

BC Geological Survey Coal Assessment Report 1061



COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT: Fording River Operations Assessment Report
2019 Turnbull and Castle Exploration Project

TOTAL COST: \$ 6,573,349.35

AUTHOR: Barry F. Musil

SIGNATURE: Originals Signed and Sealed by Author

NOTICE OF WORK PERMIT NUMBER/DATE:

Castle Mountain CX-5-022 / Aug 24, 2018 - Aug. 24, 2023

YEAR OF WORK: 2019

PROPERTY NAME: Castle Mountain Exploration (FRO)

COAL LICENSE(S) AND/OR LEASES ON WHICH PHYSICAL WORK WAS DONE:

COAL LEASES: 327991,389310

MINERAL INVENTORY MINFILE NUMBER:

File: 14675-20/1630586

MINING DIVISION: Fort Steele

NTS / BCGS: 082J0262

LATITUDE: 50° 13' 01"

LONGITUDE: -114° 50' 28" (at centre of work)

UTM Zone: 11 **EASTING:** 654000

NORTHING: 5565000

OWNER: Teck Coal Limited

MAILING ADDRESS: PO BOX 100, Elkford, BC, V0B 1H0

OPERATOR: Teck Coal Limited

MAILING ADDRESS: PO BOX 100, Elkford, BC, V0B 1H0

REPORT KEYWORDS:

Interbedded Elk Formation, Mist Mountain Formation, Morissey Formation, Fernie Formation, Alexander Creek Syncline, Ewin Pass Thrust, Erickson Fault, Coal, Sampling, Proven/Probable Reserves, Measured/Indicated Resources, Teck Resources Ltd., Coal, Castle Mountain.

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
Annual FRO Exploration Assessment Reports Since 1970

SUMMARY OF TYPES OF WORK IN THIS REPORT		EXTENT OF WORK (in metric units)	ON WHICH TENURES
GEOLOGICAL (scale, area)			
	Ground, mapping		
	Photo interpretation		
GEOPHYSICAL (line-kilometres)			
	Ground (Specify types)		
	Airborne (Specify types)		
	Borehole		
	Gamma, Neutron	18,435 meters	Coal Lease: 327991, 389310
	Density	18,435 meters	Coal Lease: 327991, 389310
	Caliper	18,435 meters	Coal Lease: 327991, 389310
	Deviation	18,435 meters	Coal Lease: 327991, 389310
	Dip	6,500 meters	Coal Lease: 327991, 389310
	Others (specify): Optical/Acoustic Televiewer	6,444.7 meter optical/acoustic	Coal Lease: 327991,389310
	Core	3,313.4 meters	Coal Lease: 389310
	Non-core	15,122.5 meters	Coal Lease: 327991,389310
SAMPLING AND ANALYSES			
Total # of Samples	Results from external labs are still outstanding as of July 24, 2020.		
469	Raw Ash		Coal Lease: 327991, 389310
79	Proximate		Coal Lease: 327991, 389310
	Ultimate		
0/442	Petrographic		Coal Lease: 327991, 389310
	Vitrinite reflectance		Coal Lease: 327991, 389310
18 LD Core Samples	Carbonization and Coke Testing		Coal Lease: 327991, 389310
79/442	Mineral Ash Analysis		Coal Lease: 327991, 389310
442/442	Single Gravity Wash		Coal Lease: 327991, 389310

Table 8 and parts of Appendix 3 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

Fording River Operations

Assessment Report

2019 Castle Mountain Exploration Project

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Fording River Operations Assessment Report

2019 Castle Exploration Project

1. INTRODUCTION

This report presents results of coal exploration activities conducted during the summer and fall of 2019 on the Castle Mountain Exploration project, located in the Elk Valley Coalfield, Teck Coal Limited, Fording River Operation, in southeastern British Columbia. The exploration work was completed by Fording River site personnel.

i. Property Description and Access

The Castle Mountain Exploration projects is in the Fording River property and Upper Fording River Valley, approximately 26 kilometers north, and east of Elkford, BC. Access to the Fording River property is by paved road northeast from Elkford along the Fording River Valley, or north along the Elk River Valley via the Forestry Service gravel road or the Kan-Elk Powerline road. Refer to Figure 1 for property location.

ii. Property History

The Elk River portion of the property was actively explored by the Canadian Pacific Railway Company in the period between 1902 and 1908. Until 1947, the property was comprised of 10,276 hectares in 40 Crown Granted Lots. In that year, the holdings were reduced to 2,979 hectares in 15 Crown Granted Lots. In 1967 and 1968, Canadian Pacific Oil and Gas reacquired part of the coal lands which had been abandoned in 1947. An additional nine Coal Licenses located at the south end of the property were acquired in 2001. At the present time, the Fording River Property consists of 22,128 hectares, held on seven coal leases and 21 coal licenses. The tenure number, name, owner, grant, and area are summarized in Table 1. All licenses are in British Columbia in the Fort Steel Mining Division. Refer to Figure 2 for coal lease and license location.

Mining operations, which commenced in 1971, have produced more than 288 million tonnes of clean metallurgical and thermal coal for markets in North and South America, Africa, Europe, and Asia.

Table 1: FRO Coal Licenses

Code	Name	Parties	Status	Grant Date	Area (Ha)	Project
389275	COAL LEASE No. 01	TECK COAL LIMITED (100%)	Active	1/1/1974	1,009	Fording River Operations, BC
389282	COAL LEASE No. 02	TECK COAL LIMITED (100%)	Active	5/19/1977	2,250	Fording River Operations, BC
389285	COAL LEASE No. 05	TECK COAL LIMITED (100%)	Active	3/17/1982	644	Fording River Operations, BC
389290	COAL LEASE No. 09	TECK COAL LIMITED (100%)	Active	10/1/1991	1,096	Fording River Operations, BC
389310	COAL LEASE No. 16	TECK COAL LIMITED (100%)	Active	5/9/1998	2,859	Fording River Operations, BC
389311	COAL LEASE No. 17	TECK COAL LIMITED (100%)	Active	5/9/1999	8,180	Fording River Operations, BC
389312	COAL LEASE No. 18	TECK COAL LIMITED (100%)	Active	1/30/2000	1,298	Fording River Operations, BC
402047	CLIC-402047	TECK COAL LIMITED (100%)	Active	5/8/2003	259	Fording River Operations, BC
402048	CLIC-402048	TECK COAL LIMITED (100%)	Active	5/8/2003	129	Fording River Operations, BC
402049	CLIC-402049	TECK COAL LIMITED (100%)	Active	5/8/2003	258	Fording River Operations, BC
402050	CLIC-402050	TECK COAL LIMITED (100%)	Active	5/8/2003	259	Fording River Operations, BC
402051	CLIC-402051	TECK COAL LIMITED (100%)	Active	5/8/2003	261	Fording River Operations, BC
402052	CLIC-402052	TECK COAL LIMITED (100%)	Active	5/8/2003	258	Fording River Operations, BC
402053	CLIC-402053	TECK COAL LIMITED (100%)	Active	5/8/2003	129	Fording River Operations, BC
402054	CLIC-402054	TECK COAL LIMITED (100%)	Active	5/8/2003	129	Fording River Operations, BC
402055	CLIC-402055	TECK COAL LIMITED (100%)	Active	5/8/2003	259	Fording River Operations, BC
402056	CLIC-402056	TECK COAL LIMITED (100%)	Active	5/8/2003	259	Fording River Operations, BC
402057	CLIC-402057	TECK COAL LIMITED (100%)	Active	5/8/2003	130	Fording River Operations, BC
402058	CLIC-402058	TECK COAL LIMITED (100%)	Active	5/8/2003	240	Fording River Operations, BC
402105	CLIC-402105	TECK COAL LIMITED (100%)	Active	5/8/2003	259	Fording River Operations, BC
402106	CLIC-402106	TECK COAL LIMITED (100%)	Active	5/8/2003	325	Fording River Operations, BC
402110	CLIC-402110	TECK COAL LIMITED (100%)	Active	5/8/2003	258	Fording River Operations, BC
402111	CLIC-402111	TECK COAL LIMITED (100%)	Active	5/8/2003	255	Fording River Operations, BC
402112	CLIC-402112	TECK COAL LIMITED (100%)	Active	5/8/2003	228	Fording River Operations, BC
402113	CLIC-402113	TECK COAL LIMITED (100%)	Active	5/8/2003	95	Fording River Operations, BC
402115	CLIC-402115	TECK COAL LIMITED (100%)	Active	5/8/2003	284	Fording River Operations, BC
417067	CLIC-417067	TECK COAL LIMITED (100%)	Active	10/14/2005	259	Fording River Operations, BC
417068	CLIC-417068	TECK COAL LIMITED (100%)	Active	10/14/2005	259	Fording River Operations, BC

2. GEOLOGY

i. Stratigraphy

The general stratigraphic succession on the Fording River Property is summarized in Table 2.

Table 2: Fording River Stratigraphy

Period	Litho-Stratigraphic Units			Principle Rock Types
Recent				Colluvium
Quaternary				Clay, silt, sand, gravel, cobbles
Lower Cretaceous	Blairmore Group			Massive bedded sandstones and conglomerates
Lower Cretaceous to Upper Jurassic	KOOTENAY GROUP	Elk Formation		Sandstone, siltstone, shale, mudstones, chert pebble conglomerate, minor coal
		Mist Mountain Formation		Sandstone, siltstone, shale, mudstones, thick coal seams
		MORRISSEY FORMATION	Moose Mountain Member	Medium to coarse-grained quartz - chert sandstone
			Weary Ridge Member	Fine to coarse-grained, slight ferruginous quartz-chert sandstone
Jurassic	Fernie Formation			Shale, siltstone, fine-grained sandstone
Triassic	Spray River Formation			Sandy shale, shale quartzite
	Rocky Mountain Formation			Quartzite
Mississippian	Rundle Group			Limestone

The oldest rocks present on the Fording River property are the Rundle Group limestone, located on the west bank of the Fording River, near the southern property boundary.

These rocks are in faulted contact with the Kootenay Group to the west, and unconformable contact with Rocky Mountain Formation quartzites to the north. The latter are best exposed on the eastern slope of the Brownie Creek valley.

The Fernie Formation shales occur throughout the area, generally along the sides of the valleys on the lower flanks of the mountains. The shales are recessive and, generally poorly exposed. However, there are some good exposures of Fernie Formation strata on the lower western slopes of Eagle Mountain in some creek drainages. The Fernie Formation is in conformable contact with the Morrissey through the "Passage Beds," which are a transitional zone from marine to non-marine sedimentation.

The Morrissey Formation, which is the “basal sandstone” of the Kootenay Group, is a prominent cliff-forming marker horizon in many locations. On the Fording River property, the top of the Moose Mountain member (Morrissey Formation) is in sharp contact with 010 seam, the lowermost bed of the Mist Mountain Formation.

The Mist Mountain Formation contains all the economic coal seams and is the most widely occurring formation on the Fording River property. This economically important formation is an interbedded sequence of sandstones, siltstones, silty shales, mudstones, and medium to high volatile bituminous coal seams. The volatile content of the coal increases up section, with decreasing rank. Lenticular sandstones comprise about 1/3 of the Mist Mountain sediments at Fording River, but very few laterally extensive sandstone beds exist.

The sandstone immediately above and below seams 040 and above 090, are the most persistent units, and are often cliff-forming marker horizons.

The Mist Mountain Formation is generally overlain conformably by strata of the Elk Formation. On the Fording property, this formation is commonly a succession of sandstones, siltstones, shales, mudstones, chert pebble conglomerates, and sporadic, thin, high volatile bituminous coal seams. The coal seams are characterized by high alginate content and referred to as “Needle” coal. The Elk Formation is observed near the tops of the mountains, mainly on the east side of the Elk Valley on the Greenhills Range, and northward to the Mount Tuxford areas.

The top of the Elk Formation marks the upper boundary of the Kootenay Group, which is unconformably overlain by the basal member of the Blairmore Group. This thick bedded, cliff-forming sandstone and conglomerate unit is observed on the upper slopes of Mount Tuxford.

ii. [Structure](#)

After deposition, the sediments were involved in the mountain building movements of the late Cretaceous to early Tertiary Laramide Orogeny. The major structural features of the Fording River property are the North-South trending synclines with near horizontal to steep westerly dipping thrust faults, and a few high angle normal faults. Some of the thrust faults were likely folded late in the tectonic cycle.

The formation of the major fold structures began early in the tectonic cycle. In the current mining area, two asymmetric synclines are evident: the Greenhills Syncline to the west, and the Alexander Creek Syncline to the east of the Fording River.

The thrust faulting (i.e. the Ewin Pass and Brownie Ridge Thrusts), was probably contemporaneous with the later stages of folding. The intervening anticline was subsequently faulted (Erickson Fault), then eroded.

The Alexander Creek Syncline can be traced from the southern property boundary on Castle Mountain to the northern end of the property on Weary Ridge. The strata of the west limb, on the west face of Eagle Mountain, dip easterly at 20 to 25°, decreasing gradually to zero as the axis is approached. The east limb, however, attains a 20° westerly dip within a much shorter (500 m) distance of the axis.

This asymmetry is possibly due, at least in part, to the influence of the Ewin Pass Thrust which subcrops 600 to 800 meters east of the synclinal axis.

Further to the east, on Brownie Ridge, the strata dip westerly at a mean dip of 42°. The Brownie Ridge Thrust, which subcrops near the crest of the ridge, probably contributes to this steepening.

Within the mining area, the axis of the Alexander Creek Syncline plunges to the north at an average of 4°. Turnbull Mountain exhibits a localized series of an echelon fold structure, plunging both to the north and to the south. These subsidiary folds may be related to thrust faulting. From the south end of Mount Tuxford, the synclinal axis continues north- northwest along the base of Mount Veits and into the Elk River Valley near Aldridge Creek.

On Mount Tuxford, the beds exposed are those of the Elk Formation and the overlying (non-coal bearing) Cadomin Formation. The area has not been extensively explored. The stratigraphic sequence of the east limb, in the more extensively explored Mist Mountain strata near Aldridge Creek (Elco property), closely resembles the east limb strata found on Henretta Ridge, ten kilometers to the south.

On the northwest corner of Eagle Mountain, the lower Kootenay-upper Fernie section is the locus for a zone of near horizontal thrust faulting. The effect is to cause a double repetition of the lower coal seams and basal sandstone on the west synclinal limb. This fault zone is synclinal in form and continuous with the Ewin Pass Thrust zone found in the east limb.

The Greenhills Syncline in the mining area is essentially a “mirror-image” of the Alexander Creek structure. The east limb of the asymmetric syncline dips westerly at 15 to 25°, except in areas near the Erickson Fault, where 45 to 55° dips are common. The west limb exhibits much steeper dips, commonly in the 35 to 45° range. The Greenhills Syncline plunges northward (340 to 350°), at less than 5°, and then appears to die out to the north in the area of the Osborne Creek Depression.

The Erickson Fault, which locally runs along the base of the Greenhills Range, west of the Fording River, is one of the major regional faults. From south to north, this westerly dipping (40 to 70°) normal fault, brings Mist Mountain strata progressively into contact with Rundle, Rocky Mountain, Spray River, Fernie, and Morrissey strata. The downthrown block is to the west. Near the south end of Lake Mountain, the Erickson Fault begins to “splay” into two zones.

The main fault runs along the eastern margin of Lake Mountain, and the subsidiary fault runs to the west and appears to “die out” northward. The steep northward dip exhibited in the Lake Mountain strata could be due to influence from these flanking “splays” of the fault. The flat lying region to the north of Lake Mountain (Osborne Creek Depression area) is completely void of outcrop, and the Erickson Fault has not been traced either through or to the north of this area.

Refer to Figure 3 for a detailed geological map of the Castle Mountain exploration area and corresponding cross section in Figure 4.

3. 2019 SUMMARY OF EXPLORATION WORK

i. 2019 Exploration Project Objectives

In 2019, the Fording River geology and geotechnical teams conducted an exploration drilling and coal sampling program on Castle Mountain. Reverse circulation, diamond drill, large-diameter core rigs and geotechnical test pitting were utilized to collect the desired data.

A total of 27 (RC) drill holes, two large-diameter core holes, and six HQ geotechnical drill holes were completed. The (RC) drill holes were drilled in order to gain coal quality data on various coal seams intersected during the drilling while the LDC drill holes were drilled to gain higher resolution data on coal quality of specific seams. The diamond drill holes were drilled to better define large structure present within the property, and to intersect the planned pit design. Samples of coal seams were collected and sent for analysis after all geotechnical logging and data collection was complete.

A total of 37 drill holes were completed in 2019, for a combined total of 19,504.7 meters. Geophysical logging was done on all the above-mentioned drill holes, and a summary of the various drilling can be found below:

- 27 RC holes – 14,803 meters
- Eight diamond drill holes – 3,978.4 meters
- Two large-diameter core holes – 1,380.2 meters

Additionally, 49 test pit sites that were excavated for geotechnical purposes.

The overall objective for the geology team during the 2019 Castle Mountain Exploration drilling program was to improve resource confidence and increase coal location and quality data through increased drill hole density, as well as gain additional geotechnical information to better constrain local and regional subsurface structure.

These objectives were accomplished by:

- Developing and implementing an exploration program that included drilling and geophysical logging of 27 new RC exploration holes, collecting two bulk samples, and drilling of eight geotechnical holes.
- Revising geological interpretation that was based on historic mapping and drilling in the Castle Mountain area.
- Integrating the new exploration and geotechnical drilling results with previous historic programs.
- Updating the geological interpretation based on new drilling.
- Determine the coal quality of the represented coal seams from drill cuttings samples and bulk samples.
- Updating the coal resources in the exploration area using a geological modeling within Hexagon Minesight 3D.
- Improve resource model and support an economic assessment of Castle Mountain.

Each drilling location was surveyed to obtain exact coordinates and elevations. The exploration project was completed under the direction and supervision of Fording River Operation's site geology team.

Table 3 highlights the drill holes completed during the 2019 season with respect to Coal License which they fall within.

Table 3: Drill hole Locations Relative to Coal License

Coal License	Drill holes and LDC sites
327991	3462, 3463, 3465, 3466, 3467, 3469
389310	3414, 3419, 3422, 3423, 3424, 3425, 3426, 3427, 3429, 3430, 3432, 3442, 3443, 3446, 3461, 3464, 3468, 3470, 3471, 3472, 3473, BK-0036, BK-0037, GTF18-17, GTF19-05, GTF19-06, GTF19-07, GTF19-08, GTF19-09, GTF18-20, GTF18-21

ii. [Summary of Completed Work](#)

The total cost for the 2019 Castle Mountain Exploration Project was \$ 6,573,349.35. See Appendix 1 for the cost statement.

The exploration project planning, execution, and geological interpretation and modeling were completed by the Fording River geology team.

Prior to drill site preparation on Castle Mountain, the excavated trails and exploration drill sites were pre-selected and located by the Fording River geology team. Engineered road design was completed by Vast Resources of, Cranbrook, BC and the new roads and drill pads were constructed by Transcendent Mining & Mobilization Inc. of, Sparwood, BC. Danger tree falling was completed by Nupqu Development Corporation of, Cranbrook, BC.

A total of 17 km of pre-existing road was re-established in order to access drill pad locations, and 2.2 km of new road was designed and constructed. 27 new drill pads were constructed for RC drilling, and six drill pads were constructed for the geotechnical diamond drilling. Large diameter core drilling utilized pre-existing RC drill pads but were increased in size in order to fit all necessary equipment.

RC and LDC drilling services were performed by Foraco Canada Ltd., Calgary, AB using a Foremost DR-24 rotary drill. The reverse circulation drilling method was chosen as the preferred method for collecting uncontaminated, representative and accurately located coal samples. LDC is the preferred method for collecting bulk samples for the purpose of carbonization. Geotechnical diamond drilling was completed by Foraco Canada Ltd., Kamloops, BC.

As sampling accuracy is critical to develop an accurate understanding of coal seam thickness and quality, Fording River utilized a rigorous Quality Assurance/Quality Control procedure to assure accurate collection of coal samples.

The abovementioned 27 RC drill holes were completed for a cumulative drilling length of 14,803 meters. Drill hole depths ranged between 161 meters and 806 meters, averaging 530 meters. The six geotechnical holes totaled 3,978.36 meters, ranging from 184 meters to 790 meters, averaging 550 meters. Diamond drill core was logged on-site by Stantec, Calgary for geology and rock mass rating (RMR).

A summary of all drill holes completed on Castle Mountain in 2019 can be found in Table 4 below.

Table 4: 2019 Drill hole Collar Locations

Drillhole Name	Project	Purpose	UTM COORDINATES		Elevation	Azimuth	Dip	Hole Depth (m)
			Easting	Northing				
3414	Castle	geological	656613.5	5556112	2131.62	0	-90	781
3419	Castle	geological	656408.4	5555748	2029.89	0	-90	592
3422	Castle	geological	655167.8	5557557	1934.66	0	-90	350
3423	Castle	geological	656576.6	5557731	2367.76	0	-90	561
3424	Castle	geological	656003.1	5557990	2199.29	0	-90	622
3425	Castle	geological	656139.1	5558074	2292.75	0	-90	714
3426	Castle	geological	655649	5557204	2091.56	0	-70	603
3427	Castle	geological	656066.7	5557136	2106.3	0	-90	464
3429	Castle	geological	655526.8	5557721	2025.28	0	-90	460
3430	Castle	geological	656195.7	5557155	2115.6	0	-90	641
3432	Castle	geological	654840.2	5558779	2264.5	0	-90	604
3442	Castle	geological	656136.2	5556861	2127.67	0	-90	604
3443	Castle	geological	656137	5556861	2127.7	70	-70	665
3446	Castle	geological	656086.1	5557342	2141.6	0	-90	550
3461	Castle	geological	653849.2	5559428	1981.31	0	-90	253
3462	Castle	geological	656146.3	5554248	1794.23	0	-90	537
3463	Castle	geological	656343.7	5554199	1809.48	0	-90	549
3464	Castle	geological	654051.5	5559661	1967.6	0	-90	189
3465	Castle	geological	656266	5554559	1844.25	0	-90	476
3466	Castle	geological	656383.7	5554833	1886.44	0	-90	561
3467	Castle	geological	656457.2	5554990	1921.47	0	-90	539
3468	Castle	geological	655852.6	5557931	2122.6	0	-90	512
3469	Castle	geological	656716.9	5555457	2055.1	0	-90	806
3470	Castle	geological	654575.8	5558680	2179.35	0	-90	435
3471	Castle	geological	654889.5	5558403	2206.05	0	-90	486
3472	Castle	geological	654801.8	5557920	2063.62	0	-90	460
3473	Castle	geological	656656.4	5555668	2076.86	0	-90	789
BK-0036	Castle	quality data	654059.7	5559648.6	1972.2	0	-90	250
BK-0037	Castle	quality data	654751.21	5559829.99	1989.81	0	-90	161.4
GTF18-17	Castle	geotechnical	656198.29	5557809.71	2320.94	58	-85	600.54
GTF18-20	Castle	geotechnical	656035.5	5559786.4	1995	55	-65	351.54
GTF18-21	Castle	geotechnical	655177	5559672	1937.4	62	-75	302.1
GTF19-05	Castle	geotechnical	656638.47	5556628.45	2196.48	58	-60	793.5
GTF19-06	Castle	geotechnical	656037.02	5558236.66	2277.58	58	-85	518.878
GTF19-07	Castle	geotechnical	656219.61	5557463.09	2221.72	58	-75	575.762
GTF19-08	Castle	geotechnical	656592.5	5555872.1	2093.41	0	-60	650.215
GTF19-09	Castle	geotechnical	653708.31	5558778.98	1943.78	0	-60	184.5

Downhole geophysical logs were completed by Century Wireline Services from Red Deer, AB. Each hole was logged through the drill pipe for gamma-neutron, and open hole logs collected deviation, caliper, resistivity, and gamma density information. Additionally, acoustic and/or optical televiwers were run down each geotechnical hole drilled in the summer exploration season in 2019 as well as GTF18-20 and GTF18-21 which were both drilled in early-2019 prior to the larger summer exploration campaign. Several RC drill holes were also selected for televiwer logs in order to gain better insight into structurally complex areas. Copies of all geophysical logs can be found in Appendix 2.

Coal seams intersected by reverse circulation drilling were sampled in 0.5-meter intervals. Representative composite samples for each coal seam were prepared at Fording River Operation's on-site process plant laboratory. Raw composite samples received in-house raw proximate, sulphur, and FSI analysis.

Composites were forwarded to GWIL Industries, Calgary, AB, for single gravity wash, mineral ash analysis (MAA), and fluorine analysis. Clean coal samples were returned to the Fording River laboratory where Fording River Operation's staff completed in-house clean proximate analysis. This includes ash, volatile matter, raw moisture, fixed carbon, sulfur, P_2O_5 , and FSI analysis. Pearson Coal Petrography, Victoria BC, is utilized to complete a full Petrographic analysis.

Large diameter coring is a specialized method of drilling using a conventional reverse circulation rig to drill a 0.23m diameter hole to recover representative core of target coal seams. The seams targeted at site BK-0036 were 040220, 030220 and 020220. A total of seven holes were drilled in order to collect the appropriate total thickness of each of the three seams. At site BK-0037, the target seam 070220 required two holes in order to collect the appropriate thickness for the pilot plant wash and carbonization testing to be conducted. Details for each drill hole and coal seam sampled can be found in Table 5, and coordinates of each of the large diameter core sites can be found in Table 6.

Bulk samples from seams 070220, 040220, 030220 and 020220 were sent to GWIL Industries Inc. (Calgary, AB) for homogenization and washability analysis, to Hazen Research Inc. (Golden, CO) for a pilot-plant wash, and then to Canmet Energy (Ottawa, ON) for carbonization and testing. Currently available results can be found in Appendix 3.

Table 5: Summary of all coal samples collected using the large diameter coring drill rig.

LDC Drill hole ID	Coal Seam	Raw Ash	Total Seam Thickness (m)	Sample Thickness (m)	Depth From	Depth To
BK-0036-1	040	10.4	5.5	1.5	122.8	124.3
BK-0036-1	040	6.7		1.5	124.3	125.8
BK-0036-1	040	9.5		1.5	125.8	127.3
BK-0036-1	040	11.2		1	127.3	128.3
BK-0036-1	030	28.6	1.6	1.6	155	156.6
BK-0036-1	020	11	2.8	2.8	158.9	161.7
BK-0036-2	040	9.5	5.2	1.5	122.9	124.4
BK-0036-2	040	9.3		1.5	124.4	125.9
BK-0036-2	040	6.4		1.5	125.9	127.4
BK-0036-2	040	9.3		0.7	127.4	128.1
BK-0036-2	030	32.9	2.4	2.4	154	156.4
BK-0036-2	020	12.7	2.7	2.7	158.8	161.5
BK-0036-3	040	7.88	5.3	1.5	123	124.5
BK-0036-3	040	7.26		1.3	124.5	125.8
BK-0036-3	040	11.66		1.7	125.8	127.5
BK-0036-3	040	10.42		0.8	127.5	128.3
BK-0036-3	030	17.86	2.7	1.5	154	155.5
BK-0036-3	030	40.02		1.2	155.5	156.7
BK-0036-3	020	10.68	2.7	1.5	159	160.5
BK-0036-3	020	10.5		1.2	160.5	161.7
BK-0036-4	030	38.5	2.15	2.15	154.4	156.55
BK-0036-4	020	11.52	2.7	2.7	158.6	161.3
BK-0036-5	030	29.73	2.6	2.6	153.5	156.1
BK-0036-5	020	11.33	2.7	2.7	158.8	161.5
BK-0036-6	030	28.1	2.7	2.7	153.5	156.2
BK-0036-6	020	10.3	2.8	2.8	158.8	161.6
BK-0036-7	030	26.3	2.1	2.1	153.5	155.6
BK-0037-1	070	11.79	8	1.5	152.7	154.2
BK-0037-1	070	24.5		1.5	154.2	155.7
BK-0037-1	070	15.6		1.5	155.7	157.2
BK-0037-1	070	16.34		1.5	157.2	158.7
BK-0037-1	070	11.32		2	158.7	160.7
BK-0037-2	070	13.53	8	1.5	152.4	153.9
BK-0037-2	070	13.7		1.5	153.9	155.4
BK-0037-2	070	15.61		1.5	155.4	156.9
BK-0037-2	070	15.65		1.5	156.9	158.4
BK-0037-2	070	19.8		2	158.4	160.4

Table 6: Bulk Sampling - 2019

Drillhole Name	Project	Purpose	UTM COORDINATES		Elevation	Azimuth	Dip	# of Holes	Hole Depth (m)
			Easting	Northing					
BK-0036	Castle	LDC	654056.83	5559658.96	1967.83	0	-90	7	2 holes at 123m (7 at 153m)
BK-0037	Castle	LDC	654751.208	5559829.987	1989.806	0	-90	2	2 holes at 152m

49 test pits were completed on Castle Mountain by Transcendent Mining & Mobilization Inc. of, Sparwood, BC. Logging of the pits was completed by Stantec, Calgary along with Teck Coal staff. Pits had a surface area of 1 x 2 meter and ranged in depth from 2 – 10 meters. They were taken on the edge of existing roads and all material was backfilled upon completion of mapping and sampling the pit. All work was completed in order to gain more information on water management and spoil suitability. Locations are shown in Table 7.

Table 7: 2019 Test Pit Locations

Test Pit ID	UTM COORDINATES		Elevation
	Easting	Northing	
TP19-01	657888	5560743	1856
TP19-02	657401	5560803	1839
TP19-03	656858	5560634	1773
TP19-05	656728	5560483	1763
TP19-07	656411	5560411	1761
TP19-08	656362	5560183	1848
TP19-09	657104	5560387	1799
TP19-11	655955	5560087	1894
TP19-12	654000	5560096	1746
TP19-13	656986	5559960	1873
TP19-14	654288	5559849	1917
TP19-15	655273	5559766	1956
TP19-16	654783	5559852	1995
TP19-17	655728	5559634	1942
TP19-18	653500	5559769	1750
TP19-19	655139	5559655	1942
TP19-20	653308	5559652	1710
TP19-21	654588	5559508	2032
TP19-22	654977	5559419	2052
TP19-23	655219	5559478	2003
TP19-24	653597	5559265	1871
TP19-25	656045	5559297	2102
TP19-26	654140	5559180	2120
TP19-27	653867	5559052	2035
TP19-28	653767	5558980	1925
TP19-29	654059	5558742	2028
TP19-30	654727	5558725	2199
TP19-32	654334	5558522	2028

TP19-33	654126	5558545	2030
TP19-34	653380	5558439	1763
TP19-39	654520	5558046	2036
TP19-40	655946	5557836	2184
TP19-41	655164	5557823	2010
TP19-42	655484	5557736	2042
TP19-45	655215	5557198	2000
TP19-46	654664	5556605	1816
TP19-47	655556	5556449	1879.6
TP19-48	656614	5556107	2125
TP19-49	655594	5555127	1809
TP19-50	655450	5554246	1658
TP19-51	653103	5558062	1583
TP19-52	653213	5557750	1609
TP19-53	653692	5557022	1639
TP19-54	654697	5555360	1619
TP19-55	654784	5555760	1733
TP19-56	655191	5557598	1924
TP19-57	655861	5557531	2177
TP19-58	655537	5556867	1894

Geochemical samples were taken on exploration drill holes 3461 and 3464 in Castle. Samples were collected over the entirety of the drill hole in the Elk, Mist Mountain, and Morrissey Formations. RC drill cutting samples were 1 to 2 kg(s) in size and were sampled off a shaker table. In the Elk Formation, samples were collected in two-meter intervals. In the Mist Mountain Formation, samples targeted three intervals: Two-meter intervals for typical rock, 0.5-meter intervals above and below coal seams, and entire coal seams. In the Morrissey Formation, samples were collected in one-meter intervals. Samples underwent testing (Fizz Testing) for the geochemical signatures of the rock, specifically looking for the potential of Acid Generation (PAG). Shipment of samples to Maxxam Analytics in Burnaby, BC for further analysis is still pending at the time of this report. The FRO in-house laboratory fizz testing results can be found in Appendix 3.

4. RESULTS

i. Castle Mountain

The primary goal of the 2019 drilling program on Castle Mountain was to improve resource confidence through tighter spaced drilling, and increased coal seam location and quality information. Additionally, a focus to gain an increased geotechnical understanding of Castle Mountain by drilling structurally complex areas was also conducted.

The project consisted of 27 exploration RC drill holes, eight HQ diamond drill holes for geotechnical purposes and two large diameter core holes for quality and coking analysis.

In house raw coal assay results from composites that have been completed as of July 24th, 2020 are included in Appendix 3. As of July 24th, 2020, clean coal assay results from GWIL have been completed on 440 composite samples out of a total request of 469 composites. Current results can be found in Appendix 3. Once all composites are complete, the seam quality data will be added into the geological

database and interpolated in the geological model. Coal petrography reports, RoMax and test pit data are still outstanding as of July 24th, 2020. Previous seam qualities support the coal's marketability and assist the long term mine plan for the region.

Castle Mountain Resources have not been incorporated into the Fording River East 3D Block Model. Resources have been calculated using the Castle Mountain 3D Block Model.

Table 8 shows the current Castle Mountain Resources but does not include any information gathered from the 2019 drilling.

Table 8: 2019 Castle Mountain Resources



5. CONCLUSION

The 2019 exploration drilling program has successfully increased drill hole density and will in turn increase the resource classification confidence in Castle Mountain. The program confirmed the location and continuity of all coal seams in the Castle Mountain area allowing for improved geological and structural interpretation. The assay results are ongoing and coal quality data will be incorporated into the geological model. Fording River Operations is in the process of updating its current model as results become available, and a mine engineering economic assessment of Castle Mountain is under evaluation.

Further RC drilling to improve resource confidence and to increase the amount of coal quality data including ash, volatile matter, P₂O₅, FSI, fluorine, and fluidity is recommended prior to detailed planning for mining. In addition, bulk sampling of all economic seams using large diameter drilling methods is recommended for carbonization and coke testing.

6. Author's Qualifications

Statements of Author's Academic and Professional Qualifications

CERTIFICATE OF QUALIFIED PERSON

Name: Barry F. Musil, P.Geo.

Company: Teck Coal Limited Address:

Fording River Operations

P.O. Box 100

Elkford, BC

VOB IHO

Phone: (250) 865-5169

I, Barry F. Musil, P.Geo, am employed as a Senior Geologist, Supervisor at Fording River Operations. This certificate applies to the report titled "Fording River Operations, Assessment Report, 2019 Castle Exploration Program". I graduated from the University of British Columbia with a Bachelor of Science Degree in Geology, 1984. I am a member of the Association of Professional Engineers and Geoscientists of British Columbia (member # 19361). Since 1986 I have been involved with coal mining projects at Fording River, and other Teck Coal Operations. As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).

"Signed and Stamped"

Barry F. Musil, P.Geo.

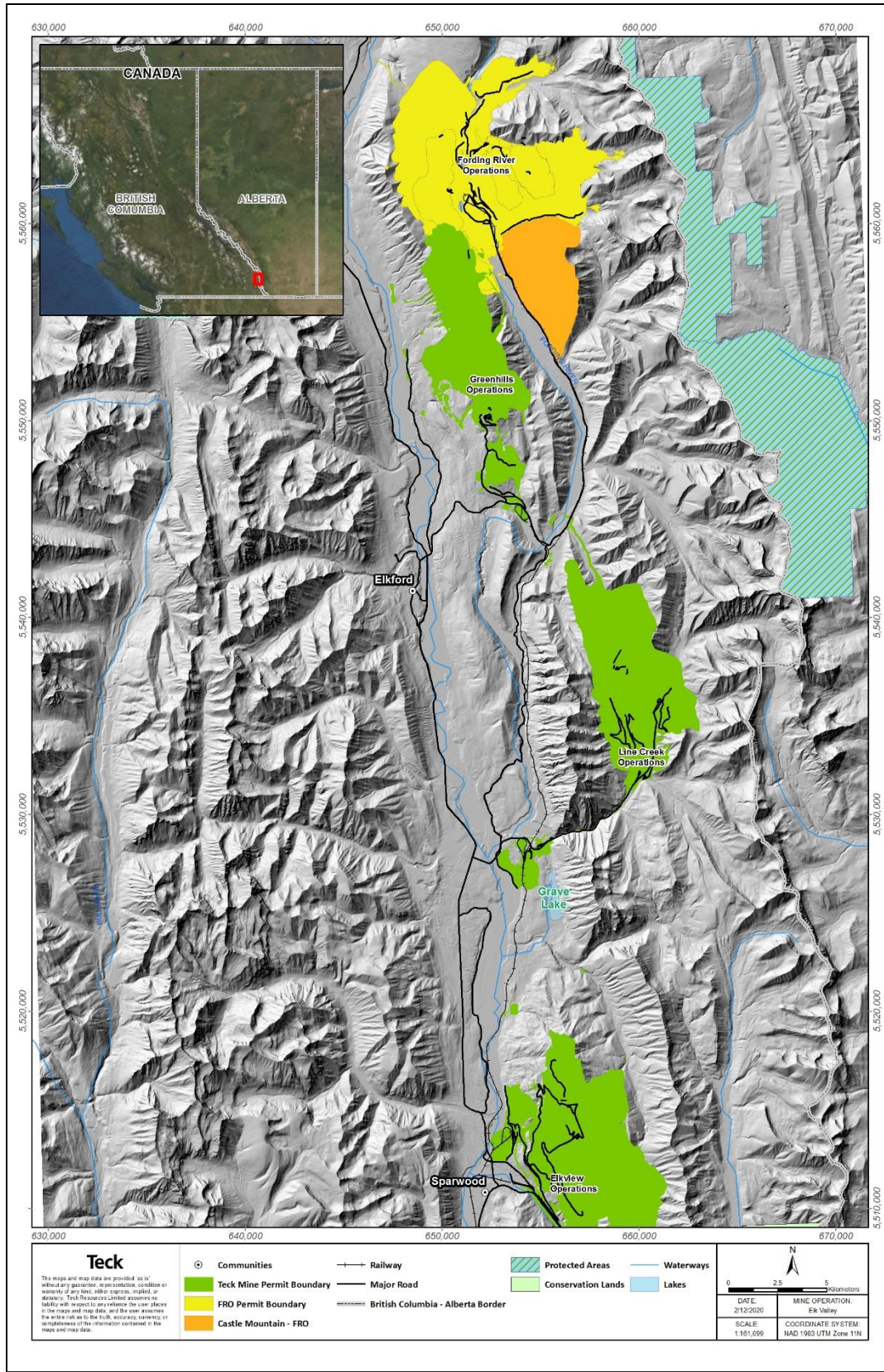


Figure 1: Location of Teck Mine Permit Boundaries with Fording River and Castle Mountain highlighted.

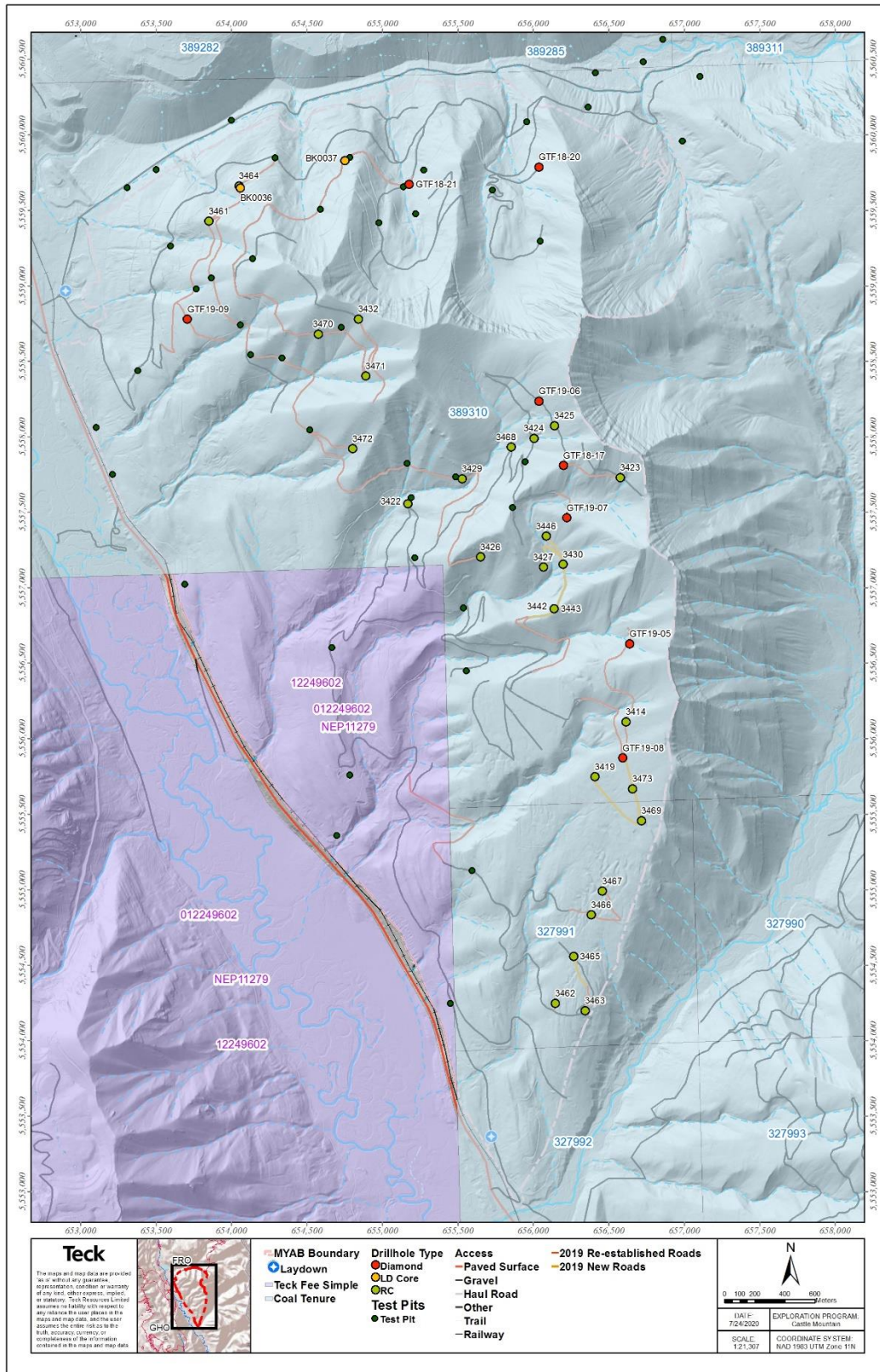
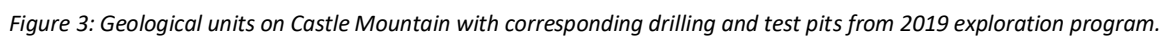


Figure 2: Map of coal licenses incorporated within the Castle Mountain project area showing all 2019 drilling and test pits.



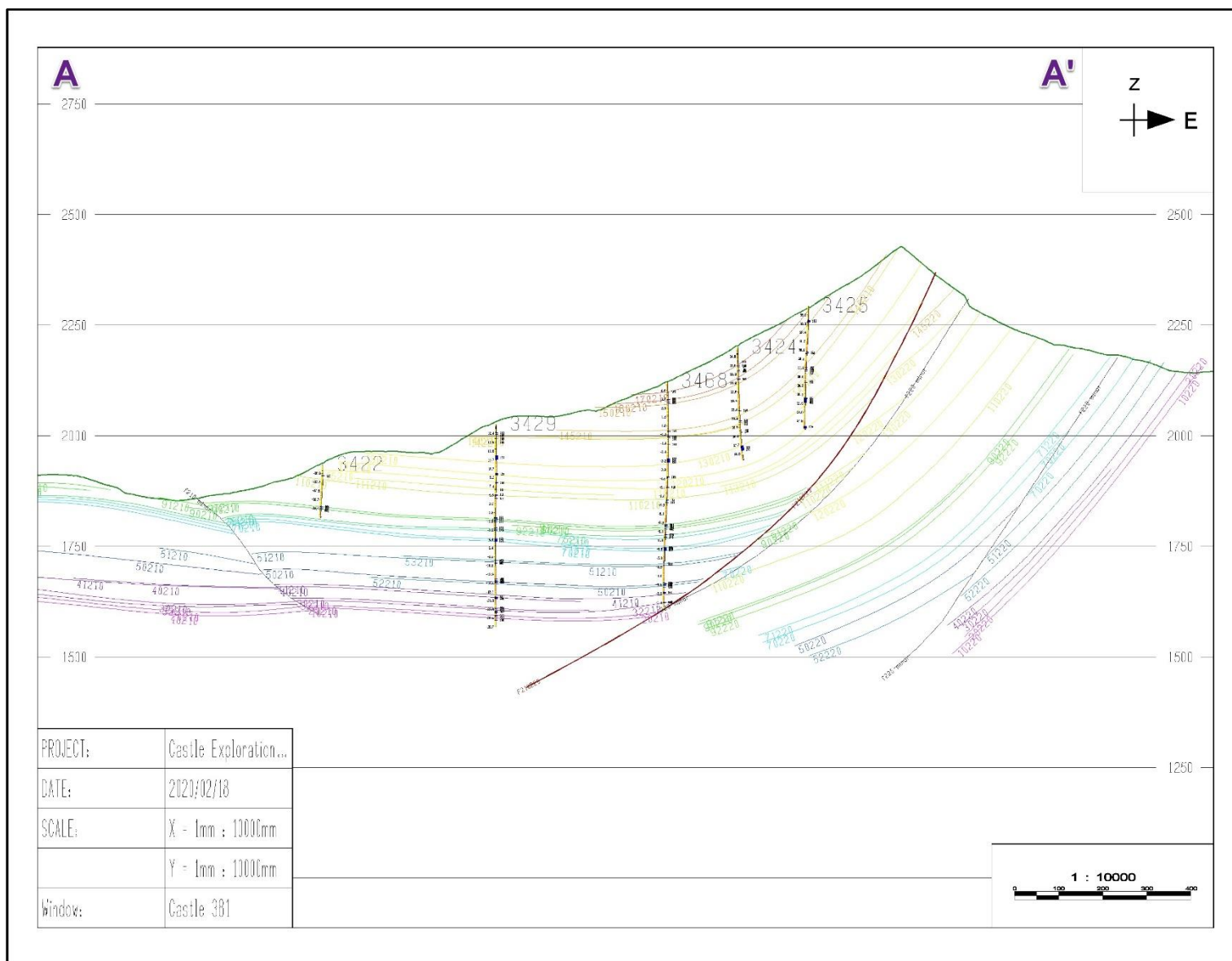
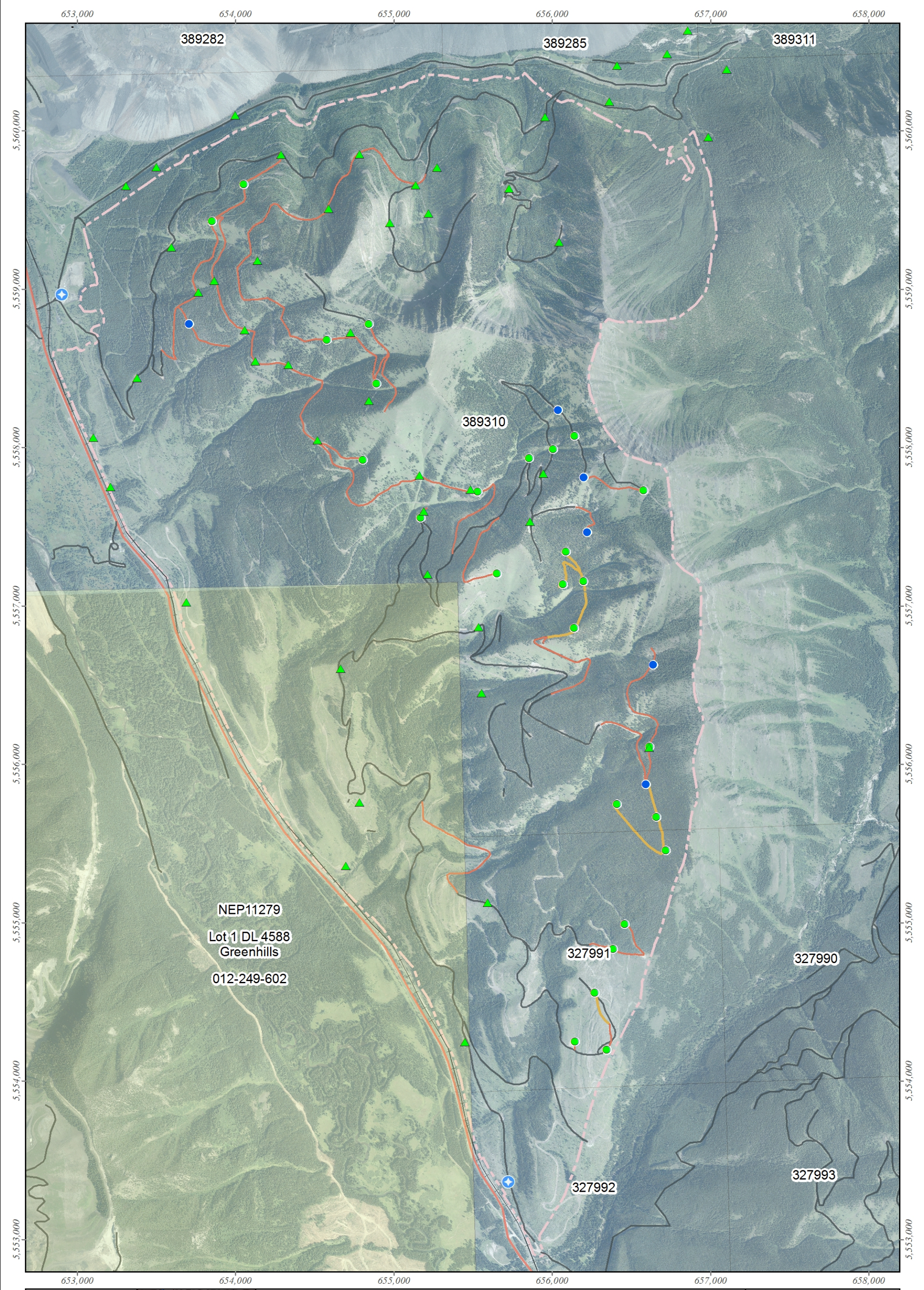


Figure 4: Castle Mountain Geology Section 381. Cross Reference to Figure 3.



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Castle Mountain 2019

MYAB Boundary

Laydown

FeeSimpleTeck

Coal Tenure

2019 Geotech Collars

2019 Test Pits

2019 RC Collars

Access

Paved Surface

Gravel

Haul Road

Other

Trail

Railway

2019 Re-established Roads

2019 New Roads

N

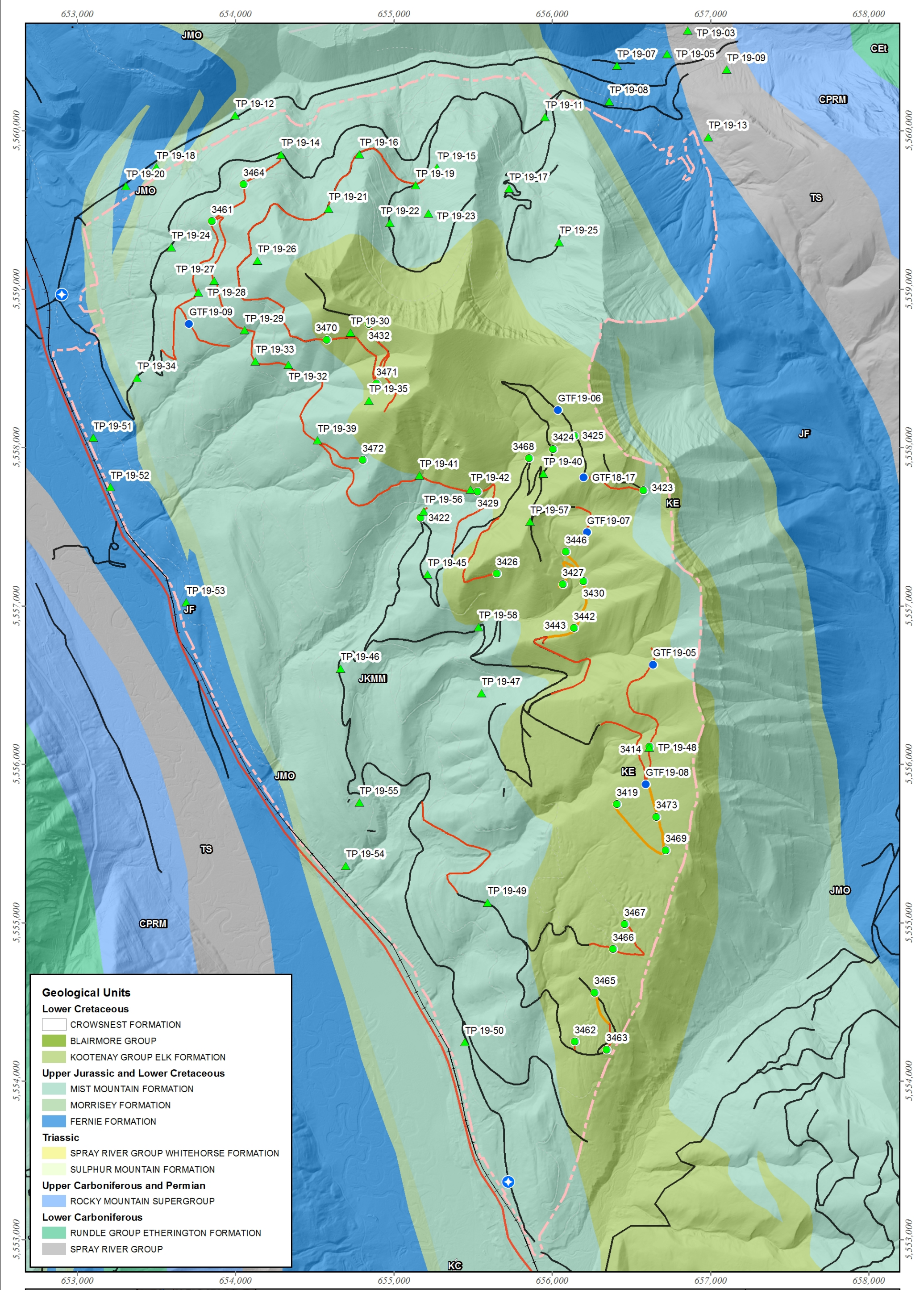
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DATE:
2/12/2020

EXPLORATION PROGRAM:
Castle Mountain

SCALE:
1:21,307

COORDINATE SYSTEM:
NAD 1983 UTM Zone 11N



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MYAB Boundary

Laydown

2019 Geotech Collars

2019 Test Pits

2019 RC Collars

Access

Paved Surface

Gravel

Haul Road

Other

Trail

Railway

2019 Re-established Roads

2019 New Roads

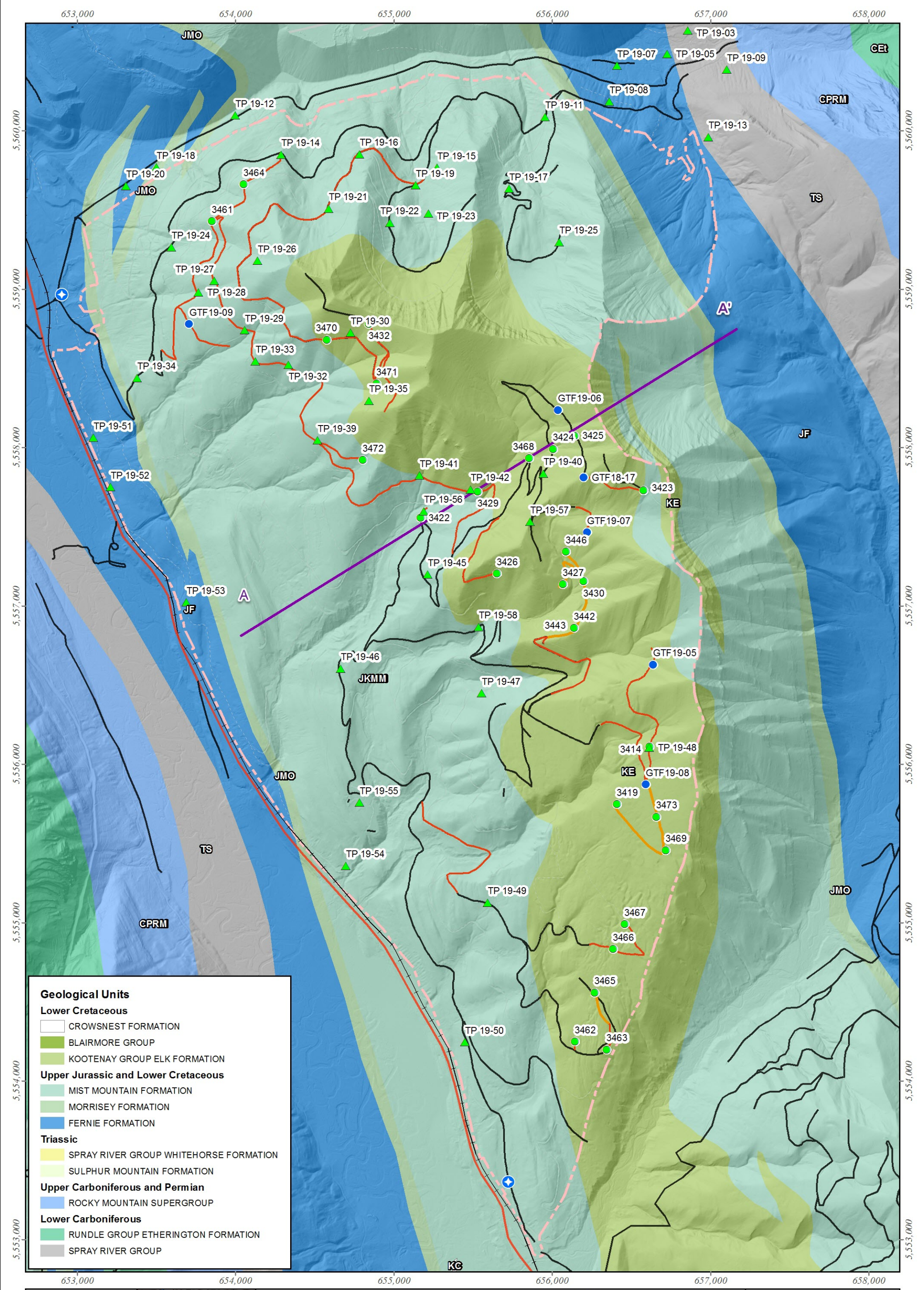
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DATE:
2/12/2020

EXPLORATION PROGRAM:
Castle Mountain

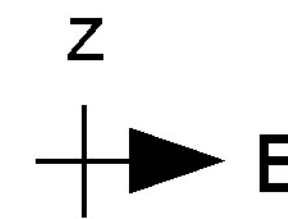
SCALE:
1:21,307

COORDINATE SYSTEM:
NAD 1983 UTM Zone 11N



A
2750

A'



2500

2500

2250

2250

2000

2000

1750

1750

1500

1500

PROJECT:	Castle Exploration...
DATE:	2020/02/18
SCALE:	X = 1mm : 10000mm
	Y = 1mm : 10000mm
Window:	Castle 313



Appendix 1

Appendix 1- Exploration Cost Statement - Caslte Mountain Exploration - 2019

Exploration Work Type	Company	Comment	Subtotal
RC Drilling	Foraco Drilling (Calgary)	27 holes (14,799.8 m)	\$1,500,237.92
LDC Drilling	Foraco Drilling (Calgary)	2 LDC holes (1,380.2 m)	\$427,243.00
HQ Diamond Drilling	Foraco Drilling (Kamloops)	6 holes (3,142 m)	\$1,859,695.09
		Total Drilling	\$3,787,176.01
Geophysical Downhole Logging	SEMM Logging Inc.	3325 meters	\$74,609.08
Geophysical Downhole Logging	Century Wireline Services	14799.86 meters	\$227,929.00
		Total Geophysical	\$302,538.08
Road and Pad Building, Snow removal	Transcendent	Road Building/Culvert Construction/Pad Clearing	\$1,264,067.00
Danger Tree Falling	Nupqu	Tree falling activities on Castle Mountain	\$15,252.76
Engineered Road and Pad Design	Vast Resources	Road design for new excavated trails	\$9,000.00
		Total Road and Pad Building	\$1,288,319.76
Consumables	Various	Drill casing, Sample Bags & Tags, etc.	\$21,304.00
Consumables	RST Instruments Ltd.	VWPs / Cable / Covers / Hub / etc.	\$124,011.50
		Total Consumables	\$145,315.50
Environmental Monitor	Hemerra	On-site environmental monitor	\$275,000.00
Core logging and Geotechnical Consulting	Stantec	Core logging / VWP install / Test Pitting / Reporting / Lab Testing etc.	\$775,000.00
		Total Consultants	\$1,050,000.00
2019 Castle Cost Total			\$6,573,349.35

2019 Castle Exploration Composites

Hole Completion Summary											Raw Analysis						Clean Analysis								
	acquire Comp ID	RH Comp	S.G.	MAA	Ro/Pet	R	C	Pet	Clean Procedure	Fit	Ash	R.M.	Vol	F.C.	FSI	Sul	1.5 SG	1.5 SG	ASH	RM	VOL	FC	F.S.I.	Sul.	% P205
#	Must be in the Format FRO19-0***	#	#							@ 1.50	RASH	RMOI	RVCM	RFXC	RFSI	RSUL	Float	Sink							
3462	FRO19-0114	114	114	v	Pet						28.4	0.60	26.78	44.22	6.5	0.72									
3462	FRO19-0115	115	115	v	Pet						23.2	0.56	28.08	48.16	8.0	0.60									
3462	FRO19-0116	116	116	v	Pet						15.8	0.66	30.18	53.36	7.5	0.45									
3462	FRO19-0117	117	117	Y	Pet						13.8	0.64	29.88	55.68	8.0	0.69									
3462	FRO19-0118	118	118	v	Pet						11.5	0.58	27.28	60.64	8.0	0.62									
3462	FRO19-0119	119	119	v	Pet						34.1	0.72	23.81	41.37	7.5	0.70									
3462	FRO19-0120	120	120	v	Pet						34.5	0.49	22.64	42.37	7.5	0.77									
3462	FRO19-0121	121	121	Y	Pet						16.6	0.66	25.43	57.31	7.0	0.56									
3462	FRO19-0122	122	122	v	Pet						15.7	0.66	27.38	56.26	8.0	0.71									
3462	FRO19-0123	123	123	v	Pet						23.7	0.63	22.46	53.19	5.0	0.67									
3462	FRO19-0124	124	124	v	Pet						28.2	0.59	21.43	49.78	8.0	0.86									
3462	FRO19-0125	125	125	Y	Pet						21.4	0.63	23.53	54.44	8.0	0.87									
3462	FRO19-0126	126	126	v	Pet						24.6	0.70	21.62	53.08	7.5	0.57									
3462	FRO19-0127	127	127	v	Pet						20.6	0.64	23.74	55.02	8.0	0.68									
3462	FRO19-0128	128	128	v	Pet						27.1	0.61	20.04	52.25	4.0	0.48									
3462	FRO19-0129	129	129					No wash needed			41.1	0.67	17.98	40.25	4.5	0.69	No Clean								
3462	FRO19-0130	130	130	v	Pet						24.4	0.64	20.94	54.02	7.0	0.57									
3462	FRO19-0131	131	131	v	Pet						27.1	0.61	18.94	53.35	3.5	0.59									
3462	FRO19-0132	132	132	v	Pet						32.8	0.62	18.87	47.71	1.0	0.49									
3462	FRO19-0133	133	133	Y	Pet						28.0	0.60	20.72	50.68	2.5	0.55									
3414	FRO19-0134	134	134	v	Pet						27.4	0.92	27.70	43.98	7.0	0.93									
3414	FRO19-0135	135	135	v	Pet						53.9	0.74	22.23	23.13	2.5	0.65									
3414	FRO19-0136	136	136	v	Pet						29.9	1.11	26.90	42.09	5.0	0.56									
3414	FRO19-0137	137	137	Y	Pet						16.3	0.78	29.83	53.09	7.5	0.91									
3414	FRO19-0138	138	138	v	Pet						19.9	0.73	29.10	50.27	7.5	0.79									
3414	FRO19-0139	139	139	v	Pet						13.4	0.68	33.26	52.66	8.0	0.55									
3414	FRO19-0140	140	140	v	Pet						34.7	0.66	25.20	39.44	6.0	1.39									
3414	FRO19-0141	141	141	Y	Pet						19.7	0.64	25.77	53.89	7.0	0.77									
3414	FRO19-0142	142	142	v	Pet						29.8	0.49	24.78	44.93	7.5	0.86									
3414	FRO19-0143	143	143	v	Pet						20.7	0.68	25.32	53.30	7.0	0.52									
3414	FRO19-0144	144	144	v	Pet						20.4	0.79	25.57	53.24	7.0	0.66									
3414	FRO19-0145	145	145	Y	Pet						13.2	0.60	26.44	59.76	8.0	0.79									
3414	FRO19-0146	146	146	v	Pet						12.8	0.49	26.28	60.43	8.0	0.62									
3414	FRO19-0147	147	147	v	Pet						15.0	0.50	24.50	60.00	8.0	0.93									
3414	FRO19-0148	148	148	v	Pet						19.8	0.58	24.04	55.58	8.0	0.72									
3414	FRO19-0149	149	149	Y	Pet						28.7	0.54	20.46	50.30	6.5	0.72									
3414	FRO19-0150	150	150	v	Pet						19.6	0.55	22.01	57.84	2.0	0.69									
3414	FRO19-0151	151	151	v	Pet						25.4	0.45	22.13	52.02	1.5	0.64									
3414	FRO19-0152	152	152	v	Pet						16.9	0.53	21.04	61.53	2.0	0.66									
3414	FRO19-0153	153	153	Y	Pet						17.6	0.53	21.17	60.70	5.0	0.58									
3414	FRO19-0154	154	154	v	Pet						21.5	0.51	21.31	56.68	3.0	0.67									
3414	FRO19-0155	155	155	v	Pet						19.6	0.47	21.95	57.98	7.0	0.53									
3414	FRO19-0156	156	156	v	Pet						33.3	0.56	20.12	46.02	3.0	0.52									
3414	FRO19-0157	157	157	Y	Pet						26.9	0.51	22.45	50.14	6.0	0.72									
3414	FRO19-0158	158	158	v	Pet						22.9	0.47	22.86	53.77	8.0	0.53									
3414	FRO19-0159	159	159	v	Pet						17.3	0.55	22.22	59.93	7.0	0.74									
3414	FRO19-0160	160	160	v	Pet						26.1	0.52	21.16	52.22	7.5	1.15									
3414	FRO19-0161	161	161	Y	Pet						19.0	0.43	20.67	59.90	1.5	0.61									
3414	FRO19-0162	162	162	v	Pet						30.8	0.42	16.66	52.12	1.0	0.65									
3414	FRO19-0163	163	163	v	Pet											100.00									
3422	FRO19-0164	164	164	v	Pet											100.00									
3422	FRO19-0165	165	165	Y	Pet											100.00									
3422	FRO19-0166	166	166	v	Pet											100.00									
3422	FRO19-0167	167	167	v	Pet											100.00									
3422	FRO19-0168	168	168	v	Pet											100.00									
3422	FRO19-0169	169	169	Y	Pet						29.3	0.34	16.63	53.73	1.5	0.46									
3422	FRO19-0170	170	170	v	Pet						17.6	0.34	18.11	63.95	2.0	0.53									
3422	FRO19-0171	171	171	v	Pet						30.8	0.41	17.61	51.18	2.5	0.36									
3422	FRO19-0172	172	172	v	Pet						37.5	0.40	16.29	45.81	2.5	0.48									
3422	FRO19-0173	173	173	Y	Pet						24.7	0.35	19.95	55.00	4.5	0.48									
3422	FRO19-0174	174	174	v	Pet						22.3	0.26	19.80	57.64	7.5	0.48									