52        | 76        | 134                                 |
| 74579  | Mtv        | 4              | <b>Dolomitic Mudstone</b> , light grey to light brown weathered, light tan-grey fresh, very fine-grained, vuggy; nodular, hard, resistant   | 61.31                 | 37.72                 | 0.73                 | 0.052                              | 0.086                              | 79        | 114       | 50                                  |

| Sample | Strat Unit | Strat Tkns (m) | Description   | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--------|------------|----------------|---|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 74580  | Mtv        | 3              | <b>Dolomitic Mudstone</b> , light grey to light brown weathered, light tan-grey fresh, very fine-grained, vuggy; nodular, hard, resistant                     | 56.97                 | 42.40                 | 0.41                 | 0.031                              | 0.094                              | 67        | 140       | 50                                  |
| 74581  | Mtv        | 3              | <b>Dolomitic Mudstone to Packstone</b> , light grey to light brown weathered, light tan-grey fresh, micritic to fine-grained, vuggy; nodular, hard, resistant | 57.08                 | 42.15                 | 0.56                 | 0.050                              | 0.070                              | 69        | 120       | 50                                  |

**Section 2012-24 (UTM 578946E, 5805214N)**

|       |      |      |   |       |       |      |       |       |     |      |      |
|-------|------|------|---|-------|-------|------|-------|-------|-----|------|------|
| 74582 | Dpa  | 3    | <b>Dolomitic Mudstone</b> , light brown-grey weathered, medium grey to light tan-grey fresh, very fine-grained, well-bedded; laminated, weak (powder) HCl reaction, structure(s): bedding (definite) 172/18 NW                              | 58.52 | 34.56 | 5.54 | 0.576 | 0.263 | 111 | 169  | 104  |
| 74583 | Dpau | 3    | <b>Lime Mudstone</b> , medium grey weathered, medium grey to very-dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant  | 86.67 | 10.59 | 1.98 | 0.226 | 0.144 | 277 | 113  | 50   |
| 74584 | Dpau | 3    | <b>Lime Mudstone</b> , medium grey weathered, light grey to very-light grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant  | 83.58 | 13.81 | 1.95 | 0.169 | 0.140 | 250 | 142  | 50   |
| 74585 | Dpau | 3    | <b>Lime Mudstone</b> , medium grey weathered, light grey to very-light grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant  | 89.85 | 5.82  | 3.29 | 0.260 | 0.124 | 329 | 105  | 50   |
| 74586 | Dpau | 3.5  | <b>Lime Mudstone</b> , medium grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant   | 88.67 | 7.97  | 2.35 | 0.286 | 0.174 | 296 | 167  | 50   |
| 74587 | Dpau | 3.25 | <b>Lime Mudstone</b> , medium grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded  | 96.72 | 1.49  | 1.02 | 0.176 | 0.155 | 325 | 138  | 50   |
| 74588 | Dpa  | 3    | <b>Dolomitic Mudstone</b> , light brown-grey weathered, medium grey to light tan-grey fresh, very fine-grained, well-bedded; laminated  | 78.25 | 12.93 | 5.80 | 1.170 | 0.643 | 277 | 612  | 437  |
| 74589 | Dpau | 2.75 | <b>Lime Mudstone to Wackestone</b> , medium grey weathered, medium grey to dark grey fresh, micritic to very fine-grained, fossils: fragment (indeterminate); brachiopod, thickly-bedded; moderately-bedded, resistant                      | 86.40 | 5.36  | 5.63 | 0.946 | 0.529 | 296 | 1030 | 1106 |
| 74590 | Dpau | 3    | <b>Lime Mudstone</b> , medium grey weathered, medium grey to very-dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, resistant  | 94.26 | 2.41  | 2.56 | 0.337 | 0.205 | 494 | 648  | 263  |
| 74591 | Dpau | 3    | <b>Lime Mudstone</b> , medium grey weathered, medium grey to very-dark grey fresh, micritic to very fine-grained, thickly-bedded; moderately-bedded, hard, resistant, weak (powder) HCl reaction, structure(s): bedding (definite) 195/20 W | 88.76 | 5.33  | 5.06 | 0.327 | 0.239 | 387 | 433  | 351  |

**Section 2012-25 (UTM 585286E, 5800310N)**

|       |      |     |   |       |       |      |       |       |     |    |     |
|-------|------|-----|---|-------|-------|------|-------|-------|-----|----|-----|
| 74592 | Mpk  | 2.5 | <b>Lime Mudstone to Wackestone</b> , light tan-grey to light grey weathered, light grey to medium grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, moderately-bedded, strong HCl reaction, structure(s): bedding (approximate) 96/27 S | 95.79 | 2.22  | 1.28 | 0.112 | 0.166 | 299 | 68 | 50  |
| 74593 | Mpk  | 2.5 | <b>Lime Mudstone to Wackestone</b> , light tan-grey to light grey weathered, light grey to medium grey fresh, cryptocrystalline to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, moderately-bedded  | 74.23 | 19.62 | 4.20 | 0.727 | 0.230 | 207 | 72 | 105 |
| 74594 | Mpkg | 3   | <b>Lime Grainstone</b> , light grey weathered, light grey to medium grey fresh, medium-grained to coarse-grained, fossils: solitary rugose coral; fragment (indeterminate); crinoid ossicle   | 97.54 | 1.82  | 0.42 | 0.025 | 0.035 | 207 | 39 | 50  |
| 74595 | Mpk  | 3   | <b>Lime Mudstone to Wackestone</b> , light tan-grey to light grey weathered, light grey to medium grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, moderately-bedded   | 91.51 | 7.89  | 0.56 | 0.073 | 0.081 | 154 | 46 | 50  |

| Sample   | Strat Unit | Strat Tkns (m) | Description  | CaCO <sub>3</sub> (%) | MgCO <sub>3</sub> (%) | SiO <sub>2</sub> (%) | Al <sub>2</sub> O <sub>3</sub> (%) | Fe <sub>2</sub> O <sub>3</sub> (%) | SrO (ppm) | MnO (ppm) | P <sub>2</sub> O <sub>5</sub> (ppm) |
|--|------------|----------------|--|-----------------------|-----------------------|----------------------|------------------------------------|------------------------------------|-----------|-----------|-------------------------------------|
| 74596  | Mpk        | 3.5            | <b><u>Lime Wackestone to Packstone</u></b> , light tan-grey to light grey weathered, light grey to medium grey fresh, micritic to medium-grained, fossils: fragment (indeterminate); crinoid ossicle, vuggy; moderately-bedded, strong HCl reaction, structure(s): bedding (definite) 105/16 S                             | 83.90                 | 14.62                 | 0.45                 | 0.058                              | 0.076                              | 143       | 45        | 50                                  |
| 74597  | Mpk        | 3              | <b><u>Lime Wackestone to Packstone</u></b> , light tan-grey weathered, light grey to light brown fresh, micritic to coarse-grained, vuggy  | 82.14                 | 16.97                 | 0.67                 | 0.073                              | 0.063                              | 147       | 41        | 50                                  |
| <b>Section 2012-26 (UTM 585003E, 5801013N)</b> |            |                |  |                       |                       |                      |                                    |                                    |           |           |                                     |
| 74050  | Mpkc       | 3.5            | <b><u>Lime Mudstone</u></b> , very-light grey to light grey weathered, light grey to medium grey fresh, micritic, massive, very strong HCl reaction, structure(s): bedding (definite), outcrop-scale, 350/21 E   | 86.40                 | 11.19                 | 1.52                 | 0.154                              | 0.115                              | 246       | 43        | 50                                  |
| 74598  | Mpkg       | 3.5            | <b><u>Lime Packstone</u></b> , light grey to very-light grey weathered, very-light grey to light grey fresh, medium-grained to coarse-grained, fossils: fragment (indeterminate); crinoid stem; crinoid ossicle, massive, resistant  | 98.15                 | 1.07                  | 0.48                 | 0.022                              | 0.030                              | 297       | 18        | 50                                  |
| 74599  | Mpkg       | 2.75           | <b><u>Lime Mudstone to Lime Grainstone</u></b> , light grey to very-light grey weathered, very-light grey to light grey fresh, medium-grained to coarse-grained, fossils: fragment (indeterminate); crinoid stem; crinoid ossicle, massive, resistant, very strong HCl reaction, structure(s): bedding (definite) 350/18 E | 97.06                 | 2.20                  | 0.38                 | 0.029                              | 0.065                              | 317       | 25        | 50                                  |
| 74600  | Mpkg       | 3.5            | <b><u>Lime Grainstone</u></b> , light grey to very-light grey weathered, very-light grey to light grey fresh, medium-grained to coarse-grained, fossils: fragment (indeterminate); crinoid stem; crinoid ossicle, massive, resistant   | 97.82                 | 1.55                  | 0.34                 | 0.022                              | 0.042                              | 327       | 20        | 50                                  |

### 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 12<sup>th</sup> 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 Permit  
9302090596



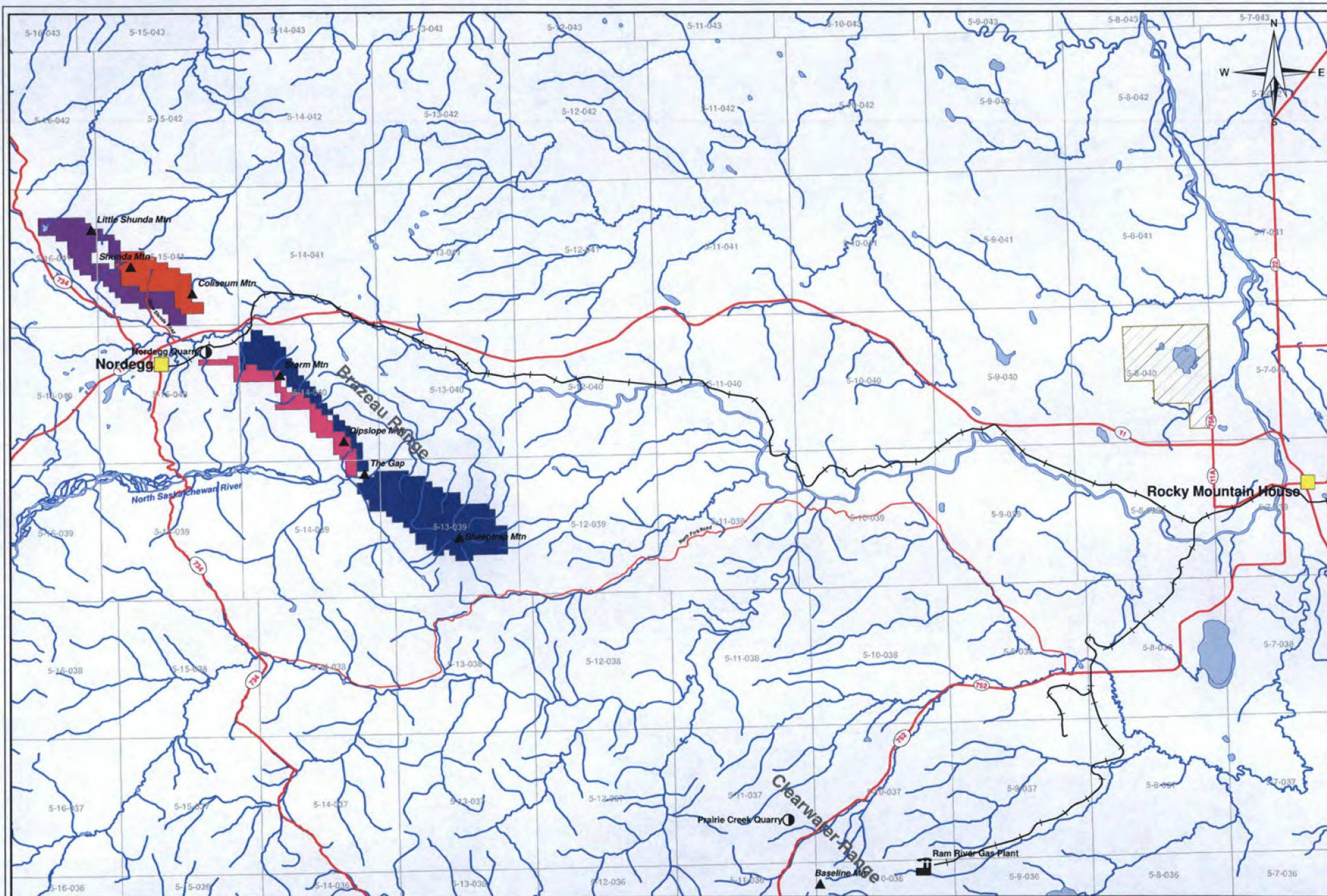
**GRAYMONT WESTERN CANADA INC.**

**DG Dahrouge Geological Consulting Ltd.**

Edmonton, Alberta

BRAZEAU RANGE,  
WEST-CENTRAL ALBERTA

**Fig. 3.1**  
**Property Location**



### Legend

- Highway
- Secondary Road
- Railway
- Provincial Park
- National Park
- Graymont Land Holdings
- Shunda Mountain
- Nordegg South Lease
- Nordegg North Lease

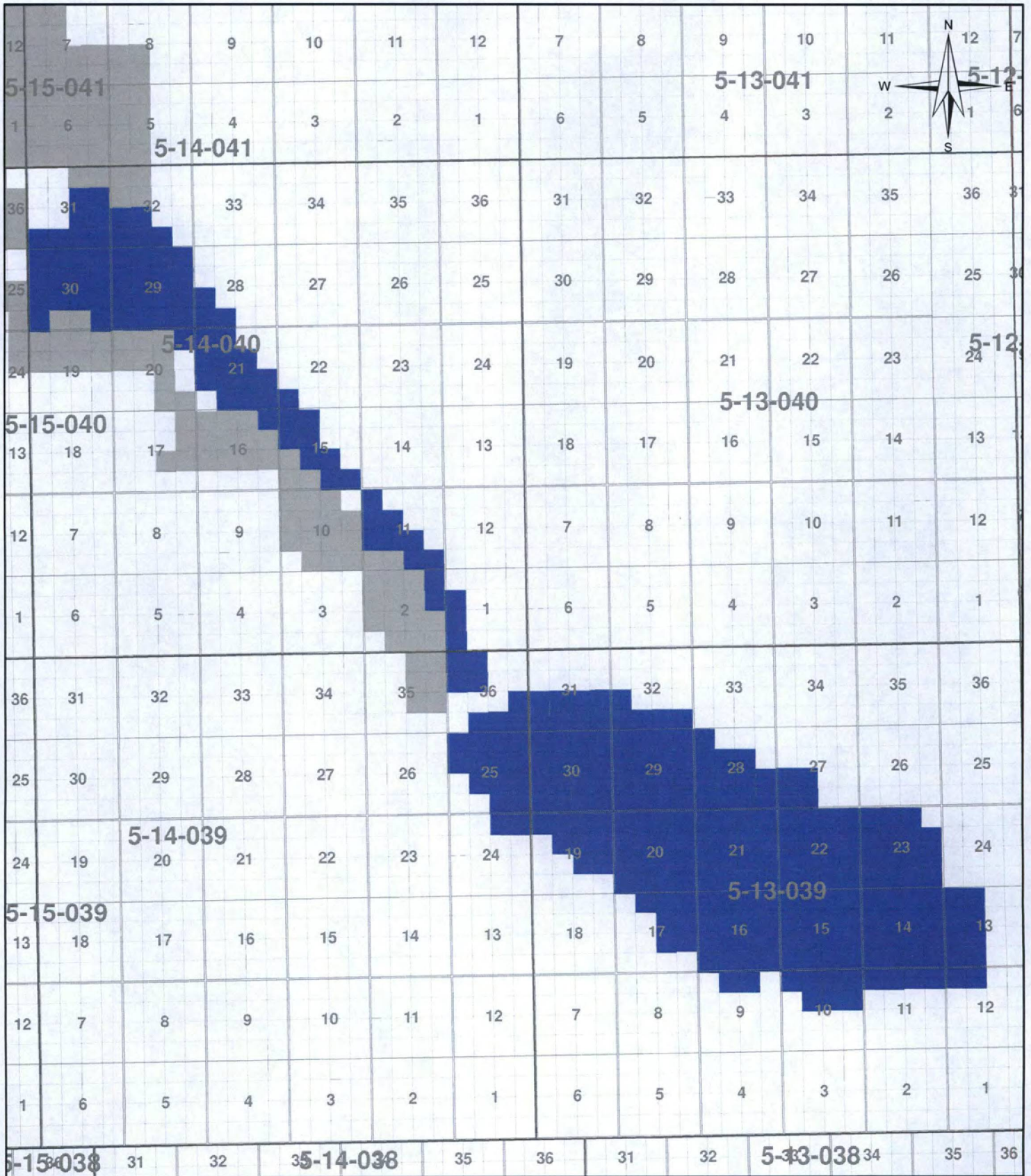
Kilometres  
0 2.5 5 10 15 20

1:350,000  
Coordinate System: UTM NAD83, Zone 11N

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**DG** Dahrouge Geological Consulting Ltd.  
Edmonton, Alberta  
BRAZEAU RANGE  
WEST CENTRAL ALBERTA

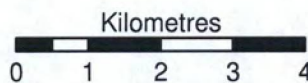
**Fig 3.2**  
Access Map



## Legend

### Land Holdings


- Permit # 9302090596 (5,056 Ha)
- Other Claims



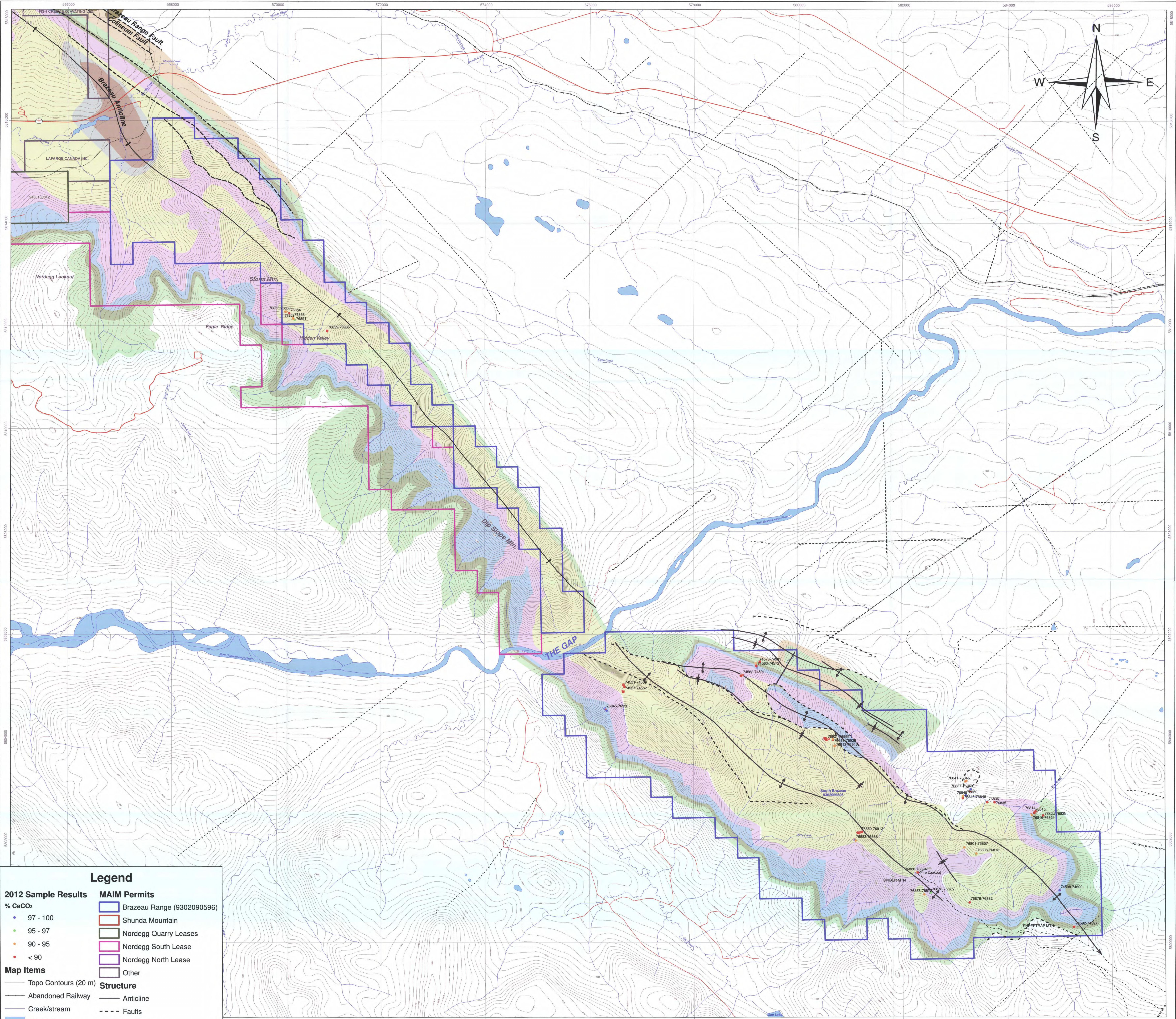
1:100,000

Coordinate System: UTM NAD83, Zone 11N

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 Edmonton, Alberta
BRAZEAU RANGE,  
WEST-CENTRAL ALBERTA

**Figure 4.1**  
**Permit Map**



**Legend**

**2012 Sample Results**

% CaCO<sub>3</sub>

- 97 - 100
- 95 - 97
- 90 - 95
- < 90

**Map Items**

- Topo Contours (20 m)
- Abandoned Railway
- Creek/stream
- River/lake
- Marsh

**Roads**

- Highway
- Secondary Road
- Residential Road
- Minor road/trail
- Trail/seismic line

**MAIM Permits**

- Brazeau Range (9302090596)
- Shunda Mountain
- Nordegg Quarry Leases
- Nordegg South Lease
- Nordegg North Lease
- Other

**Structure**

- Anticline
- Faults
- Fold Axis

**Bedrock Geology**

**Formation**

- Alexo
- Banff
- Fernie
- Mt Hawk
- Palliser
- Pekisko
- Shunda
- Turner Valley



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Edmonton, Alberta

**BRAZEAU RANGE  
WEST-CENTRAL ALBERTA**

**Figure 4.2  
Geology & Sample Locations**

PK

2012.10