



BC Geological Survey  
Coal Assessment Report  
962



Ministry of Energy and Mines  
BC Geological Survey

ASSESSMENT REPORT  
TITLE PAGE AND SUMMARY

TITLE OF REPORT [type of survey(s)] SUSKA ASSESSMENT REPORT TOTAL COST \$13,406,229.

AUTHOR(S) REBECCA GETTY P.GEO. SIGNATURE(S)

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S) 0900023 - 2012 01 YEAR OF WORK 2012-2013

STATEMENT OF WORK - CASH PAYMENT EVENT NUMBER(S)/DATE(S) \_\_\_\_\_

PROPERTY NAME SUSKA

CLAIM NAME(S) (on which work was done) COAL LICENSES 327215, 327217, 327280, 405841, 413996, 417072, 417104, 417121, 417266, 417567

COMMODITIES SOUGHT COAL

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN \_\_\_\_\_

MINING DIVISION 09 HARD NTS 93 0 08

LATITUDE 55 ° 26 ' \_\_\_\_\_ " LONGITUDE 121 ° 36 ' \_\_\_\_\_ " (at centre of work)

OWNER(S)

- 1) XSTRATA COAL CANADA RESOURCES LTD
- 2) FIRST COAL CORPORATION

MAILING ADDRESS

900-1285 WEST PENDER ST VANCOUVER BC V6E 4B1 900-1285 WEST PENDER ST VANCOUVER BC V6E 4B1

OPERATOR(S) [who paid for the work]

- 1) GLENCORE
- 2) \_\_\_\_\_

MAILING ADDRESS

900-1285 WEST PENDER ST VANCOUVER BC V6E 4B1

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

JURASSIC-EARLY CRETACEOUS MINNES GROUP, BULLHEAD GROUP AND FORT ST JOHN GROUP. COAL BEARING SEQUENCE OF CONGLOMERATE, SANDSTONE, SILTSTONE AND CLAYSTONE TRANSECTED BY A SERIES OF NWT TRENDING FAULTS AND FOLDS.

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS

GULF CANADA RESOURCES INC, 1980, 1981, 1984 GOOPRICH COAL REPORTS CLINE MINING CORP, 2006, LOSSAN FEASIBILITY STUDY

(OVER)

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
<b>GEOLOGICAL (scale, area)</b>			
Ground, mapping _____			
Photo interpretation _____			
<b>GEOPHYSICAL (line-kilometres)</b>			
Ground			
Magnetic _____			
Electromagnetic _____			
Induced Polarization _____			
Radiometric _____			
Seismic _____			
Other <u>DOWNHOLE GEOPHYSICS 108 HOLES</u>		<u>327215, 327217, 327280, 405841, 413996, 417072, 417104, 417121, 417266, 417567</u>	<u>\$472,379</u>
Airborne _____			
<b>GEOCHEMICAL (number of samples analysed for ...)</b>			
Soil _____			
Silt _____			
Rock <u>COAL QUALITY 94 SAMPLES</u>	<u>AS ABOVE</u>		<u>\$122,826</u>
Other _____			
<b>DRILLING (total metres; number of holes, size)</b>			
Core <u>2772m 19 HQ HOLES</u>	<u>AS ABOVE</u>		<u>\$354,640</u>
Non-core <u>22363m 110 HOLES 140-178mm</u>	<u>AS ABOVE</u>		<u>\$3,726,664</u>
<b>RELATED TECHNICAL</b>			
Sampling/assaying <u>GEOLOGICAL SUPPORT</u>	<u>AS ABOVE</u>		<u>\$1,253,587</u>
Petrographic _____			
Mineralographic <u>ENVIRONMENTAL ASSESSMENT</u>	<u>AS ABOVE</u>		<u>\$4,476,021</u>
Metallurgic _____			
<b>PROSPECTING (scale, area)</b> _____			
<b>PREPARATORY/PHYSICAL</b>			
Line/grid (kilometres) _____			
Topographic/Photogrammetric (scale, area) _____			
Legal surveys (scale, area) _____			
Road, local access (kilometres)/trail <u>10.3 KM</u>	<u>AS ABOVE</u>		<u>\$1,043,936</u>
Trench (metres) _____			
Underground dev. (metres) _____			
Other <u>EXPLORATION SUPPORT</u>	<u>AS ABOVE</u>		<u>\$1,956,176</u>
		<b>TOTAL COST</b>	<b><u>\$13,406,229</u></b>

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**SUSKA**  
**COAL LICENCES**

**327215, 327217, 327280, 405841, 413996, 417072,  
417104, 417121, 417266 and 417567**

**NTS SHEET 93008**

**Lat. 55° 26', Long. 121° 36'  
UTM ZONE 10 E 588585, N 6144460**

**ASSESSMENT REPORT**

**FOR THE PERIOD**

**29<sup>th</sup> June 2012 – 29<sup>th</sup> June 2013**

***Prepared for: Mineral Titles Branch British Columbia***

***Prepared by: McElroy Bryan Geological Services  
(Rebecca Getty, P. Geo.)***

***On behalf of: Glencore***

***Date: 26th August 2014***

---

**McElroy Bryan Geological Services**  
**Consulting Geologists since 1970**

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Figure 5 (Page 25) and Appendix J remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

[http://www.bclaws.ca/civix/document/id/complete/statreg/251\\_2004](http://www.bclaws.ca/civix/document/id/complete/statreg/251_2004)

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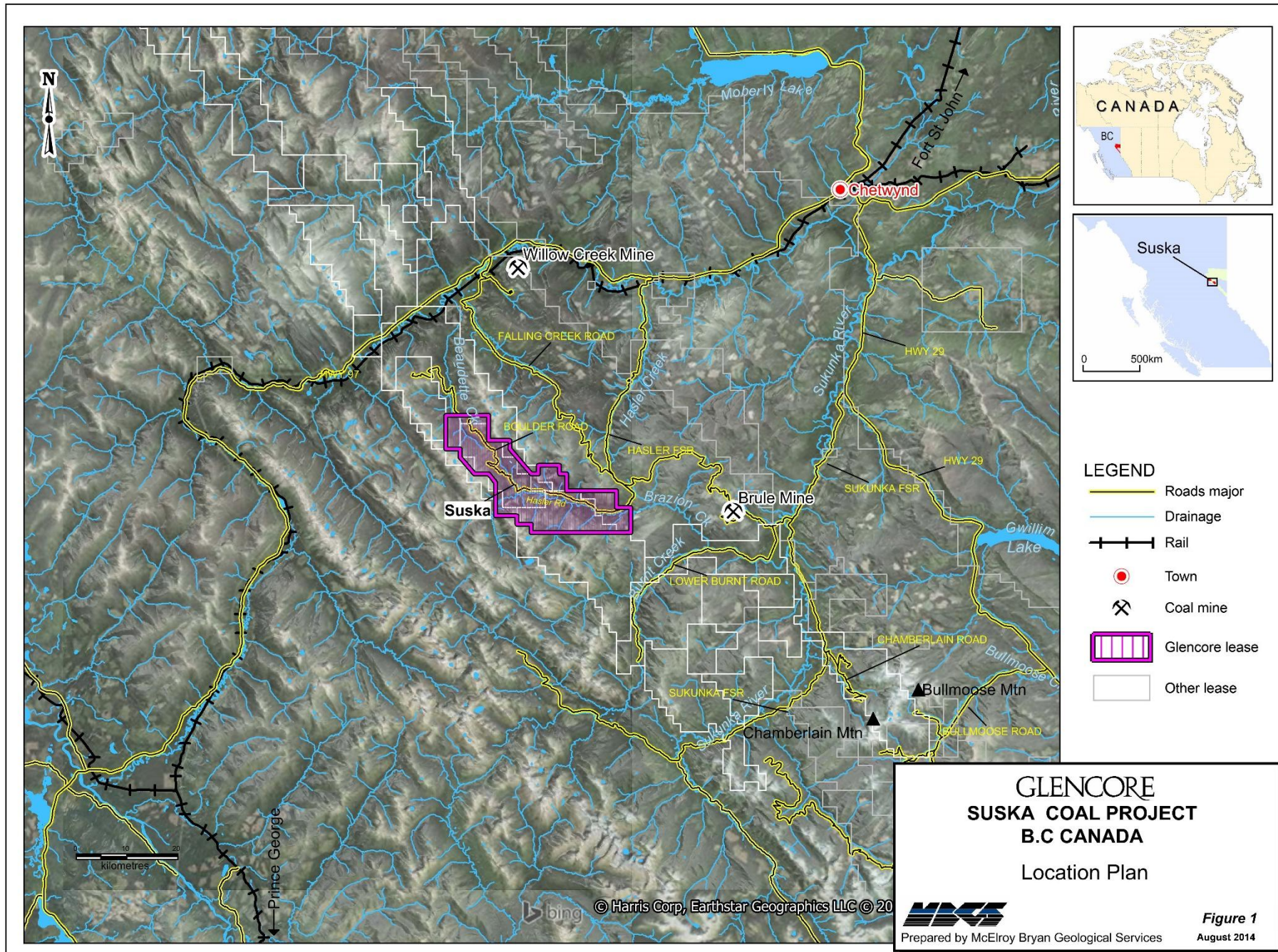
## 1 INTRODUCTION

The Suska exploration area is located approximately 70 km southwest of Chetwynd in the Peace River Coalfield of northeastern British Columbia, within the western foothills of the Canadian Rocky Mountains (**Figure 1**). The property is accessed at 44 km on the Hasler Forest Service Road which runs parallel to the Hasler Creek from Highway 97 (**Figure 2**). The exploration area is located on either side of the Brazion and Baudette Creeks. The Suska Coal Project includes 14 British Columbia coal licences summarized in Table 1, however exploration drilling only occurred in 9 coal licences.

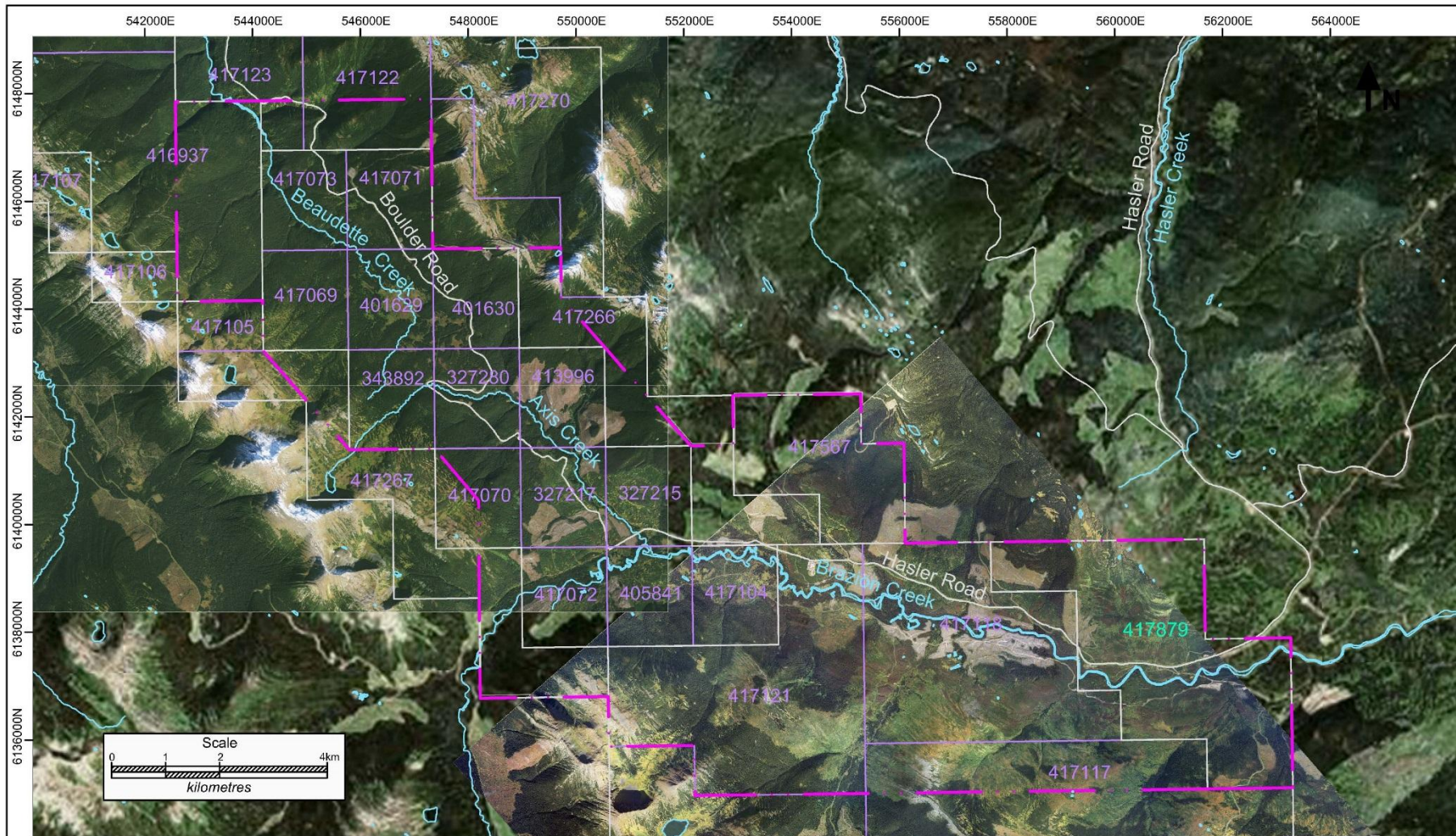
**Table 1. Suska Coal Licences**

<b>Coal Licence</b>	<b>Licence Date</b>	<b>Exploration Program (Y/N)</b>
<b>327215</b>	<b>9 July 2014</b>	<b>Y</b>
<b>327217</b>	<b>9 July 2014</b>	<b>Y</b>
<b>327280</b>	<b>9 July 2014</b>	<b>Y</b>
343892	24 February 2014	N
401630	11 April 2014	N
<b>405841</b>	<b>8 October 2014</b>	<b>Y</b>
<b>413996</b>	<b>6 September 2014</b>	<b>Y</b>
417070	8 October 2014	N
<b>417072</b>	<b>8 October 2014</b>	<b>Y</b>
<b>417104</b>	<b>15 November 2014</b>	<b>Y</b>
417118	15 November 2014	N
<b>417121</b>	<b>15 November 2014</b>	<b>Y</b>
<b>417266</b>	<b>5 February 2014</b>	<b>Y</b>
<b>417567</b>	<b>17 January 2014</b>	<b>Y</b>














Legend

-  Road
-  Drainage
-  Suska tenure limit
-  Coal licence

**GLENCORE**  
**SUSKA COAL PROJECT**  
**B.C. CANADA**  
**Tenure, Local Physiography**

 **Figure 2**  
 Prepared by McElroy Bryan Geological Services August 2014

## 2 HISTORICAL EXPLORATION

Exploration commenced on the Suska deposit in 1979 following acquisition of the Lossan licences by Ms. Suska. Gulf Canada Resources Inc. (Gulf) undertook geological mapping in late 1979 conducted by Norwest Resource Consultants Ltd (Norwest) and resulted in the identification of potential mineable resources in the Gething Formation.

Gulf optioned the coal licences and continued exploration from 1980 to 1984. Exploration during this time included helicopter supported geological mapping, drilling of 28 non-core holes and 40 fully cored HQ holes for seam definition and coal quality testing and 350 hand dug trenches were logged and most were surveyed with 144 encountering coal. All holes were geophysically logged and surveyed with one hole cemented to seal a flowing aquifer (RDH-81-1). One adit was excavated for bulk samples of raw and oxidized coal. Gravity, electromagnetic and Mini-Sosie seismic surveys were undertaken with limited success due to areas of complex structure. A preliminary pre-feasibility study was completed in 1982 but the project was not pursued due to poor economic conditions at the time.

Cline Mining Corporation (Cline) optioned the coal licences in 2004 and in 2005 drilled 18 cored or partially cored holes, 15 non-core holes and numerous blast holes were used to locate seam subcrops ahead of drilling. An adit was excavated to obtain a bulk sample for coal quality testing. All holes were geophysically logged with a standard suite of natural gamma, density, caliper, and neutron logs where ground conditions allowed. A feasibility study was prepared by Norwest in 2006 and concluded that closer drill hole spacing was required due to the complex nature of the deposit. No further exploration was done until 2011 when Xstrata, now Glencore plc acquired the First Coal Corporation and the Cline coal licences. **Figure 3** shows historical exploration within the Suska tenure area.

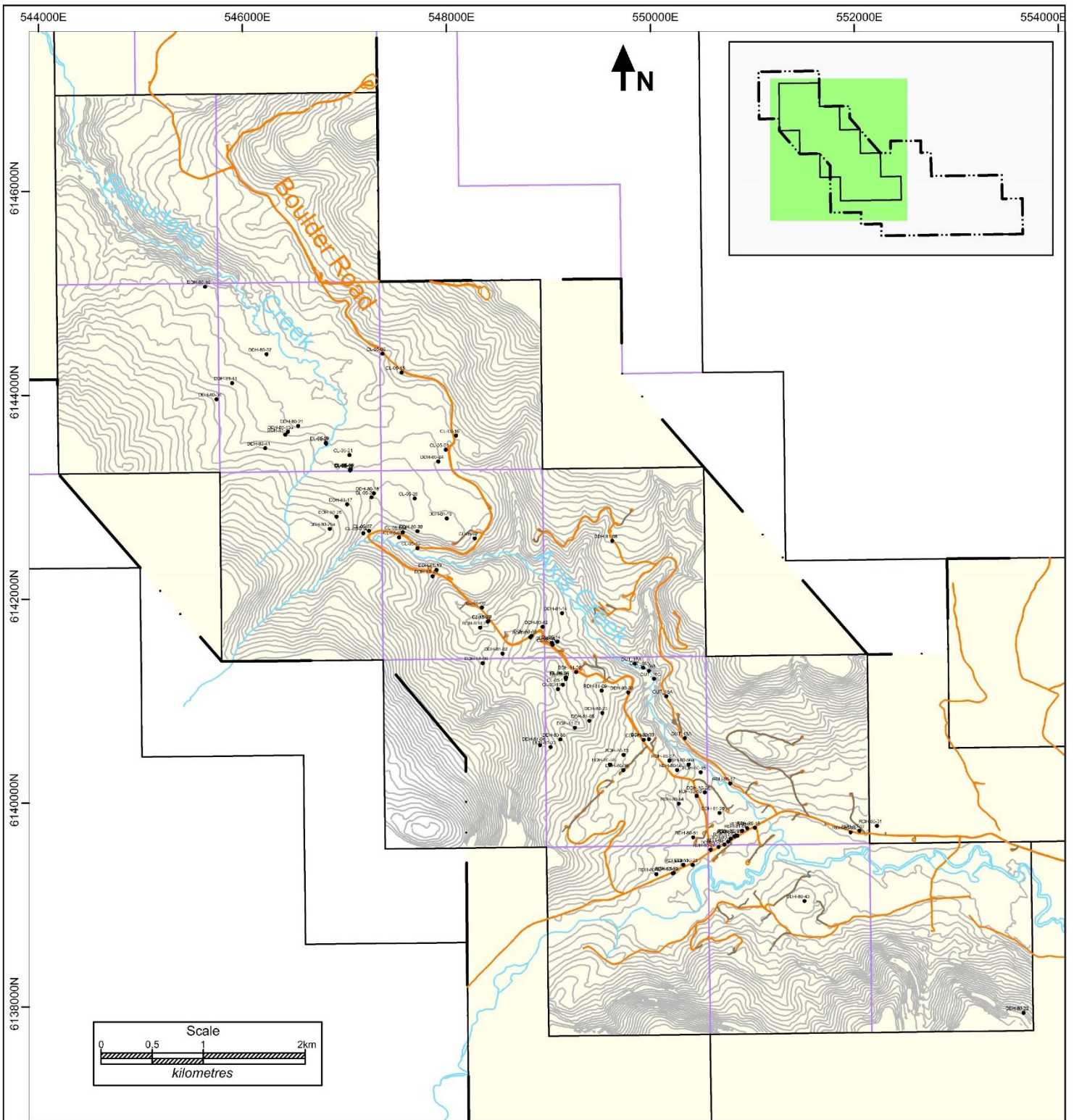
Glencore considered the Suska project to have the potential to provide two products to the market, medium volatile coking coal and medium volatile PCI but required further coal quality analysis because of large core losses in historical data.

Historical data indicated the V Seam (previously named Seam 1, principal coal seam at Suska) as a medium volatile bituminous coal requiring selective mining. The V



Seam may be characterised in two intervals: a lower portion hard coking coal with low ash, low sulphur, low phosphorous and an upper portion PCI product of low ash and low sulphur.






**Legend**

- CL-09-21 Historical drill hole
- Topography (10m interval)
- Road
- Coal licence
- Drainage
- ▭ Suska tenure limit

**GLENCORE  
SUSKA COAL PROJECT  
B.C CANADA  
Historical Exploration**

  
Prepared by McElroy Bryan Geological Services

**Figure 3**  
August 2014



### 3 EXPLORATION PROGRAM 2012-2013

Exploration by Glencore commenced in early 2012 with a desktop assessment of the exploration plan and drilling followed between June 2012 and January 2013 (**Figure 4**). Exploration was planned in two phases to provide additional seam structure definition, coal washability data and to investigate potential pit shell boundaries.

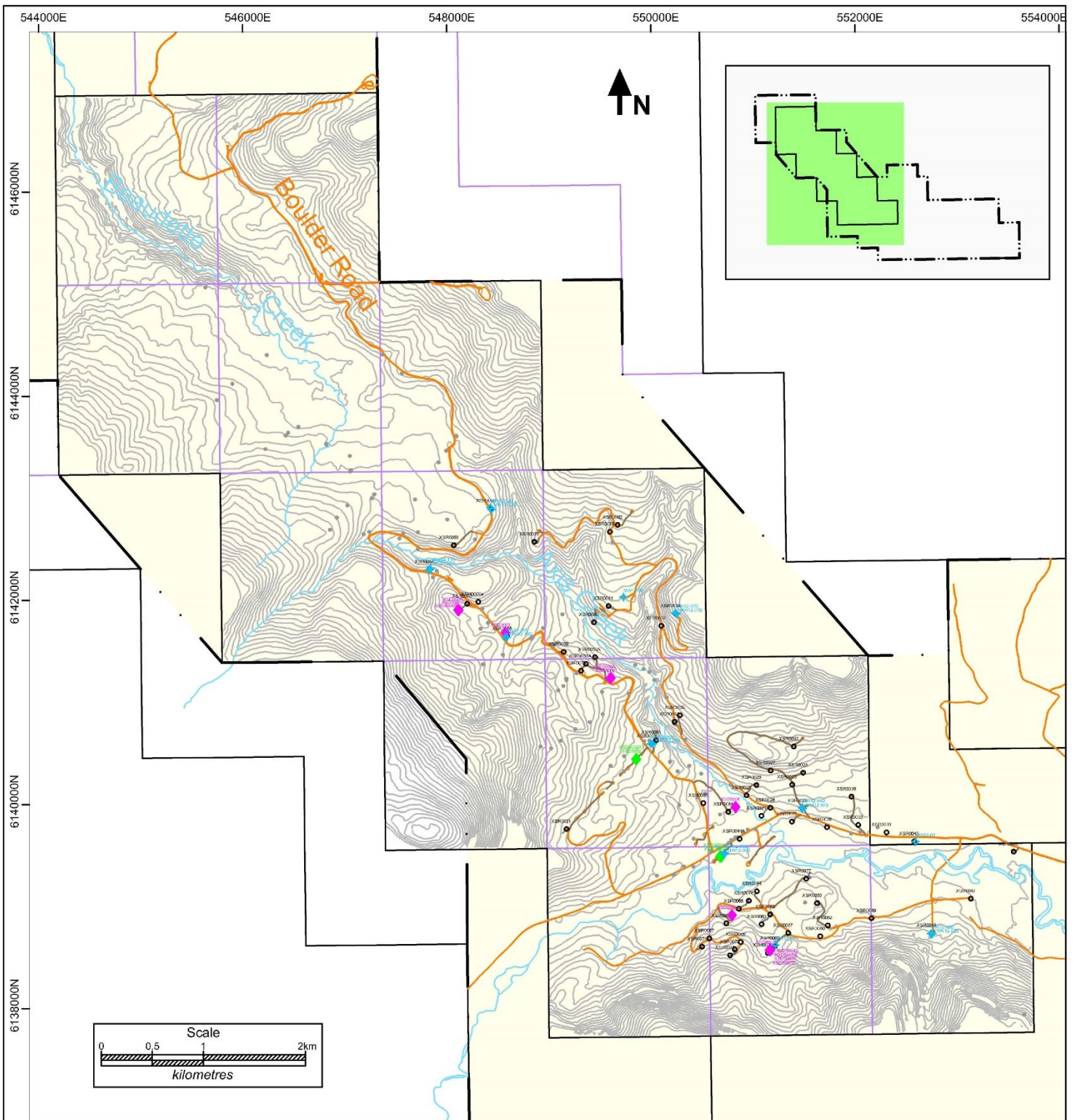
**Phase 1** comprised 89 open holes (XSR0001 to XSR0085 including four redrills with suffix A) and 19 HQ fully cored holes (XSD5001 to XSD5008 including 11 redrills suffix A to D). Poor core recovery was common as reflected by the amount of redrills. All holes were geophysically logged by Weatherford Slimline Logging Services (Weatherford). Selected coal plies with recoveries greater than 90% were sent for coal quality analysis at ALS Laboratory Group (ALS) at Vancouver. All core holes were sampled for geochemical bedrock analysis. Exploration activities were supervised on site by McElroy Bryan Geological Services (MBGS).

A hydrogeological study included 21 open holes, drilled to a depth of up to 60 m at 12 locations for groundwater monitoring and water quality assessment. The hydrogeological program was supervised by Knight Piésold Consulting Ltd. (Knight Piésold).

All drill hole data is summarised in **Table 1**.

**Phase 2** has not commenced due to changing economics.






**Legend**

- Historical drill hole
- Road
- ◆ 2012 Coal quality
- 2012 structure definition
- ◆ 2013 Coal quality
- ◆ Water monitoring
- Drainage
- Topography (10m interval)
- Coal licence
- ▭ Suska tenure limit

**GLENCORE**  
**SUSKA COAL PROJECT**  
**B.C CANADA**  
**Exploration Plan**  
**2012-2013**

 **Figure 4**  
 Prepared by McElroy Bryan Geological Services August 2014



**Table 2. Drill Hole Summary 2012-2013**

Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core/Chip Photos	Geotechnical UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
MW12-01	Hydrogeology	33.50	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-02D	Hydrogeology	51.80	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-02S	Hydrogeology	31.20	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-03	Hydrogeology	53.80	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-04D	Hydrogeology	48.20	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-04S	Hydrogeology	25.30	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-05D	Hydrogeology	44.60	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-05S	Hydrogeology	13.10	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-06D	Hydrogeology	49.30	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-06S	Hydrogeology	39.40	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-07D	Hydrogeology	50.50	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-07S	Hydrogeology	31.80	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-08	Hydrogeology	54.20	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-09D	Hydrogeology	57.70	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-09S	Hydrogeology	34.90	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-10D	Hydrogeology	57.40	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-10S	Hydrogeology	66.50	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-11D	Hydrogeology	54.90	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-11S	Hydrogeology	15.30	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-12D	Hydrogeology	49.20	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
MW12-12S	Hydrogeology	33.40	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
XSD5001	HQ Core	32.00	Yes	Yes	No	Pending	No	No	Yes	Yes	Yes
XSD5001A	HQ Core	345.00	Yes	Yes	No	No	Yes	Full			
XSD5001B	HQ Core	30.00	Yes	Yes	No	No	No	No			
XSD5001C	HQ Core	110.10	Yes	Yes	No	No	Yes	Full			



Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core/Chip Photos	Geotechnical UCS	Geochemical Leach Test	LAS	Suite of Logs	Raw	Clean	Petrology
XSD5002	HQ Core	101.00	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XSD5002A	HQ Core	95.40	Yes	Yes	No	No	Yes	Partial			
XSD5003	HQ Core	171.00	Yes	Yes	No	No	Yes	Full	Yes	No	No
XSD5004	HQ Core	222.00	Yes	Yes	No	Pending	Yes	Full	Yes	Yes	Yes
XSD5004A	HQ Core	201.00	Yes	Yes	No	No	Yes	Full			
XSD5004B	HQ Core	213.05	Yes	Yes	No	No	Yes	Partial			
XSD5005	HQ Core	213.00	Yes	Yes	Yes	Pending	Yes	Full	Yes	No	No
XSD5005A	HQ Core	200.00	Yes	Yes	Yes	No	Yes	Partial	Yes	No	No
XSD5006	HQ Core	177.00	Yes	Yes	Yes	Pending	Yes	Full	Yes	No	No
XSD5007	HQ Core	84.00	Yes	Yes	Yes	No	Yes	Full	Yes	Yes	Yes
XSD5007A	HQ Core	90.00	Yes	Yes	No	No	Yes	Full			
XSD5007B	HQ Core	78.00	Yes	Yes	No	No	Yes	Partial			
XSD5007C	HQ Core	104.00	Yes	Yes	No	No	Yes	Full			
XSD5007D	HQ Core	86.20	Yes	Yes	Yes	Pending	Yes	Full			
XSD5008	HQ Core	219.00	Yes	Yes	Yes	Pending	Yes	Full	No Coal	No Coal	No Coal
XSR0001	Non-Core	351.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0002	Non-Core	340.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0003	Non-Core	300.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0004	Non-Core	211.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0005	Non-Core	322.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0006	Non-Core	258.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0007	Non-Core	300.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0008	Non-Core	286.20	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0009	Non-Core	327.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0010	Non-Core	380.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0011	Non-Core	354.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0012	Non-Core	306.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0013	Non-Core	288.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A





Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core/Chip Photos	Geotechnical UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
XSR0014	Non-Core	318.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0015	Non-Core	294.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0016	Non-Core	342.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0017	Non-Core	306.80	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0018	Non-Core	157.00	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
XSR0019	Non-Core	251.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0020	Non-Core	72.00	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
XSR0020A	Non-Core	252.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0021	Non-Core	311.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0022	Non-Core	250.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0023	Non-Core	124.50	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0024	Non-Core	209.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0025	Non-Core	255.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0026	Non-Core	249.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0027	Non-Core	240.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0028	Non-Core	259.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0029	Non-Core	240.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0030	Non-Core	248.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0031	Non-Core	339.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0032	Non-Core	185.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0033	Non-Core	224.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0034	Non-Core	300.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0035	Non-Core	354.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0036	Non-Core	240.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0037	Non-Core	240.50	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0038	Non-Core	198.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0039	Non-Core	138.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0040	Non-Core	214.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A



Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core/Chip Photos	Geotechnical UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
XSR0041	Non-Core	217.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0042	Non-Core	240.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0043	Non-Core	240.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0044	Non-Core	25.00	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
XSR0044A	Non-Core	245.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0045	Non-Core	204.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0046	Non-Core	190.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0047	Non-Core	145.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0048	Non-Core	251.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0049	Non-Core	200.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0050	Non-Core	281.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0051	Non-Core	35.00	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
XSR0051A	Non-Core	168.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0052	Non-Core	157.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0053	Non-Core	49.00	Yes	No	N/A	N/A	No	No	N/A	N/A	N/A
XSR0053A	Non-Core	250.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0054	Non-Core	300.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0055	Non-Core	261.50	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0056	Non-Core	300.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0057	Non-Core	295.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0058	Non-Core	318.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0059	Non-Core	273.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0060	Non-Core	353.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0061	Non-Core	312.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0062	Non-Core	256.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0063	Non-Core	67.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0064	Non-Core	250.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0065	Non-Core	250.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A



Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core/Chip Photos	Geotechnical UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
XSR0066	Non-Core	227.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0067	Non-Core	250.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0068	Non-Core	312.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0069	Non-Core	239.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0070	Non-Core	316.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0071	Non-Core	196.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0072	Non-Core	200.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0073	Non-Core	140.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0074	Non-Core	210.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0075	Non-Core	269.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0076	Non-Core	120.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0077	Non-Core	150.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0078	Non-Core	255.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0079	Non-Core	125.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0080	Non-Core	319.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0081	Non-Core	250.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0082	Non-Core	289.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0083	Non-Core	174.00	Yes	No	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XSR0084	Non-Core	251.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A
XSR0085	Non-Core	208.00	Yes	No	N/A	N/A	Yes	Full	N/A	N/A	N/A



### 3.1 Scope and Objectives

Exploration during 2012 and 2013 was planned to assess seam continuity to the boundaries of the planned pit shells from the concept study, areas of possible tectonic seam thickening and to provide coal quality data for coal seams of the Gething Formation. A desktop assessment of the exploration plan at the start of 2012 was followed by drilling from June 2012 to January 2013 and was supervised on site at all times by MBGS. Exploration drilling was planned along existing trials and roads as much as possible to minimise ground disturbance. Non-core holes were drilled between July and September 2012 and core drilling commenced in November 2012. Samples for coal washability analysis were taken from all potential coal seams with recoveries above 90% and sent for quality analysis at ALS, Vancouver. Samples were taken for geotechnical uniaxial compressive strength (UCS) testing above and below the target seams in all HQ core holes.

Once drilling was completed all holes were sampled for geochemical assessment of the acid generating properties of the overburden by Lorax Environmental Services Ltd. (Lorax) and this study is ongoing under supervision by Klohn Crippen Berger consultants. A hydrogeological assessment to supplement baseline environmental studies was supervised by engineers from Knight Piésold from September to October 2012. Knight Piésold successfully installed 21 monitoring piezometers and collected groundwater samples for quality analysis.

In addition to the drilling program a regional aerial photo interpretation was completed in mid-2013 by Stephen Snodin of Consulting Services in Geological Image Interpretation, the results are presented in **Figure 5** and the report included in **Appendix A**. The image was compiled using the British Columbia government stereoscopic colour photos flown in 2005 (1:30,000 scale). The photo interpretation was focused on structure delineation as it was not possible to reliably delineate the bedrock lithostratigraphic units in the area due to:

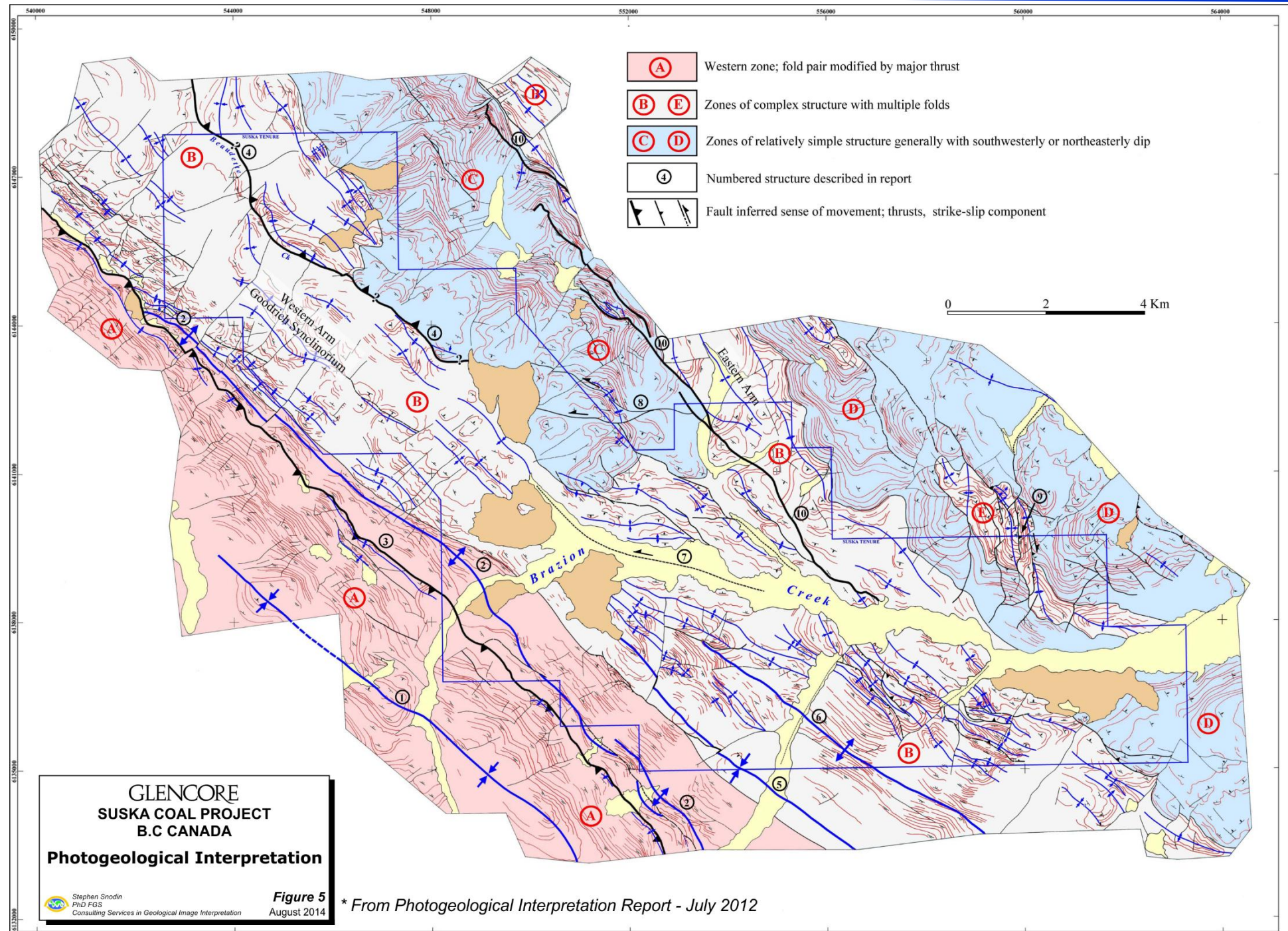
- forest cover masking the lithological units
- smoothing of landforms by glacial scouring
- complex structure
- monotonously thinly bedded sequence (at the air-photo scale)



- lack of strong conglomerate component in the Cadomin Formation

No further exploration has been undertaken since drilling was completed in January 2013.





## 3.2 Drilling

Three drill companies were contracted by Glencore during 2012 and 2013, Westech Drilling Corporation (Westech), Boart Longyear (Boart) and Major Drilling Group International Inc. (Major). Details of drill holes are tabulated in **Appendix B**.

Westech was engaged to drill 21 open holes (MW prefix) for the hydrogeological assessment and installation of groundwater monitoring wells. Holes were drilled with a B-54 air rotary rig to depths between 10 m - 70 m with a maximum of 33 m of 140 mm casing installed.

Boart Longyear operated two truck mounted reverse circulation drill rigs and drilled a total of 89 non-core holes (XSR0001 to XSR0085) including four redrill holes (suffix A) to assess seam continuity. All holes were drilled using a 5.25" hammer bit from 35 m - 350 m depth and steel cased up to 90 m. A total of 21,467 m were drilled.

Major were engaged to drill 12 HQ core holes but only eight were completed due to coal recovery issues. A total of 19 core holes were drilled at eight drill sites (XSD5001 to XKD5008), including 11 redrills at five drill sites (XSD5001, XSD5002, XSD5004, XSD5005 and XSD5007 suffixes A to D) for coal quality and geotechnical assessment. A total of 2,553 m were cored using a 96 mm diamond bit to depths ranging between 85 m - 345 m. Holes were ended 20 m below the bottom target seam to ensure there was enough floor sample for geotechnical sampling.

All holes were lithologically and geotechnically logged and photographed at the drill rig by field geologists. **Appendix C** presents geological field data. Field geologists were contracted from UTM Exploration Services Ltd (UTM) and they were trained and supervised by MBGS who provided on site geological management.

Qualifications of geological staff are included in **Appendix D**. In addition to geological data, all drilling information was recorded including loss of returns, production of water and poor drilling conditions. Dip tests were not utilised as standing water levels were recorded by the geophysical loggers in all holes where possible. The results of hydrogeological drilling and monitoring well development



and testing were recorded by engineers from Knight Piésold and details are in **Appendix E**. All core is stored at the Chetwynd core shed.

All logging and sample data was entered into the Glencore acQuire database in offline mode and Prolog software was used to produce lithological graphics to enable depth corrections to geophysical logs. Final data was saved in Prolog and imported into the live acQuire database at the Vancouver office.





### 3.3 Geophysical

All holes were geophysically logged by Weatherford. A standard suite of sondes was used where possible and included:

- density, gamma and caliper
- sonic
- neutron
- resistivity
- verticality
- acoustic scanner
- dipmeter

The acoustic scanner was not part of the standard suite of sondes for non-core holes because the roughness of the drill hole wall would prevent detailed imaging. Down-hole problems such as low water levels and hole stability issues sometimes prevented logging with the full suite of tools as indicated in summary **Table 2**. Numerous holes were unable to be logged the full depth, with 16 holes logged through the rods with only gamma and density tools and one hole (XSR0023) had only the gamma tool run. Standing water levels were recorded in all drill holes where possible. Hard copies of all recent geophysical logs are stored at the Chetwynd office with duplicates stored at the Vancouver office and all digital data is saved on the Glencore server in Vancouver. Geophysical data including LAS files and geophysical logs are included in **Appendix F**.

### 3.4 Geotechnical

Geotechnical samples for UCS and direct shear tests (**Table 3**) were taken from all HQ core holes and three redrilled holes and all drill core was geotechnically logged by the geologist at the drill rig. Samples were selected above and below target seams based on advice from Seedsman Geotechnics Pty Ltd. Samples were wrap in cling plastic, aluminium foil and packing tape to preserve moisture and under advice from Glencore, samples from four holes were sent to Golder Associates Ltd. and the results are in **Appendix G**.



**Table 3. Geotechnical Data Summary 2012-2013**

Hole ID	Hole Purpose	Depth (m)	Geotechnically Logged	UCS Samples Sent	Direct Shear Samples Sent
XSD5001	Coal Quality	32.00	Yes	No	No
XSD5001A	Coal Quality	345.00	Yes	No	No
XSD5001B	Coal Quality	30.00	No	No	No
XSD5001C	Coal Quality	110.10	Yes	No	No
XSD5002	Coal Quality	101.00	Yes	Yes	No
XSD5002A	Coal Quality	95.40	Yes	No	Yes
XSD5003	Coal Quality	171.00	Yes	No	No
XSD5004	Coal Quality	222.00	Yes	No	No
XSD5004A	Coal Quality	201.00	Yes	No	No
XSD5004B	Coal Quality	213.05	No	No	Yes
XSD5005	Coal Quality	213.00	Yes	Yes	Yes
XSD5005A	Coal Quality	200.00	Yes	No	No
XKG7006	Coal Quality	177.00	Yes	Yes	No
XKG7007	Coal Quality	84.00	Yes	Yes	Yes
XKG7007A	Coal Quality	90.00	Yes	No	No
XKG7007B	Coal Quality	78.00	Yes	No	No
XKG7007C	Coal Quality	104.00	Yes	No	No
XKG7007D	Coal Quality	86.20	Yes	No	No
XKG7008	Coal Quality	219.00	Yes	No	No

On most HQ core holes the dipmeter and acoustic scanner tool was run and the data was interpreted in conjunction with core photos, geological and geotechnical logging and the sonic tool response with the aim of providing identification and orientation on thrust faults. ASIMS<sup>1</sup> interpreted the acoustic scanner images and provided reports of dip and direction of interpreted features as well as joint sets (**Appendix G**).

### 3.5 Geochemical

The eight HQ core holes were sampled for geochemical analysis by Lorax. The entire length of each drill core (excluding coal) was split along axis and one half sampled for both static and kinetic leech testing to assess the acid generation properties of the rock. Static testing was undertaken by SGS with kinetic tests taking up to 52 weeks to complete. The resulting geochemical report is in **Appendix H**. The geochemical assessment is supervised by Klohn Crippen Berger consultants. Sample intervals and results are contained in **Appendix H**.

<sup>1</sup> ASIMS is a joint initiative between MBGS and Seedsman Geotechnics



### 3.6 Survey

All holes drilled were surveyed by the Integrated ProAction Group (IPac) Survey locations were identified and field verified by a Glencore representative. The IPac survey data is in **Appendix I**.

The survey was completed using a Trimble GNSS R8 RTK Base Station and Receiver following standard survey practices in accordance with Trimble guidelines. With this survey equipment configuration points surveyed can be expected to be accurate within 5 cm vertically and horizontally according to the manufacturers' specifications. Control points were established in areas with a clear sky view and in good line of sight in all directions to avoid multipath interference. These points were all subsequently processed using Natural Resource Canada Geodetic Survey Division's Precise Point Positioning System to obtain a precise vertical and horizontal location and elevation. Positions are ground coordinates and are valid in UTM Zone 10 N map projection (NAD83) with elevations above mean sea level, orthometric height CGVD28 (HTv2.0).

### 3.7 Sampling and Analysis

Target seams in the eight HQ core holes with recoveries greater than 90% were sampled on a ply by ply basis under direct supervision from MBGS geologists on site and analysed for coal quality parameters by ALS in Vancouver. Clean coal quality testing was undertaken on four drill holes (**Table 1**). Poor coal recoveries due to tectonic shearing and steeply dipping seams required that target seams for washability and clean coal analysis were combined from different holes.

All samples were despatched by courier to the ALS laboratory and testing requirements were sent digital and with the coal samples. Coal quality data was reviewed and validated by MBGS with initial supervision from Bob Leach (Bob Leach Pty Ltd) who provided advice and methodologies to estimate in-situ density and in-situ moisture. **Figure 5** summarises coal quality results for the main coal seam (Seam V) in the deposit. **Appendix J** includes graphic sections of available coal quality results and laboratory standards.



## 4 GEOLOGY

### 4.1 Regional Geology

Suska lies within the western foothills of the Rocky Mountains in a northwest trending belt of coal bearing strata known as the Inner Foothill Belt. This extends approximately 400 km in British Columbia and lies within a Mesozoic sequence deposited to the east of a strongly folded Palaeozoic belt which crops out throughout the Rocky Mountains. The Peace River Coalfield is the northern part of this belt which contains coal seams of Lower Cretaceous age within the Gates and the Gething formations (**Figure 6**).

The local stratigraphic sequence is Jurassic to Early Cretaceous in age and includes the basal Minnes Group, the Bullhead Group and the lowest part of the Fort St John Group. Coal horizons occur throughout the sequence however seams of economic interest lie within the Gething Formation of the Bullhead Group (**Figure 7**).

The Early Cretaceous Bullhead Group is predominantly a non-marine sequence. The Cadomin Formation, at the base of the Bullhead Group, comprises coarse sandstone and conglomerate, and is conformably overlain by the Gething Formation. The Gething Formation comprises primarily mudstone and siltstone interbedded with sandstone and coal seams. Thickness and distribution of coal seams and interburden vary across the area partly due to tectonic influence.

The Fort St John Group overlies the Bullhead Group. The Moosebar Formation, the basal section of the Fort St John Group, comprises 270 m of marine mudstone and siltstone. The Bluesky Member, a distinctive silty sandstone at the base of the Moosebar Formation, can be correlated across most of the area.

Tectonic plate collision during the Late Cretaceous to Eocene Laramide Orogeny was the source of near-horizontal compressive stresses that in the Inner Foothills

resulted in a series of north-westerly trending chevron and box folds folding and transected by low angle thrust faults.

## 4.1 Deposit Geology

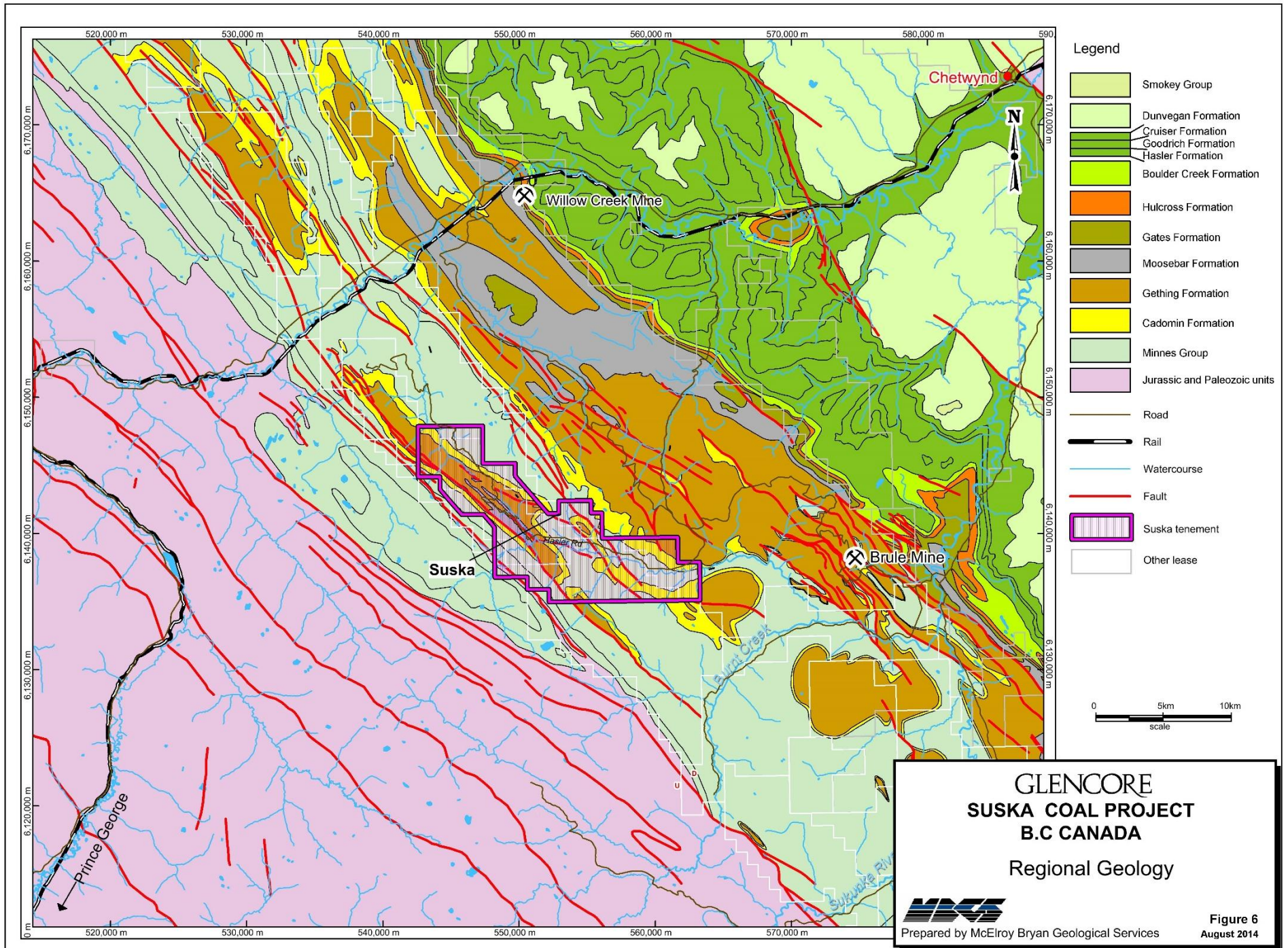
The Gething Formation is locally divided into Upper, Middle and Lower Members with seams of interest occurring in the Upper Gething (**Figure 8**). Up to eight seams have been investigated and are labelled alphabetically (from base of sequence to top): D, E, G, M, N, Y, V and X. Seam thicknesses vary from the south to the northwest of the deposit and correlations are very difficult, especially in holes more than 50m apart due to tightly folded bedding, thrust faulting and the deviation of drill holes. Further exploration would be likely to improve correlations in the less well defined seams (seams T, N, G, E and D) and in locations where drill hole density is greater than 50m spacing.

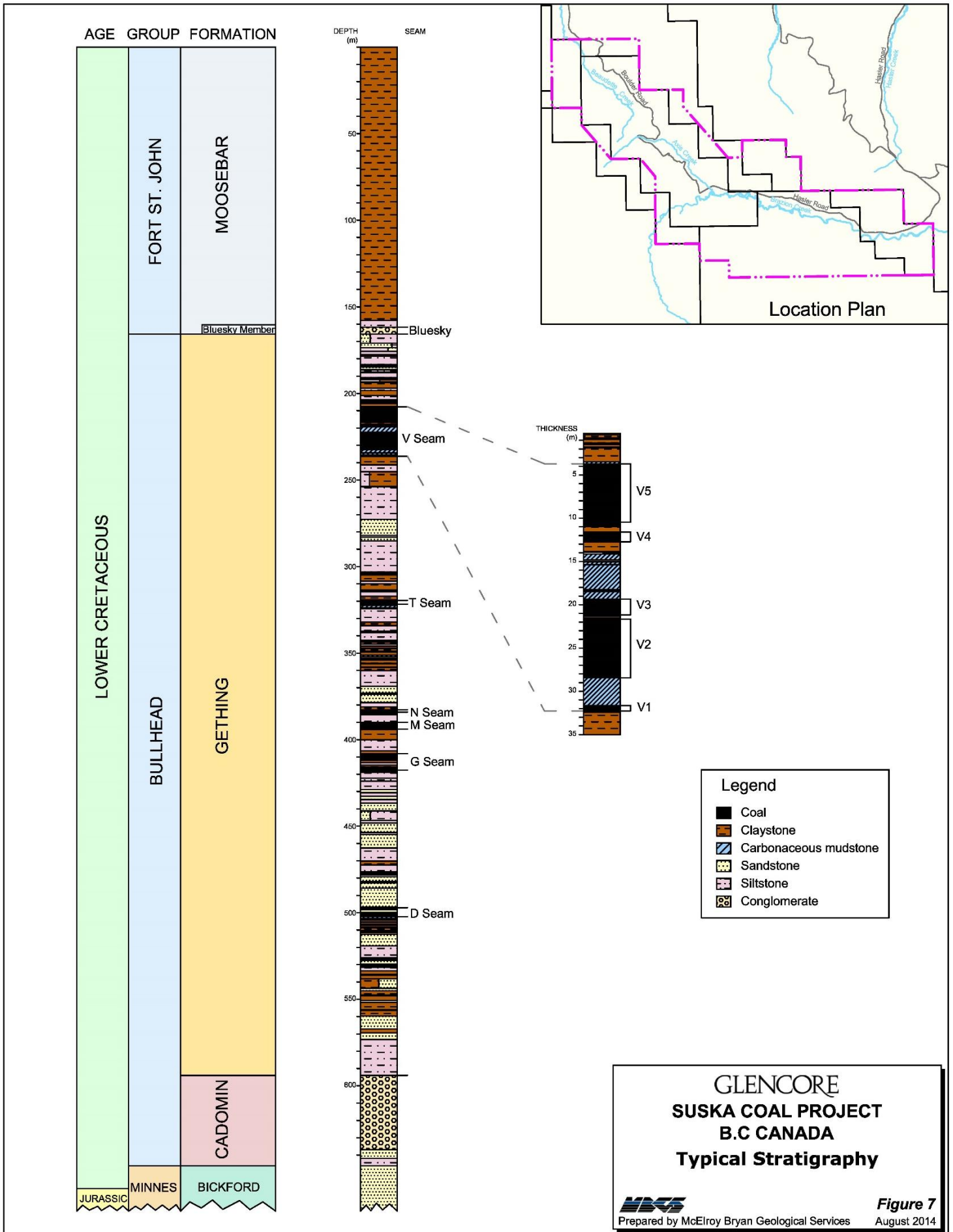
- Seam V (previously Seam 1) occurs about 50 m below the Bluesky Member and is the main seam in the south of the lease. Seam V varies in thickness from 5 m to 20 m (and sometimes more because of reverse faulted seam repeats) and typically includes several stone and tuffaceous bands. Seam V has a siltstone or claystone roof and a claystone floor. The seam deteriorates towards the northwest where Seam M (previously Seam 3) becomes the principal seam.
- Seam M is 3 m – 5 m thick in the northwest and may be tectonically thickened in places, thinning to 1 m in the south of the deposit. It comprises two plies separated by up to 1 m of carbonaceous mudstone or stony coal. Roof and floor lithologies are usually carbonaceous mudstone.
- Seam G (previously Seam 4) reaches a thickness of about 3.5 m in the northwest of the lease but deteriorates to a zone of thin bands and carbonaceous mudstone in the south.

- Seam D (previously Seam 5) comprises three plies with the upper partly stony ply separated from the lower plies by up to 1.5 m of stone parting. The lower two plies are up to 2.5 m thick in the south of the deposit and thins to about 1m. The floor is a carbonaceous mudstone.
- The other seams are only thin (<1 m) coaly or carbonaceous bands but can be partially correlated across the deposit.

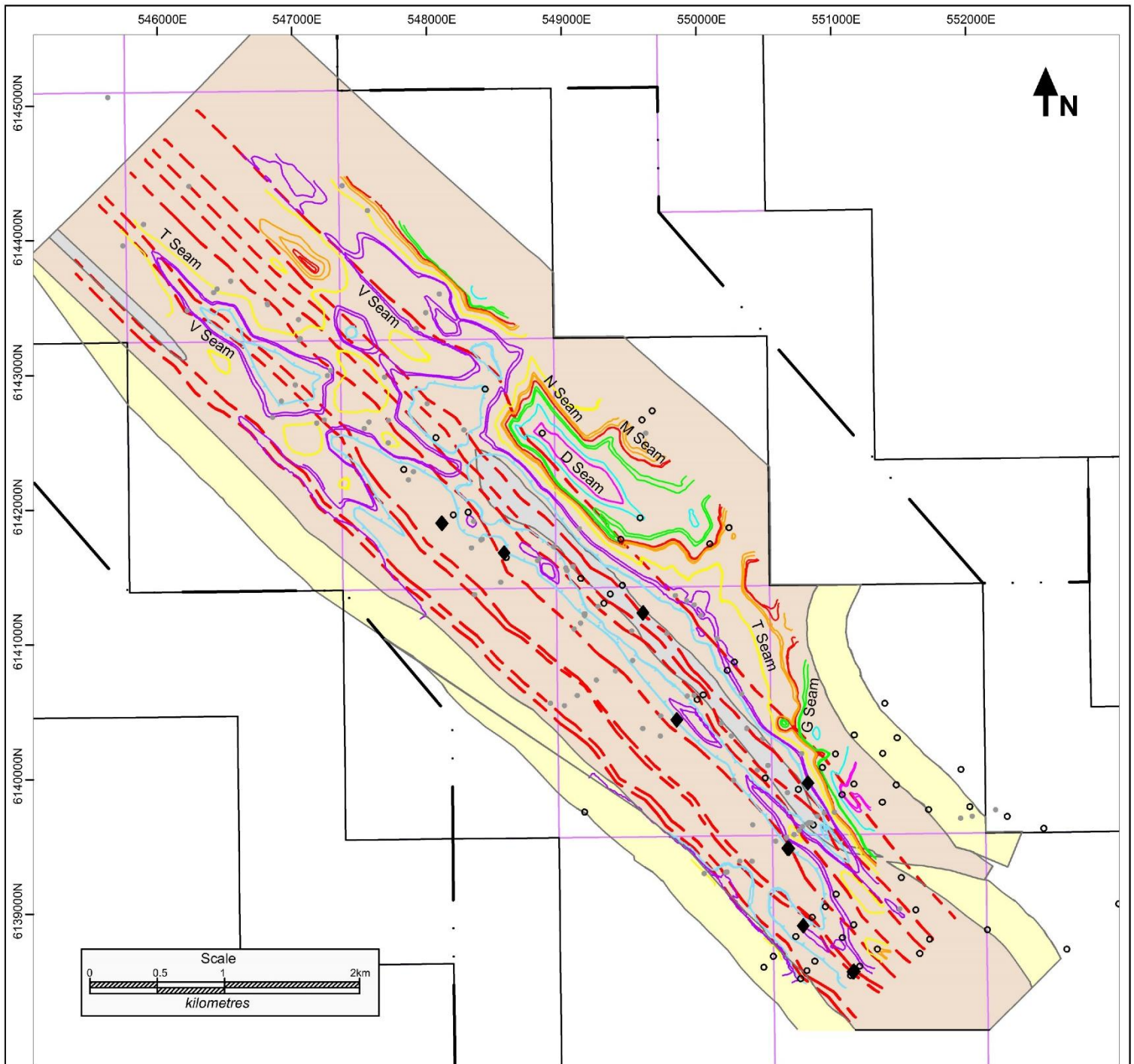
Suska geology is structurally complex with a series of north-westerly trending multiple folds forming anticline/syncline pairs and additional smaller folds. The dip of fold limbs can vary from nearly horizontal to overturned, but usually ranges from 20° to 50°. The dominant structure is a complex fold referred to as the Goodrich Synclinorium. This structure is well exposed on Mount Goodrich, to the south of the Suska project, and consists of a simple, very large, essentially concentric fold. The structure becomes more complex to the north where the synclinorium evolves.

Folds are transected by nine interpreted sub-parallel reverse faults, where fault planes dip at about 70° to the south-west. As a result of this structure seams may dip up to 80° on fold limbs. Small-scale faults with displacement less than 6 m were observed in the drill core.










**Legend**

- Historical drill hole
- ◆ Glencore drill hole
- Coal licence
- ▭ Suska tenure limit
- - - Fault

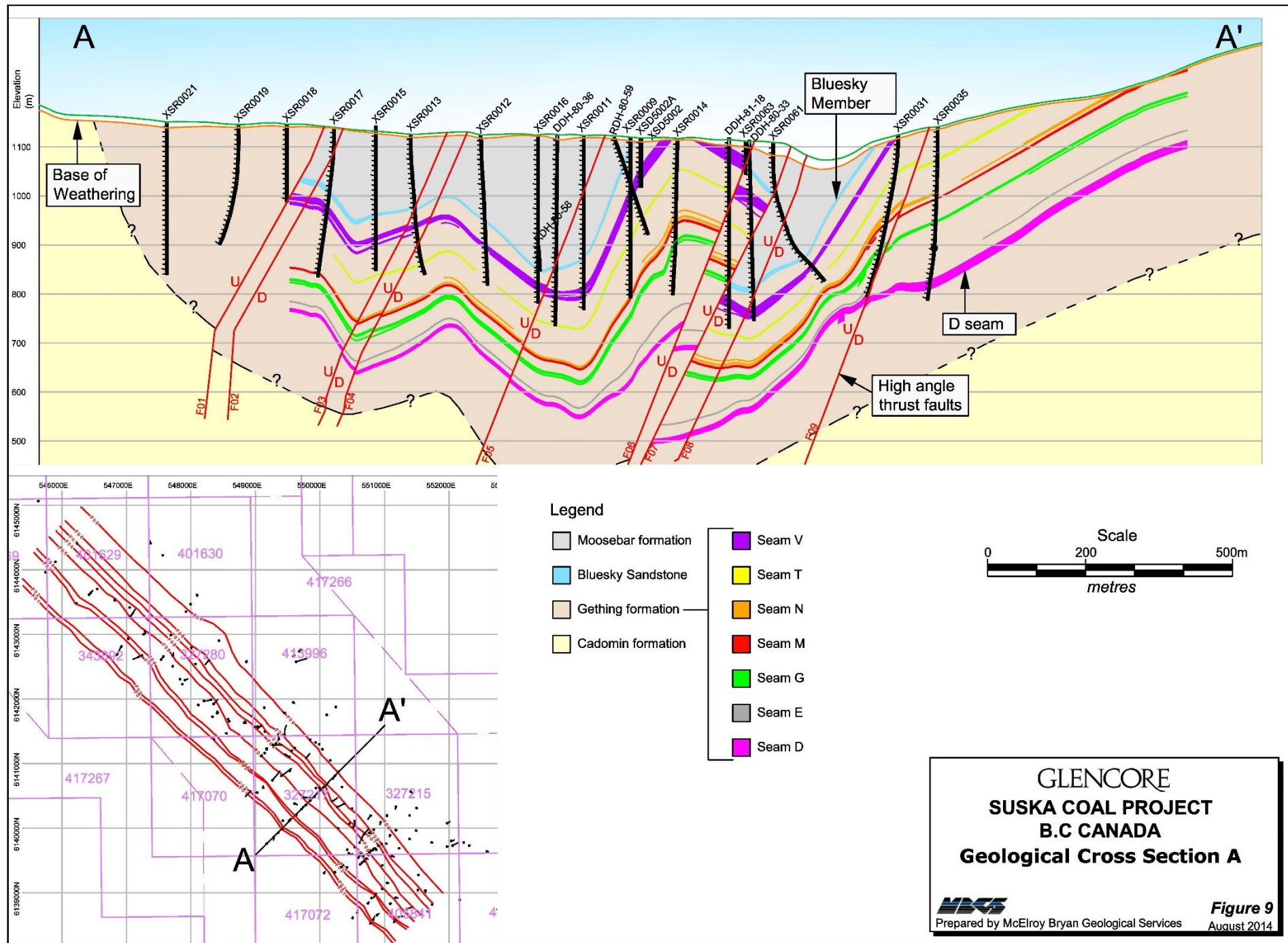
- Moosebar formation
- Bluesky Sandstone
- Gething formation
- Cadomin formation

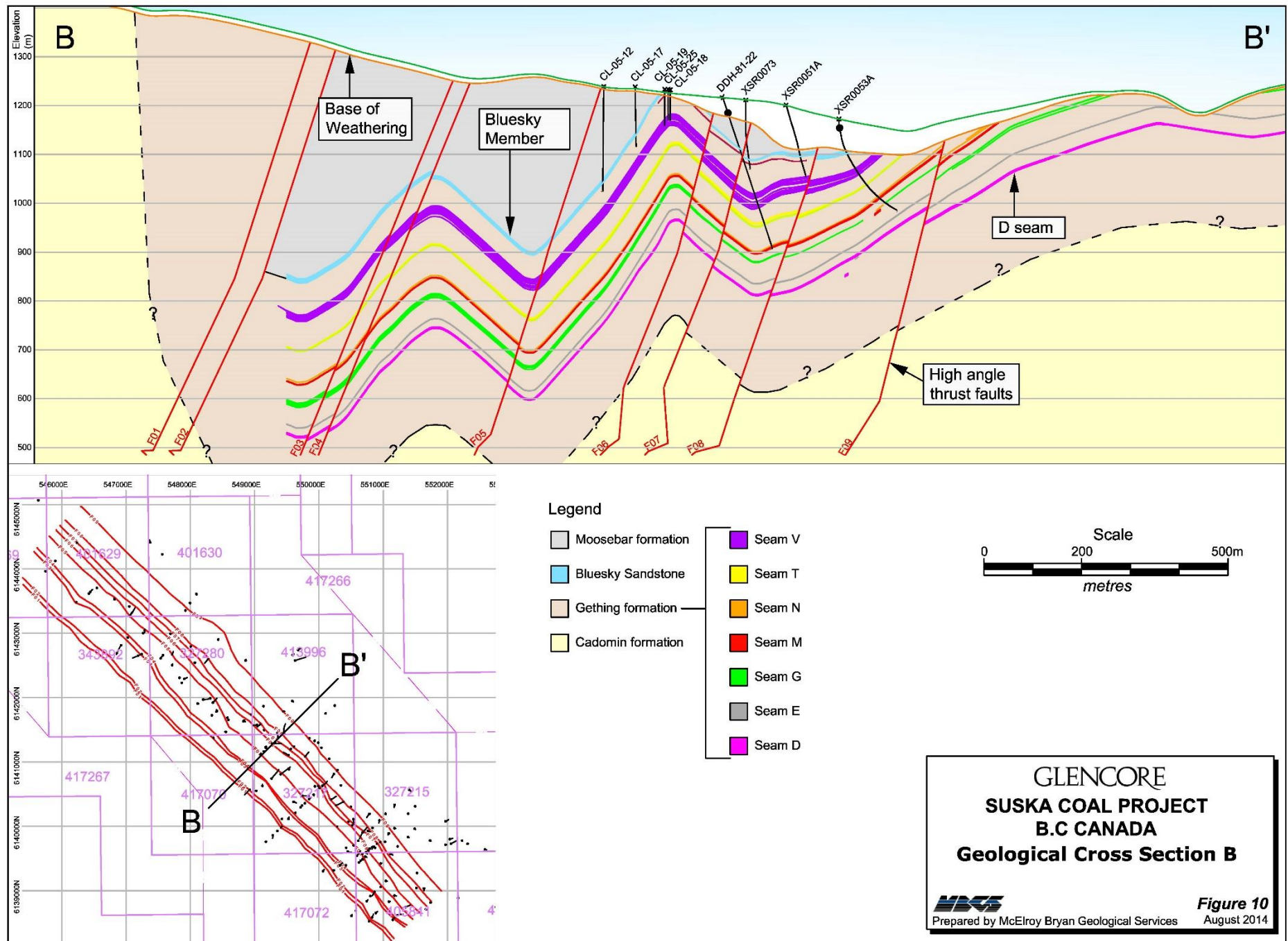
- Seam V
- Seam T
- Seam N
- Seam M
- Seam G
- Seam E
- Seam D

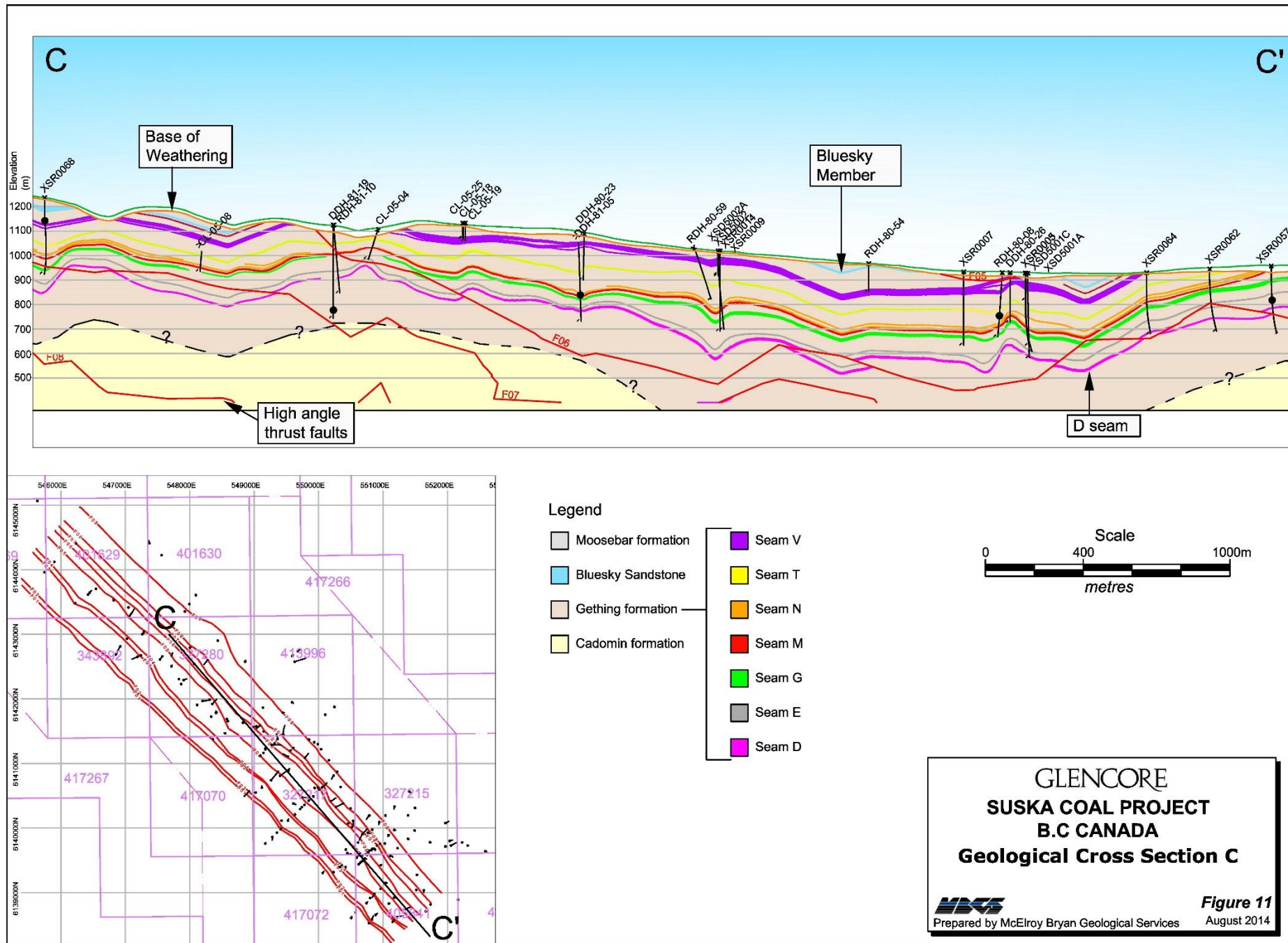
**GLENCORE**  
**SUSKA COAL PROJECT**  
**B.C CANADA**  
**Deposit Geology**

  
 Prepared by McElroy Bryan Geological Services

**Figure 8**  
 August 2014

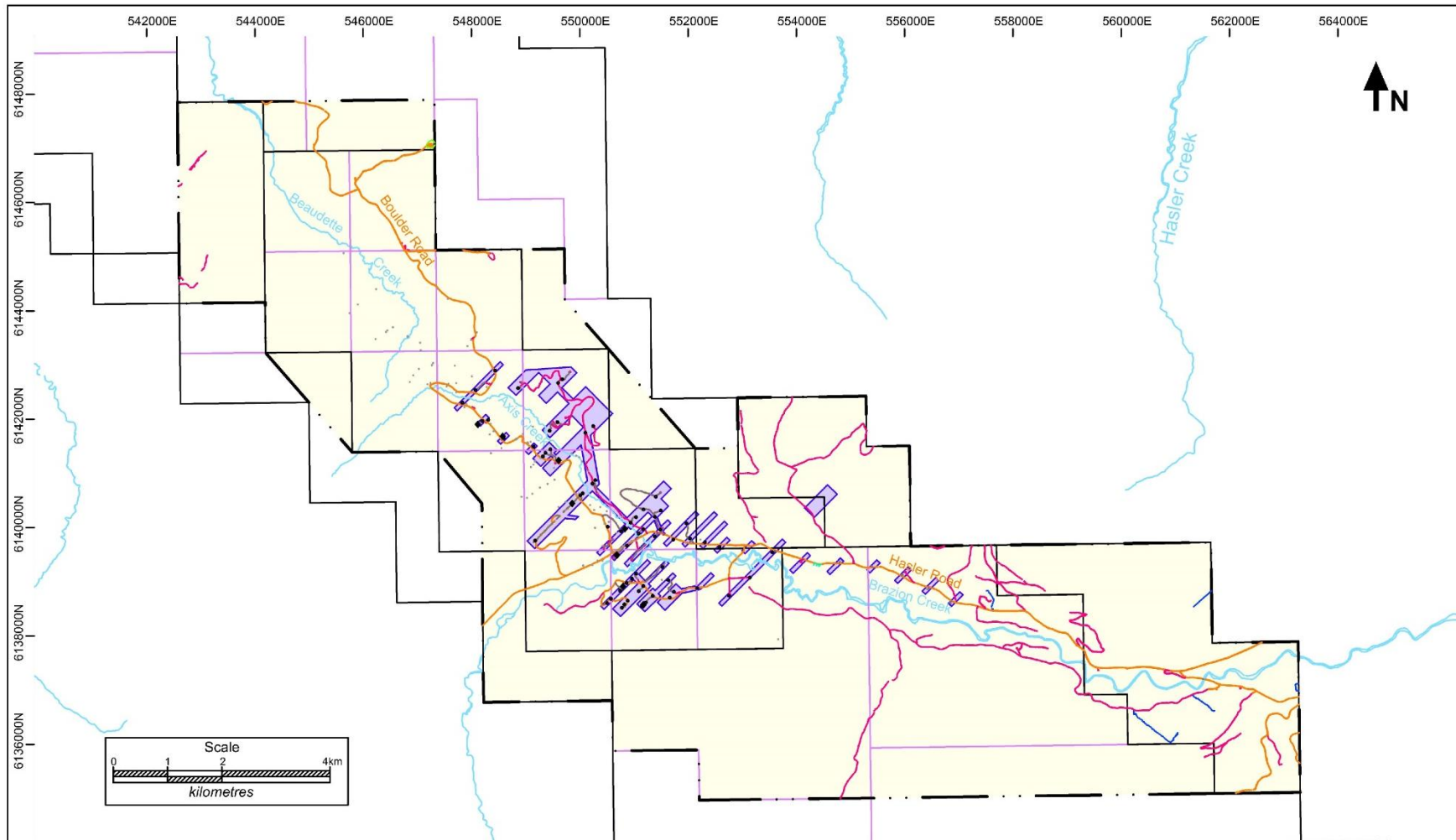






## 5 PHYSICAL WORK

Physical work throughout the exploration program has included construction of tracks and drill pads to allow access for drilling and support equipment and including several stream crossings and one 35 m span temporary bridge. All construction work was undertaken by Bump Construction Ltd. in accordance with the Notice of Work, Occupant Licence to Cut, Health and Safety Reclamation Code (2008), Handbook for Mineral and Coal Exploration in British Columbia (2009) and Section 9 of the Water Act (1996) for stream crossings. Disturbance has remained within prescribed limits. **Figure 12** shows drill pad locations and roads that have been constructed for exploration purposes.



**Legend**

- Historical drill hole
- Glencore drill hole
- Drainage
- Coal licence
- ▭ Suska tenure limit
- ▭ Disturbance corridor
- Gravel driveway
- Gravel road
- Gravel parking
- Rough road
- Trail
- GPS trail

**GLENCORE**  
**SUSKA COAL PROJECT**  
**B.C CANADA**  
**Disturbance Plan**

**Figure 12**  
 Prepared by McElroy Bryan Geological Services August 2014

## 6 STATEMENT OF COSTS

Expenditure from June 2012 to June 2013 included exploration drilling and support costs, geological modeling and reporting and baseline environmental studies. A summary of this expenditure is provided in **Table 4** with a detailed spreadsheet in **Appendix K**.

**Table 4. Summary of Costs**

<b>Work Type</b>	<b>Total Cost</b>
Drilling - Non-core	\$3,726,664
Drilling - Diamond	\$354,640
<b>Drilling - Total</b>	<b>\$4,081,304</b>
<b>Geological Support</b>	<b>\$1,253,587</b>
<b>Exploration Support</b>	<b>\$1,346,170</b>
<b>Environmental Assessment</b>	<b>\$4,476,021</b>
<b>Construction</b>	<b>\$1,043,936</b>
<b>Rentals</b>	<b>\$95,596</b>
<b>Transportation</b>	<b>\$1,109,615</b>
<b>TOTAL Expenditures</b>	<b>\$13,406,229</b>

## 7 CONCLUSION

Exploration drilling from 2012 to 2013 confirmed the presence of seams of the Gething Formation and enabled a more detailed stratigraphic correlation of the V Seam. The steep dip of seams and complex structure of the Suska deposit means correlation of seams between drill holes is very difficult. Further exploration would be required to determine the geology in areas of greater drill hole spacing and towards the limits of the exploration area. Recent coal washability results were limited due to coal recovery issues and money constraints, further exploration drilling would be required for a detailed coal quality assessment.

## 8 REFERENCES

Ministry of Energy, Mines and Petroleum Resources British Columbia.  
Geology Maps.

Gulf Canada Resources Inc., 1980, 1981, 1984. Goodrich Coal Project,  
Geological Reports.

Cline Mining Inc., 2006, Technical Report Lossan Coal Project.



## 9 APPENDICES

### **Appendix A – Aerial Photogeological Interpretation**

## Appendix B – Table of Drill Hole Details

DRILL HOLE NUMBER	SURVEYED EASTING	SURVEYED NORTHING	SURVEYED COLLAR RL (masl)	TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (Degrees)	AZIMUTH (Degrees)	GEOLOGICAL LOGS	LAS	PHOTOS	COMMENTS
MW12-01	551221.00	6138625.00	1076.00	33.50	6.00	19-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-02D	552746.00	6138735.00	1052.00	51.80	16.50	21-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-02S	552759.00	6138734.00	1052.00	31.20	17.00	21-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-03	552595.00	6139636.00	1033.00	53.80	17.50	23-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-04D	551485.00	6139973.00	1045.00	48.20	10.50	24-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-04S	551490.00	6139963.00	1045.00	25.30	9.50	25-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-05D	554811.00	6139375.00	1028.00	44.60	32.50	26-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-05S	554798.00	6139379.00	1028.00	13.10	12.00	27-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-06D	550726.00	6139524.00	1029.00	49.30	15.50	28-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-06S	550715.00	6139517.00	1028.00	39.40	15.50	29-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-07D	550251.00	6141869.00	1276.00	50.50	1.50	30-Sep-12	Non-Core	111	90	0	Yes	No	No	
MW12-07S	550242.00	6141879.00	1276.00	31.80	1.50	1-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-08	549733.00	6142033.00	1239.00	54.20	9.50	2-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-09D	550000.00	6140595.00	1111.00	57.70	11.00	3-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-09S	550020.00	6140596.00	1111.00	34.90	15.00	3-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-10D	548590.00	6141639.00	1250.00	57.40	9.50	4-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-10S	548577.00	6141644.00	1251.00	66.50	9.50	5-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-11D	547840.00	6142309.00	1311.00	54.90	4.00	6-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-11S	547829.00	6142299.00	1312.00	15.30	12.50	6-Oct-12	Non-Core	111	90	0	Yes	No	No	



DRILL HOLE NUMBER	SURVEYED EASTING	SURVEYED NORTHING	SURVEYED COLLAR RL (masl)	TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (Degrees)	AZIMUTH (Degrees)	GEOLOGICAL LOGS	LAS	PHOTOS	COMMENTS
MW12-12D	548439.00	6142890.00	1325.00	49.20	14.00	8-Oct-12	Non-Core	111	90	0	Yes	No	No	
MW12-12S	548429.00	6142911.00	1325.00	33.40	4.50	8-Oct-12	Non-Core	111	90	0	Yes	No	No	
XSR0001	550620.24	6139437.53	1027.33	351.00	17.00	14/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSD5001	550690.19	6139490.66	1027.81	32.00	18.00	6/11/2012	Core	96	90	0	No	No	No	
XSD5001A	550689.42	6139490.14	1027.56	345.00	24.00	18/11/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5001B	550683.73	6139495.16	1027.69	30.00	20.00	20/11/2012	Core	96	90	0	No	No	No	
XSD5001C	550680.07	6139490.77	1027.67	110.10	21.00	25/11/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5002	549859.11	6140445.68	1118.30	101.00	7.00	28/11/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5002A	549857.21	6140444.55	1118.32	95.40	6.00	1/02/2013	Core	96	90	0	No	Yes	No	
XSD5003	548576.39	6141684.92	1251.66	171.00	8.00	2/12/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5004	548112.81	6141905.80	1251.17	222.00	25.00	8/12/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5004A	548116.04	6141905.18	1251.17	201.00	24.00	12/12/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5004B	548116.82	6141903.40	1251.33	213.05	24.00	4/02/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5005	549606.16	6141238.12	1185.65	213.00	87.00	18/12/2012	Core	96	90	0	Yes	Yes	Yes	
XSD5005A	549607.95	6141240.29	1185.65	200.00	84.00	9/02/2013	Core	96	90	0	No	No	Yes	
XSD5006	550831.15	6139976.70	1038.48	177.00	48.00	12/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5007	551172.96	6138576.99	1083.72	84.00	6.50	15/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5007A	551169.60	6138573.62	1083.71	90.00	6.50	22/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5007B	551172.43	6138574.46	1083.78	78.00	10.50	25/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5007C	551168.80	6138575.71	1083.73	104.00	8.00	27/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5007D	551165.37	6138574.64	1083.69	86.20	10.50	30/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSD5008	550796.44	6138915.90	1040.14	219.00	6.00	19/01/2013	Core	96	90	0	Yes	Yes	Yes	
XSR0002	551110.22	6139567.96	1023.19	340.00	26.00	16/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0003	550648.20	6139467.74	1027.61	300.00	21.00	18/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0004	551222.98	6139687.43	1024.54	211.00	66.00	19/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0005	550717.92	6139527.73	1028.40	322.00	24.00	25/07/2012	Non-Core	133	90	0	Yes	Yes	No	



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XSR0006	550959.81	6139422.16	1024.15	258.00	19.00	21/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0007	550536.09	6139704.63	1033.83	300.00	25.00	23/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0008	550612.84	6139775.78	1035.82	286.20	25.00	25/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0009	549848.08	6140425.42	1118.85	327.00	19.00	27/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0010	550446.01	6139610.29	1031.28	380.00	25.00	26/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0011	549780.15	6140358.68	1122.39	354.00	19.00	28/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0012	549632.03	6140208.00	1122.30	306.00	7.00	28/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0013	549523.76	6140114.85	1125.18	288.00	6.00	30/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0014	549916.02	6140492.72	1115.46	318.00	13.00	30/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0015	549488.49	6140067.75	1128.98	294.00	6.00	31/07/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0016	549712.28	6140293.76	1123.50	342.00	13.00	3/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0017	549419.63	6139997.57	1139.41	306.80	6.00	2/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0018	549352.11	6139928.76	1144.82	157.00	24.00	4/08/2012	Non-Core	133	90	0	Yes	No	No	
XSR0019	549280.86	6139860.99	1144.96	251.00	6.00	6/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0020	549554.45	6141196.96	1199.10	72.00	72.00	6/08/2012	Non-Core	133	90	0	No	No	No	
XSR0020A	549554.45	6141196.96	1199.10	252.00	90.00	7/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0021	549173.78	6139760.63	1150.71	311.00	12.00	8/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0022	551486.60	6139962.34	1044.59	250.00	13.00	9/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0023	551386.18	6140196.01	1067.69	124.50	7.00	11/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0024	551084.90	6139889.78	1031.32	209.00	36.00	11/08/2012	Non-Core	133	90	0	Yes	Yes	No	



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XSR0025	551493.43	6140312.36	1076.16	255.00	7.00	12/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0026	551172.47	6139968.83	1035.68	249.00	18.00	12/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0027	551175.00	6140333.17	1101.48	240.00	7.00	13/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0028	550938.38	6140091.48	1048.38	259.00	6.00	13/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0029	551036.03	6140191.87	1070.91	240.00	6.00	14/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0030	551401.80	6140568.59	1127.03	248.00	7.00	15/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0031	550233.36	6140812.50	1124.18	339.00	12.00	16/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0032	550102.96	6141751.88	1206.02	185.00	12.00	17/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0033	552032.90	6139800.26	1040.40	224.00	7.00	19/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0034	550244.82	6141872.62	1276.13	300.00	6.00	19/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0035	550285.44	6140874.77	1140.12	354.00	6.00	26/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0036	551966.61	6140076.93	1059.53	240.00	7.00	20/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0037	551383.31	6139833.88	1023.34	240.50	30.00	21/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0038	551726.71	6139778.83	1029.28	198.00	10.00	22/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0039	552310.46	6139727.93	1034.51	138.00	7.00	23/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0040	552581.88	6139639.42	1032.72	214.00	7.00	25/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0041	554079.94	6139363.89	1034.18	217.00	10.00	26/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0042	556410.61	6138861.89	1053.39	240.00	7.00	28/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0043	556001.98	6139182.20	1064.29	240.00	15.00	29/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0044	550863.00	6139673.00	No Record	25.00	25.00	28/08/2012	Non-Core	133	90	0	Yes	No	No	GPS Coordinates



DRILL HOLE NUMBER	SURVEYED EASTING	SURVEYED NORTHING	SURVEYED COLLAR RL (masl)	TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (Degrees)	AZIMUTH (Degrees)	GEOLOGICAL LOGS	LAS	PHOTOS	COMMENTS
XSR0044A	550870.57	6139664.97	1029.82	245.00	36.00	30/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0045	555382.50	6139306.05	1036.45	204.00	39.00	30/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0046	553557.56	6139539.05	1014.72	190.00	12.00	31/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0047	553137.30	6139079.12	1018.44	145.00	22.00	31/08/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0048	552753.03	6138742.52	1052.12	251.00	18.00	1/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0049	552162.94	6138886.38	1030.30	200.00	10.00	2/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0050	551661.08	6138710.26	1043.94	281.00	45.00	4/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0051	549355.09	6141374.62	1201.38	35.00	35.00	4/09/2012	Non-Core	133	90	0	No	No	No	
XSR0051A	549364.58	6141379.48	1200.88	168.00	88.00	16/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0052	551735.43	6138815.94	1035.82	157.00	30.00	6/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0053	549449.50	6141439.22	1172.56	49.00	49.00	5/09/2012	Non-Core	133	90	0	No	No	No	
XSR0053A	549453.52	6141443.95	1172.14	250.00	67.00	18/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0054	547832.24	6142304.57	1311.41	300.00	13.00	6/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0055	551631.71	6139034.22	1058.84	261.50	6.00	7/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0056	548435.44	6142901.26	1325.43	300.00	13.00	7/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0057	551346.79	6138743.24	1057.11	295.00	29.00	9/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0058	548591.37	6141650.76	1250.29	318.00	13.00	8/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0059	549146.58	6141495.52	1206.46	273.00	13.00	9/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0060	551217.06	6138616.68	1075.83	353.00	6.00	10/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0061	550054.14	6140631.15	1107.89	312.00	37.00	12/09/2012	Non-Core	133	90	0	Yes	No	No	



DRILL HOLE NUMBER	SURVEYED EASTING	SURVEYED NORTHING	SURVEYED COLLAR RL (masl)	TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (Degrees)	AZIMUTH (Degrees)	GEOLOGICAL LOGS	LAS	PHOTOS	COMMENTS
XSR0062	551170.90	6138923.31	1043.93	256.00	25.00	14/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0063	550009.47	6140596.55	1110.87	67.00	18.00	13/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0064	551040.14	6139150.85	1029.18	250.00	7.00	15/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0065	550863.39	6138978.88	1033.59	250.00	6.60	16/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0066	550740.98	6138835.86	1047.39	227.00	12.00	17/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0067	550574.18	6138689.15	1076.72	250.00	5.00	18/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0068	548070.25	6142540.72	1335.08	312.00	6.00	19/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0069	550882.04	6138652.79	1101.29	239.00	6.00	19/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0070	548199.73	6141967.21	1248.68	316.00	18.00	20/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0071	550777.12	6138523.68	1112.63	196.00	15.00	20/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0072	550823.52	6138582.33	1108.41	200.00	14.00	21/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0073	549317.27	6141310.87	1211.52	140.00	48.00	21/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0074	550504.35	6138608.21	1080.51	210.00	7.00	21/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0075	548859.57	6142574.20	1280.26	269.00	6.00	22/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0076	550960.88	6139057.81	1031.27	120.00	19.00	22/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0077	551523.97	6139274.42	1043.69	150.00	6.00	23/03/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0078	549599.29	6142672.36	1314.25	255.00	6.00	23/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0079	551147.23	6138546.86	1085.76	125.00	8.00	23/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0080	549442.28	6141785.63	1179.68	319.00	25.00	24/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0081	549586.38	6141944.90	No Record	250.00	12.00	25/09/2012	Non-Core	133	90	0	Yes	Yes	No	GPS Coordinates



DRILL HOLE NUMBER	SURVEYED EASTING	SURVEYED NORTHING	SURVEYED COLLAR RL (masl)	TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (Degrees)	AZIMUTH (Degrees)	GEOLOGICAL LOGS	LAS	PHOTOS	COMMENTS
XSR0082	549674.99	6142739.80	No Record	289.00	12.00	26/09/2012	Non-Core	133	90	0	Yes	Yes	No	GPS Coordinates
XSR0083	551087.10	6138828.05	1047.15	174.00	18.00	26/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0084	550760.27	6139928.77	1039.18	251.00	57.00	28/09/2012	Non-Core	133	90	0	Yes	Yes	No	
XSR0085	550514.46	6140013.64	1042.52	208.00	18.00	29/09/2012	Non-Core	133	90	0	Yes	Yes	No	





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## **Appendix C – Geological Field Data**

## Appendix D – Statements of Geological Qualifications

680 Willoughby Road, Willoughby,  
NSW, Australia, 6163.

[Beccy.Getty@mbgs.com.au](mailto:Beccy.Getty@mbgs.com.au)

I am currently employed as a Project Geologist at MBGS where I have worked since 2008. I graduated with a Bachelor of Science with Honours degree in geology from the University of Brighton, UK in 2008. I am a member of the Association of Professional Engineers and Geoscientists BC (APEGBC member number 179835), Australian Institute of Mining and Metallurgy (AusIMM member number 504526) and Australian Institute of Geoscientists (AIG member number 5686). My work experience has included coal exploration across seven Australian projects, from greenfield projects to exploration adjacent to active mines and for both underground and open cut requirements. My role has encompassed drill supervision; geological and geotechnical logging and sampling; field mapping; training and mentoring junior and contract geologists; data management and analysis and statutory and internal reporting.

I supervised exploration on site at Suska from November 2012 to February 2013. All details of the work performed are accurately described in this report and I am not aware of any relevant omissions.

Dated 15<sup>th</sup> August 2014.



Rebecca Getty P. Geo.

### Statement of Geological Qualifications – Suska 2012 - 2013

UTM Exploration Services provided field geologists to staff drill rigs on a 24 hour basis. A summary of each geologists experience is outlined below.

- Kay McKenzie, M.I.T, has been employed as a contract geologist since graduating with a Bachelor of Science Honours degree (Geology) from St

Marys University, Halifax, Nova Scotia in 2009. Her experience included core logging; lithological and geotechnical sampling; mapping; reporting; data management and analysis and project management across eight hard rock projects throughout Canada.

- Barry MacCallum, M.I.T., has been employed as a contract geologist since graduating with a Bachelor of Science with Honours degree (Geology) from St Marys University in Halifax, Nova Scotia in 2009. His experience included core logging; field mapping and sampling; structural interpretation; data analysis and project management across 10 hard rock exploration projects throughout Canada.
- Stan Hammon, PhD, has been employed as a geologist and research assistant since graduating with a Bachelor of Science degree (Geosciences) in Texas, Dallas and completed a PhD in Geology and the University of Colorado, Boulder. His experience included well site logging, geophysical research and software development in the US.
- Darren LeFort has been employed as a contract geologist since graduating with a Master of Science degree (Applied Science) from St Marys University, Halifax, Nova Scotia in 2012. His experience included sampling, petrographic analysis and technical writing for projects with Vale Ltd. (Sudbury), Codelco (Chuquicamata) and USGS (Bokan Mt).
- Celeste Rambaran has been employed as a contract geologist since graduating with a Bachelor of Science degree (Earth and Ocean Science) from the University of British Columbia in 2009. Her experience included core logging, mapping and trenching as an assistant and sample management across four hard rock exploration projects in the Yukon and Nunavut.
- Jessica Stewart has been employed as a contract geologist since graduating with a Bachelor of Science degree (Geology) in 2012. Her experience included core logging, mapping and sampling and data management as a summer student in Nunavut.

- Danielle Hussey has been employed as a contract geologist since graduating with a Bachelor of Science Honours degree (Earth Science) from the Memorial University of Newfoundland in 2011. Her experience included core logging and report writing for two hard rock projects in Newfoundland and Labrador.

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## **Appendix E – Hydrogeological Report**

## Appendix F – Geophysical Data

### Statement of Qualifications

Weatherford Slimline logging services is an international company with more than 30 years' experience in geophysical logging for coal exploration. All the field engineers undergo the suite of training requirements listed below. Field engineers undergo six weeks training at head office and are required to pass a seven hour Break Out exam supervised by senior management.

- BC First Aid and standard First Aid
- H2S
- Radiation Training
- Transport of Dangerous Goods
- Fit Test for SCBA
- Hearing Test
- Fatigue Management
- WHIMS
- Trip Inspection Light Vehicle
- PST
- Weatherford Health and Safety Induction
- EEP Competency Assessment
- Mechanics in Motion
- RADAR reporting cards
- OSSA
- Vehicle Cargo Securement
- Journey Management
- Defensive Driving

The relative field experience of the Weatherford engineers is listed below.

Randie Gainer - 9 years

BJ McLachlan - 11 years

Luke Oliver - 7 years

Spencer Watson - 4 years

Cameron Shape - 3 years

Robyn Mann - 4 years

Shawn Radford - 3 years

Mark Hamill - 2 years

Sean O'Donnell - 3 years

Sharjeel Husainy - 3 years

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## **Appendix G – Geotechnical Data**

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## **Appendix H – Geochemical Data**



## Appendix I – Survey Data



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### TECHNICAL MEMORANDUM

DATE: July 9, 2014

TO: John Anderson  
Glencore Canada

FROM: Aaron Blom  
Integrated ProAction Corp.

**RE: Survey Procedures and Specifications for As Built Surveys conducted for Glencore Canada**

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Integrated ProAction Corporation (IPaC) has conducted As Built Surveys for Glencore Canada since August 2012 using Trimble GNSS R8 RTK survey instruments. Control points (base stations) were established in areas with clear sky views and good line of sight in all directions to avoid multipath interference. These points were all subsequently post processed using Natural Resource Canada Geodetic Survey Division's Precise Point Positioning service to obtain a precise horizontal and vertical location and elevation. Standard survey practices were followed using all Trimble guidelines for the R8 GNSS receiver. This equipment configuration can be expected to be accurate within 5cm vertically and horizontally according to the manufacturer's (Trimble) specifications. Horizontal positions are ground coordinates valid in UTM Zone 10 N map projection (NAD83). Elevations are orthometric height above mean sea level (geoid model HTv2.0). Integrated ProAction Corp. has been surveying following these standards on numerous types of small and large projects throughout BC since 2006 using this type of equipment.

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Please contact me at any time if you have any questions or require any additional information.

Respectfully Submitted,  
Integrated ProAction Corp.

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per Aaron Blom  
Project Manager



Integrated ProAction Corp. *Engineering, Forestry, Environmental, Log Marketing, Wood Fibre Management, Business Consulting*

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## **Appendix J – Coal Quality Data**

## Appendix K - Statement of Costs

Exploration Work Type	Contractor	Hours	Total Cost
<b>Drilling - Non-core</b>	Boart Longyear	12406	\$3,512,025
<b>Drilling - Non-core</b>	Westech Drilling Corp.	303	\$214,639
<b>Drilling - Diamond</b>	Major Drilling International	6393	\$354,640
			<b>\$4,081,304</b>
<b>Geological Support</b>	MBGS	2812	\$473,378
	MBGS (JORC December 2013)	548	\$87,065
	UTM Exploration Services	2994	\$693,144
			<b>\$1,253,587</b>
<b>Exploration Support</b>	John Goulet (foreman)	1216	\$182,418
	IPac (survey)	699	\$256,840
	Domcor (security)	3714	\$259,249
	Weatherford logging services	2148	\$472,379
	ALS Laboratory		\$122,826
	KPA Oilfield (water)	133	\$52,458
			<b>\$1,346,170</b>
<b>Environmental Assessment</b>	Knight Piesold	8	\$6,788
	Lorax Environmental	68	\$46,938
	Grassland Acres	986	\$10,752
	Sean Sharpe Consulting	509	\$7,057
	Stantec Consulting	59801	\$4,404,486
			<b>\$4,476,021</b>
<b>Construction</b>	Aegis Construction	220	\$37,968
	Bump Contracting	6338	\$729,672
	Peace Valley Industries	11	\$733
	K & O Electric	13	\$11,880
	Outland Camp Services	6510	\$259,249
	North Country Rebuilders	10	\$4,434
			<b>\$1,043,936</b>
<b>Rentals</b>	North Peace Communications	43	\$95,596
			<b>\$95,596</b>
<b>Transportation</b>	All Peace (Fuel)	578	\$53,250
	Yellowhead Helicopters	18	\$14,877
	Buffalo Aerial Services	366	\$1,036,935
	Canadian Helicopter	9	\$4,553
			<b>\$1,109,615</b>
<b>TOTAL Expenditures</b>			<b>\$13,406,299</b>