APPENDIX A

ENVIRONMENTAL MONITORING PLAN

DRAFT

Rasmussen Valley Mine Project Environmental Monitoring Plan

Prepared for

Nu-West Industries, Inc., doing business as Agrium Conda Phosphate Operations

Soda Springs, Idaho

August 25, 2015

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This is a draft and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.

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List of Abbreviations

Agrium	Nu-West Industries Inc., doing business as Agrium Conda Phosphate Operations
BC	Brown and Caldwell
BLM	Bureau of Land Management
CCC	criterion continuous concentrations
CMC	criterion maximum concentrations
CQA/QC	Construction Quality Assurance/Quality Control
EIS	Environmental Impact Statement
EMP	environmental monitoring plan
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plan
ft ags	feet above ground surface
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
IDEQ	Idaho Department of Environmental Quality
IDL	Idaho Department of Lands
IF&G	Idaho Department of Fish and Game
Low-Se	low-seleniferous
Low-SeW	low-seleniferous waste
mg/l	milligrams per liter
Mine Plan	Rasmussen Valley Mine and Reclamation Plan
QAPP	Quality Assurance Project Plan
ROD	record of decision
RVMP	Rasmussen Valley Mine Project
SeW	seleniferous waste
SRM	South Rasmussen Mine
SWPPP	stormwater pollution prevention plan
TDS	total dissolved solids
TOC	top of casing
USFS	United States Forest Service

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Section 1
Introduction

Nu-West Industries, Inc., doing business as Agrium Conda Phosphate Operations (Agrium), is proposing to develop an open-pit phosphate mine near the south end of Rasmussen Ridge in Caribou County, Idaho. The proposed Rasmussen Valley Mine Project (RVMP) is located approximately 18 miles (28 road miles) northeast of Soda Springs (Figure 1). The mining operation would develop phosphate ore reserves contained within Federal Phosphate Lease I–05972 and associated Lease Modifications and Special Use Permits (Lease) in portions of Sections 5, 6, 8, and 9, T7S, R44E; Sections 34, 35 and 36, T6S, R43E; and Section 1, T7S, R43E. The lease encompasses approximately 680 acres and is depicted on Figure 1.

The federal mineral lease for the project is administered by the United States Bureau of Land Management (BLM). Surface ownership in the project area includes state-owned land (Idaho Department of Lands [IDL] managed by the Idaho Department of Fish and Game [IF&G] and IDL), federally owned land (BLM and United States Forest Service [USFS]), and private land. In accordance with the requirements of the National Environmental Policy Act and the Federal Land Policy and Management Act, the BLM and USFS are preparing an Environmental Impact Statement (EIS) for the proposed mine. Idaho Department of Environmental Quality (IDEQ) and United States Army Corps of Engineers are Cooperating Agencies for the EIS. IDL and IF&G are also participating in the review and development of the EIS. BLM, USFS, USACE and IDEQ are collectively referred to as the Agencies for the purposes of this document.

This Draft Environmental Monitoring Plan (EMP) outlines the potential sampling and monitoring activities to be conducted during mining operations and includes monitoring of surface water, groundwater, noxious weeds, and low-seleniferous (low-Se) mine waste materials for segregation. Stormwater will be monitored under a Stormwater Pollution Prevention Plan (SWPPP), and air monitoring will be included in an Air Permit; therefore, stormwater and air monitoring are not included in this EMP. A Post-Mining EMP will be prepared closer to the end of mining as it will be based on the results of the EMP described herein, the final distribution of mine workings, and the final reclamation work. This EMP will remain in effect until the Post-Mining EMP has been approved by the Agencies.

1.1 Draft EMP Objectives and Approach

The overall objective of this Draft EMP is to describe the monitoring program which will be in place during operations that will ensure that mining activity at the RVMP does not adversely impact the environment. A Quality Assurance Project Plan (QAPP; Appendix A) and media-specific Field Sampling Plans (FSPs; Appendices B, C, and D) will be developed as this Draft EMP is revised during the development of the Final EIS and Record of Decision (ROD).

The Draft EMP is considered a working document that will be updated as additional information for the RVMP becomes available and as the EIS and ROD process develops the Preferred Alternative. The intent of this Draft EMP is to present an understanding of what may be monitored at the RVMP during operations, not to present how it will be monitored.

1.2 Site Description

Detailed information about the site is provided in the Rasmussen Valley Mine and Reclamation Plan (Mine Plan) (Agrium, 2011). Federal Phosphate Lease I–05972 is owned by Agrium, and the property on

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which it is located is owned/managed by a collection of entities including the USFS, BLM, IDL, IDEQ, and Agrium. The Lease is approximately 680 acres in size and located on the western slope of the southern end of Rasmussen Ridge in portions of Sections 5, 6, 8, and 9, T7S, R44E; Sections 34, 35 and 36, T6S, R43E; and Section 1, T7S, R43E. A summary of the pertinent information for this Draft EMP is provided below.

1.2.1 Location

The RVMP area is accessed from Soda Springs by traveling north on State Highway 34 for approximately 12 miles. Continue east on the Blackfoot River road and travel approximately 15 miles. To access the north end of the Lease, continue west onto Rasmussen Valley Road and travel approximately 1.27 miles to the north access gate. To access the south end of the site continue along Blackfoot River Road approximately another 1.25 miles and continue east onto Lanes Creek Road. Continue on Lanes Creek Road for approximately 0.25 miles to the south access road (Figure 2).

Topography in the RVMP area is characterized by a series of north- to northwest-trending mountain ranges separated by broad valleys. Topographic relief at the site exceeds 400 feet, with elevations ranging from 6,540 feet at the eastern edge of the RVMP area near Lanes Creek Road to over 7,200 feet near the northeastern extent of the Lease.

1.2.2 Site Area Background

The RVMP area is located in the Southeastern Idaho Phosphate District. Previous exploration in the RVMP area is discussed by Lee (2000). The phosphate resource in the RVMP area was first explored by the United States Geological Survey and others beginning in the early 1900s and continued through present day.

No mining has occurred on the Lease, but the Lease has been, and continues to be, extensively explored to fully define the ore deposit in preparation for mining.

1.2.3 Geology and Hydrogeology

1.2.3.1 Geology

The RVMP is located in the Western Phosphate Field, which is generally characterized by folded and faulted Paleozoic and Mesozoic sedimentary successions overprinted by more recent extensional faulting, alluvial deposition, and volcanism. The RVMP is on the southwest-dipping limb of the northwest-trending Snowdrift Anticline, the axis of which generally parallels Rasmussen Ridge. Structural dip generally increases to the north, ranging from 28 degrees to the southwest near the south end of the Lease to 72 degrees to the southwest near the north end (Rioux et al., 1975).

Geologic units present in the geology study area range from Pennsylvanian (299 to 318 million years ago) to recent in age. Most geologic units in the RVMP are marine sedimentary deposits. Older deposits include the Permian (251 to 299 million years ago) Phosphoria Formation, which contains the phosphatic ore to be mined. Regional geology and stratigraphy are presented in detail in the Rasmussen Valley Mine Project Geology Baseline Study Report (BC, 2013).

1.2.3.2 Hydrology

Groundwater flow occurs in regional-, intermediate-, and local-scale systems, depending on topography, geology, and the continuity of the hydrostratigraphic units. The major groundwater flow systems include the Wells Formation, rocks above the Meade Peak Member of the Phosphoria Formation (Rex Chert Member of the Phosphoria Formation and Dinwoody Formation), and unconsolidated deposits. With the exception of the Meade Peak Member of the Phosphoria Formation, groundwater flow systems can occur in all of the geologic units.

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1.2.3.2.1 Regional Aquifer

The regional aquifer is comprised of the Wells Formation and the Grandeur Tongue of the Park City Formation. Regional groundwater flow direction within the RVMP area is to the northwest toward the Enoch Valley and Henry Thrust faults. These two faults appear to act as the main conduits for groundwater flow within the Wells Formation in the northern portion of the Meade thrust allochthon (ARCADIS, 2013).

The Meade Peak Member of the Phosphoria Formation generally has low-permeability and acts as an aquitard that separates regional groundwater flow from smaller-scale groundwater systems in the overlying units (ARCADIS, 2013; Ralston et al., 1977; Cannon and Ralston, 1980; Winter, 1980).

1.2.3.2.2 Intermediate Aquifers

Intermediate-scale groundwater flow systems in the RVMP area are normally in the Dinwoody Formation and Rex Chert. Intermediate flow systems are characterized by predominantly intrabasinal flow and generally have large amounts of water in storage (Cannon and Ralston, 1980). Regionally, the Dinwoody Formation and Rex Chert act as aquifers based on their ability to intercept recharge, transmit groundwater, and discharge groundwater to adjacent geologic formations or to springs and other surface water bodies (Ralston et al., 1983).

Intermediate-scale groundwater flow directions are influenced by topography, stratigraphy, geologic structure, and head differences between recharge and discharge areas. At the RVMP, intermediate-scale groundwater flow directions are expected to be down dip to the southwest following topography away from the axis of the Snowdrift Anticline. The intermediate flow systems are usually unconfined at depths ranging from about 100 to 200 feet (Whetstone Associates, Inc., 2003) and are further isolated from the regional flow system by the Meade Peak Member that is considered an aquitard separating the two systems (Ralston et al., 1977; Cannon and Ralston, 1980; Winter, 1980).

1.2.3.2.3 Local Aquifers

Within the RVMP area, local-scale groundwater flow systems are relatively shallow in the Quaternary alluvium and colluvium deposits. The formations are stratigraphically above the Phosphoria Formation and are generally separated from the regional system by low-permeability shales of the intervening Meade Peak shale. A local groundwater flow system is typically characterized by short flow paths and with relatively small quantities of water in storage. The groundwater in the local systems is usually unconfined and flows from higher elevations to lower elevations. Specifically, local groundwater flows from the ridge crest of the Snowdrift Anticline towards Angus Creek within the RVMP area. Local groundwater flows primarily in the lateral directions due to the associated anisotropy in hydraulic conductivity (i.e., lateral hydraulic conductivity is much greater than vertical hydraulic conductivity) within aquifers. There is minor leakage between local groundwater systems and intermediate groundwater flow systems due to the vertical hydraulic gradients present between these units.

A consistent presence of groundwater in the basalt underlying the alluvium at the southeastern boundary of the property would be considered a shallow aquifer system. However, shallow groundwater in the basalt was not observed during the drilling of OW-1W and MW-17W, and dry conditions persisted in MW-19B (screened at and below the contact between the basalt the underlying alluvium) for 10 months after its installation in second quarter 2012. Approximately 9 ft of saturation was observed in MW-19B in spring 2013; the well dried up in in the late summer. Similar conditions were observed in 2014. Based on the ephemeral nature of MW-19B and observations during drilling, the basalt is not considered an aquifer system at the RVMP.

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Section 2

Monitoring Programs

This Draft EMP describes proposed monitoring programs to be conducted during mining operations that are designed to assess surface water quality, groundwater quality, and the presence of noxious weed infestations, as well as provide guidance for segregating low-Se waste from Se-bearing waste during mining. Quality control for the monitoring programs will be described in the project-specific QAPP included in the Final EMP (Appendix A). Stormwater will be monitored under a site-specific SWPPP. Air monitoring will be covered under an approved air permit; therefore, stormwater monitoring is not included in this EMP.

2.1 Surface Water Monitoring

During mine operations, surface water conditions will be monitored at seven locations adjacent to the mine during spring and fall of each year (two events) to characterize high and base flow conditions. The actual dates of the monitoring will depend on weather and sampling location accessibility but are anticipated to occur in April or May and September or October. Surface water monitoring activities will be conducted as close as is practical to the groundwater sampling activities to best compare the data. Proposed locations are shown on Figure 3 and described in Table 2-1.

Table 2-1. Surface Water Sampling Locations

Monitoring Station	Water Body	Description	Elevation	Northing	Easting	Property Owner
SW-AC5	Angus Creek	Upstream location on Angus Creek	6,486	4743535.94	470413.22	USFS
SW-AC4	Angus Creek	Angus Creek discharge to Blackfoot River	6,420	4741301.66	472671.06	IDL
SW-BF4	Blackfoot River	Blackfoot River upstream of SW-SPC2	6,424	4741500.97	474510.77	IDL
SW-BF5	Blackfoot River	Blackfoot River downstream of SW-SPC2	6,421	4741447.72	474481.28	IDL
SW-BF6	Blackfoot River	Blackfoot River upstream of SW-AC4	6,409	4741233.62	472716.66	IDL
SW-BF7	Blackfoot River	Blackfoot River downstream of SW-AC4	6,411	4741258.84	472657.49	IDL
SW-SPC2	Spring Creek	Spring Creek discharge to Blackfoot River	6,421	4741454.86	474551.24	IDL

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The proposed surface water monitoring program will be finalized as the ROD is completed and may include the following items:

- Measurement of field parameters:
  - pH
  - temperature
  - specific conductance
  - oxidation-reduction potential
  - dissolved oxygen
  - turbidity
- Manual measurements of stream flow
- Collection of water samples for laboratory analysis

The surface water analyte list, analytical methods to be followed, and associated surface water criteria will be finalized as the ROD is completed and may include items such as those presented in Table 2-2.

Table 2-2. RVMP Potential Surface Water Analyte List

Analyte	Analytical Method	Surface Water Standards (mg/l) (Aquatic Standards from IDAPA 58.01.02)			
		Cold Water Biota		Standards for Human Health Based on Consumption of:	
		CMC	CCC	Water and Organisms	Organisms Only
Major Ions and Solution Parameters					
pH	SM 4500H+B	–	–	–	–
Specific Conductance	SM 2510B	–	–	–	–
Alkalinity, total (as $CaCO_3$)	SM 2320B	–	–	–	–
Alkalinity, carbonate (as CaCO3)	SM 2320B	–	–	–	–
Alkalinity, bicarbonate (as CaCO3)	SM 2320B	–	–	–	–
Alkalinity, hydroxide (as CaCO3)	SM 2320B	–	–	–	–
Bromide	EPA 300.0	–	–	–	–
Calcium	EPA 6010B	–	–	–	–
Chloride	EPA 300.0	–	–	–	–
Fluoride	EPA 300.0	–	–	–	–
Hardness as $CaCO_3$	SM 2340B	–	–	–	–
Magnesium	EPA 6010B	–	–	–	–
Potassium	EPA 6020A	–	–	–	–
Sodium	EPA 6010B	–	–	–	–
Sulfate	EPA 300.0	–	–	–	–
TSS	SM 2540D	–	–	–	–
Total dissolved solids (TDS) (measured)	SM2540C	–	–	–	–
TDS (ratio)	Calculation	–	–	–	–
TDS (calculated)	Calculation	–	–	–	–
TOC	SM 5310C	–	–	–	–

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Table 2-2. RVMP Potential Surface Water Analyte List

Analyte	Analytical Method	Surface Water Standards (mg/l) (Aquatic Standards from IDAPA 58.01.02)			
		Cold Water Biota		Standards for Human Health Based on Consumption of:	
		CMC	CCC	Water and Organisms	Organisms Only
Turbidity	EPA 180.1	–	–	–	–
Nutrients					
Nitrate/nitrite as nitrogen	EPA 353.2	–	–	–	–
Nitrogen, ammonia	EPA 350.1	–	–	–	–
Phosphorus	SM4500-P-E	–	–	–	–
Metals					
Aluminum	EPA 6010B	–	–	–	–
Antimony	EPA 6020A	–	–	0.0056	0.64
Arsenic	EPA 6020A	0.34	0.15	0.01	0.01
Barium	EPA 6010B	–	–	–	–
Beryllium	EPA 6020A	–	–	–	–
Boron	EPA 6020A	–	–	–	–
Cadmium	EPA 6020A	0.001	0.0006	–	–
Chromium (total)	EPA 6020A	–	–	–	–
Copper	EPA 6020A	0.017	0.011	–	–
Iron	EPA 6010B	–	–	–	–
Lead	EPA 6020A	0.065	0.0025	–	–
Manganese	EPA 6010B	–	–	–	–
Mercury	EPA 7470A	–	–	–	–
Molybdenum	EPA 6010B	–	–	–	–
Nickel	EPA 6010B	0.47	0.052	0.61	4.6
Selenium	EPA 6020A	0.02	0.005	0.17	4.2
Silver	EPA 6020A	0.003	–	–	–
Thallium	EPA 6020A	–	–	0.00024	0.00047
Uranium	EPA 6020A	–	–	–	–
Vanadium	EPA 6020A	–	–	–	–
Zinc	EPA 6010B	0.12	0.12	7.4	26

Notes:

mg/l is milligrams per liter or parts per million.

Cold Water Biota based on 100 mg/l Total Hardness and Water Effect Ratio of 1.

CMC is Criterion Maximum Concentrations; Acute.

CCC is Criterion Continuous Concentrations; Chronic.

– Indicates that no standard has been established.

[1]Standards for CMC and CCC are the presented values multiplied by the Water Effect Ratio.

[2]Standards for human health apply to inorganic arsenic only.

[3]Hardness-dependent CMC and CCC standards.

[4]Hardness is analyzed to calculate the appropriate water quality criteria.

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Details regarding sampling methodologies and analytical testing will be fully developed in RVMP SW FSP (Appendix B) in coordination with the Final EIS and ROD and presented the Final EMP.

2.2 Groundwater Monitoring

Groundwater will be monitored on a semi-annual basis at all site monitoring wells. Efforts will be made to sample the wells as close as is practical to when the surface water samples are collected (in the spring and fall) in order to best compare the data. The construction and location information for the well network that will exist during mining is provided in Table 2-3; well locations are shown on Figure 4. This network is subject to change as various events occur, including but not limited to the selection of the Preferred Alternative or issuance of a Point of Compliance determination.

If the monitoring well network is modified in the future, the new well locations and well construction details will be updated in the Final EMP as appropriate.

Table 2-3. Current RVMP Groundwater Monitoring Well Network

Well ID[1]	Date Completed	Geologic Unit	RVMP Mine Coordinate System Northing (feet)	RVMP Mine Coordinate System Easting (feet)	NAD 83 UTM Zone 12N Northing (meters)[2]	NAD 83 UTM Zone 12N Easting (meters)[2]	Survey Elevation (TOC) (ft amsl)	Ground Elevation (ft amsl)	Stick Up (ft ags)	Screened Interval (ft bgs)	Total Depth (ft bgs)[3]
MW-6A	7/30/2012	Alluvium	17,981.61	8,027.45	4743169.24	471449.09	6,584.89	6,582.47	2.42	40–60	65
MW-8A	7/20/2011	Alluvium	12,566.21	8,328.57	4742010.63	472626.63	6,461.20	6,459.44	1.76	45–65	70
MW-9A	12/22/2010	Alluvium	9,530.62	9,880.84	4741644.67	473598.46	6,544.58	6,542.95	1.63	63–83	90
MW-19B	6/16/2012	Basalt/Alluvium	8,286.77	10,817.17	4741556.25	474064.33	6,520.63	6,518.50	2.13	30–60	65
MW-10D	2/28/2012	Dinwoody	20,277.70	7,792.26	4743638.45	470925.59	6,636.86	6,634.57	2.29	70–130	135
MW-5R	1/8/2011	Rex Chert	9,404.09	10,323.27	4741706.82	473724.08	6,552.11	6,550.28	1.83	250–270	275
MW-2W	7/1/2012	Wells Formation	12,492.15	11,266.82	4742596.03	473303.92	6,852.06	6,850.10	1.96	540–560	565
MW-3W	12/18/2010	Wells Formation	9,609.50	11,491.13	4741992.42	473945.16	6,570.41	6,568.83	1.58	236–256	261
MW-13W	7/29/2012	Wells Formation	19,358.48	9,491.84	4743779.58	471496.93	7,043.47	7,041.44	2.03	740–760	765
MW-16W	2/15/2012	Grandeur Tongue	11,803.67	10,211.47	4742224.63	473207.18	6,678.66	6,674.95	3.71	755–775	780
MW-17W	12/12/2011	Grandeur Tongue	9,407.56	10,239.45	4741690.43	473704.48	6,551.95	6,548.75	3.20	740–760	765

Abbreviations:

ft ags = feet above ground surface.

ft amsl = feet above mean sea level.

ft bgs = feet below ground surface.

TOC = measuring point elevation (either top of casing or top of well casing cap).

Notes:

[1]Well ID = monitoring well identification. See Figure 4-1 for monitoring well locations.

[2]Wells surveyed in RVMP Mine Grid Coordinate System. Conversions to NAD 83 (Northing and Easting) are approximate.

[3]Total depth is constructed well depth (not boring depth).

The proposed groundwater monitoring program will be finalized as the ROD is completed and may include the following items:

- Measurement of field parameters:
  - pH

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  - temperature
  - specific conductance
  - oxidation-reduction potential
  - dissolved oxygen
  - turbidity
- Measurement of groundwater depth in order to calculate groundwater elevation
- Collection of water samples for laboratory analysis

The groundwater analyte list, analytical methods to be followed, and associated groundwater criteria will be finalized as the ROD is completed and may include items such as those presented in Table 2-3.

Table 2-3. RVMP Potential Groundwater Analyte List

Constituent	Analytical Method	Idaho Groundwater Standards (mg/l)	
		Primary	Secondary
Major Ions			
Alkalinity, bicarbonate (as CaCO3) (Total)	SM 2320B	–	–
Alkalinity, carbonate (as CaCO3) (Total)	SM 2320B	–	–
Alkalinity, hydroxide (as CaCO3) (Total)	SM 2320B	–	–
Alkalinity, total (as CaCO3) (Total)	SM 2320B	–	–
Ammonia (as N) (Total)	EPA 350.1	–	–
Bromide (Total)	EPA 300.0	–	–
Calcium (Dissolved)	EPA 6010B	–	–
Chloride (Total)	EPA 300.0	–	250
Conductivity @25C (Total)	SM 2510B	–	–
Fluoride (Total)	EPA 300.0	4	–
Hardness (as CaCO3) (Dissolved)	Calculation	–	–
Ion balance (Total)	Calculation	–	–
Magnesium (Dissolved)	EPA 6010B	–	–
Nitrate-nitrite (as N) (Total)	EPA 353.2	10	–
pH (Total)	SM 4500H+B	–	–
Potassium (Dissolved)	SM 2540C	–	–
Sodium (Dissolved)	EPA 6010B	–	–
Sulfate (Total)	EPA 300.0	–	250
Sum of anions (Total)	Calculation	–	–
Sum of cations (Total)	Calculation	–	–
Suspended solids (residue, non-filterable) (Total)	SM 2540D	–	–
TDS (calculated) (Total)	SM 2540C	–	–
TDS (ratio – measured/calculated) (Total)	SM 2540C	–	–
TDS (Total)	SM 2540C	–	500

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Table 2-3. RVMP Potential Groundwater Analyte List

Constituent	Analytical Method	Idaho Groundwater Standards (mg/l)	
		Primary	Secondary
Total organic carbon (Total)	SM 5310B	–	–
Turbidity (Total)	EPA 180.1	–	–
Metals 5			
Aluminum (Dissolved)	EPA 6010B	–	–
Aluminum (Total)	EPA 6010B	–	0.2
Antimony (Dissolved)	EPA 6020A	–	–
Antimony (Total)	EPA 6020A	0.006	–
Arsenic (Dissolved)	EPA 6020A	–	–
Arsenic (Total)	EPA 6020A	0.05	–
Barium (Dissolved)	EPA 6010B	–	–
Barium (Total)	EPA 6010B	2	–
Beryllium (Dissolved)	EPA 6020A	–	–
Beryllium (Total)	EPA 6020A	0.004	–
Boron (Dissolved)	EPA 6020A	–	–
Boron (Total)	EPA 6020A	–	–
Cadmium (Dissolved)	EPA 6020A	–	–
Cadmium (Total)	EPA 6020A	0.005	–
Chromium (Dissolved)	EPA 6020A	–	–
Chromium (Total)	EPA 6020A	0.1	–
Copper (Dissolved)	EPA 6020A	–	–
Copper (Total)	EPA 6020A	1.3	–
Iron (Dissolved)	EPA 6010B	–	–
Iron (Total)	EPA 6010B	–	0.3
Lead (Dissolved)	EPA 6020A	–	–
Lead (Total)	EPA 6020A	0.015	–
Manganese (Dissolved)	EPA 6010B	–	–
Manganese (Total)	EPA 6010B	–	0.05
Mercury (Dissolved)	EPA 7470A	–	–
Mercury (Total)	EPA 7470A	0.002	–
Molybdenum (Dissolved)	EPA 6010B	–	–
Molybdenum (Total)	EPA 6010B	–	–
Nickel (Dissolved)	EPA 6010B	–	–
Nickel (Total)	EPA 6010B	–	–
Phosphorus, total (Dissolved)	SM4500-P-E	–	–

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Table 2-3. RVMP Potential Groundwater Analyte List

Constituent	Analytical Method	Idaho Groundwater Standards (mg/l)	
		Primary	Secondary
Selenium (Dissolved)	EPA 6020A	—	—
Selenium (Total)	EPA 6020A	0.05	—
Silver (Dissolved)	EPA 6020A	—	—
Silver (Total)	EPA 6020A	—	0.1
Thallium (Dissolved)	EPA 6020A	—	—
Thallium (Total)	EPA 6020A	0.002	—
Uranium (Dissolved)	EPA 6020A	—	—
Uranium (Total)	EPA 6020A	—	—
Vanadium (Dissolved)	EPA 6020A	—	—
Vanadium (Total)	EPA 6020A	—	—
Zinc (Dissolved)	EPA 6010B	—	—
Zinc (Total)	EPA 6010B	—	5

Notes:

mg/l is milligrams per liter or parts per million.

— Indicates that no standard has been established.

Details regarding sampling methodologies and analytical testing will be fully developed in RVMP GW FSP (Appendix C) in coordination with the Final EIS and ROD and presented in the Final EMP.

2.3 Vegetation Monitoring

Reclaimed vegetation monitoring will be conducted during mining and reclamation operations at the site to ensure final site compliance with the applicable land use plans.

2.4 Noxious Weed Monitoring

The mining area will be sprayed for noxious weeds on an annual basis with a United States Environmental Protection Agency-approved herbicide. Any identified noxious weed problem areas observed during mining activities will be sprayed on an as-needed basis.

2.5 Waste Rock Segregation

Based on Agrium's experience with overburden characterization plans implemented at the Dry Valley and North Rasmussen Ridge Mines, selenium concentrations in overburden tend to be stratigraphically constrained, allowing for identification of strata containing material exhibiting relatively higher seleniferous concentrations from strata containing material exhibiting relatively lower seleniferous concentrations. The strata containing waste material exhibiting relatively higher seleniferous concentrations includes all Meade Peak Member waste material (center waste shale, hanging wall mud, and footwall muds) and portions of the Rex Chert Member and Cherty Shale Member (dark colored chert). The strata containing waste material exhibiting relatively lower seleniferous concentrations includes alluvial/colluvial deposits; the blond-colored chert in the Rex Chert Member; the Dinwoody Formation; and footwall dolomite, limestone, sandstone, and shales of the Grandeur Tongue and Wells

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Formations. These two classifications have been defined as seleniferous waste (SeW) and low-Se waste (low-SeW), respectively, in various Agrium documents and Meade Peak and Non-Meade Peak containing material, respectively, in various agency documents. The differentiation between the SeW and low-SeW will be visually identified in situ, marked with wooden stakes and colored flagging, segregated during mining if necessary, and stockpiled appropriately.

SeW will be directly placed as backfill in the P4 South Rasmussen Mine (SRM) pit, previous RVMP pit phases, or stockpiled as indicated in the Preferred Alternative. Low-SeW will be used to construct various mine features such as haul roads, ready lines, cap and cover, etc., or directly placed as backfill in the P4 SRM pit, previous RVMP pit phases, or stockpiled as indicated in the Preferred Alternative and as operational requirements dictate.

2.6 Stormwater

Stormwater monitoring will be conducted during mining and reclamation operations at the site to ensure runoff discharged from the mine complies with the site Stormwater Pollution Prevention Plan (SWPPP) which is managed under EPA's NPDES Multi Sector General Permit. The SWPPP monitoring is a stand-alone document subject to revisions as per EPA regulations and will not be included in the EMP.

2.7 Construction Quality Assurance Quality Control

In order to ensure that the cover is constructed within the parameters of the design, a Construction Quality Assurance/Quality Control (CQA/QC) program will be developed. This CQA/QC program will guide the construction of the selected cap and cover alternative and allow for field verification and documentation that the cap and cover system is constructed as designed. The CQA/QC program will be fully developed once a preferred cap and cover alternative is selected in the ROD. This CQA/QC program will specify certain field measurable parameters to monitor. These field-measurable parameters may include in-place material density, placed material moisture content, and/or placed material layer thickness.

Details regarding specific monitored parameters, criteria, and sampling methodologies will be fully developed in RVMP CQA/QP in coordination with the Final EIS and ROD and presented the Final EMP.

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Section 3

Data Validation and Reporting

Data quality objectives, data validation, and other quality assurance/quality control procedures will be defined in the QAPP (Appendix A) of the Final EMP. Field procedures will follow the yet-to-be-defined media-specific FSPs (Appendices B, C, and D). The field procedures and laboratory results will be reviewed and evaluated by the project manager and quality assurance officer to confirm that the data obtained from the work is valid and meets all data quality objectives as will be defined in the QAPP.

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Section 4

Limitations

This document was prepared solely for Agrium in accordance with professional standards at the time the services were performed and in accordance with the contract between Agrium and Brown and Caldwell dated January 6, 2011. This document is governed by the specific scope of work authorized by Agrium; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Agrium and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

This document sets forth the results of certain services performed by Brown and Caldwell with respect to the RVMP. Agrium recognizes and acknowledges that these services were designed and performed within various limitations, including budget and time constraints. These services were not designed or intended to determine the existence and nature of all possible environmental risks (which term shall include the presence or suspected or potential presence of any hazardous waste or hazardous substance, as defined under any applicable law or regulation, or any other actual or potential environmental problems or liabilities) affecting the Property. The nature of environmental risks is such that no amount of additional inspection and testing could determine as a matter of certainty that all environmental risks affecting the Property had been identified. Accordingly, THIS DOCUMENT DOES NOT PURPORT TO DESCRIBE ALL ENVIRONMENTAL RISKS AFFECTING THE PROPERTY, NOR WILL ANY ADDITIONAL TESTING OR INSPECTION RECOMMENDED OR OTHERWISE REFERRED TO IN THIS DOCUMENT NECESSARILY IDENTIFY ALL ENVIRONMENTAL RISKS AFFECTING THE PROPERTY.

Further, Brown and Caldwell makes no warranties, express or implied, with respect to this document, except for those, if any, contained in the agreement pursuant to which the document was prepared. All data, drawings, documents, or information contained in this report have been prepared exclusively for the person or entity to whom it was addressed and may not be relied upon by any other person or entity without the prior written consent of Brown and Caldwell unless otherwise provided by the Agreement pursuant to which these services were provided.

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Section 5

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Figures

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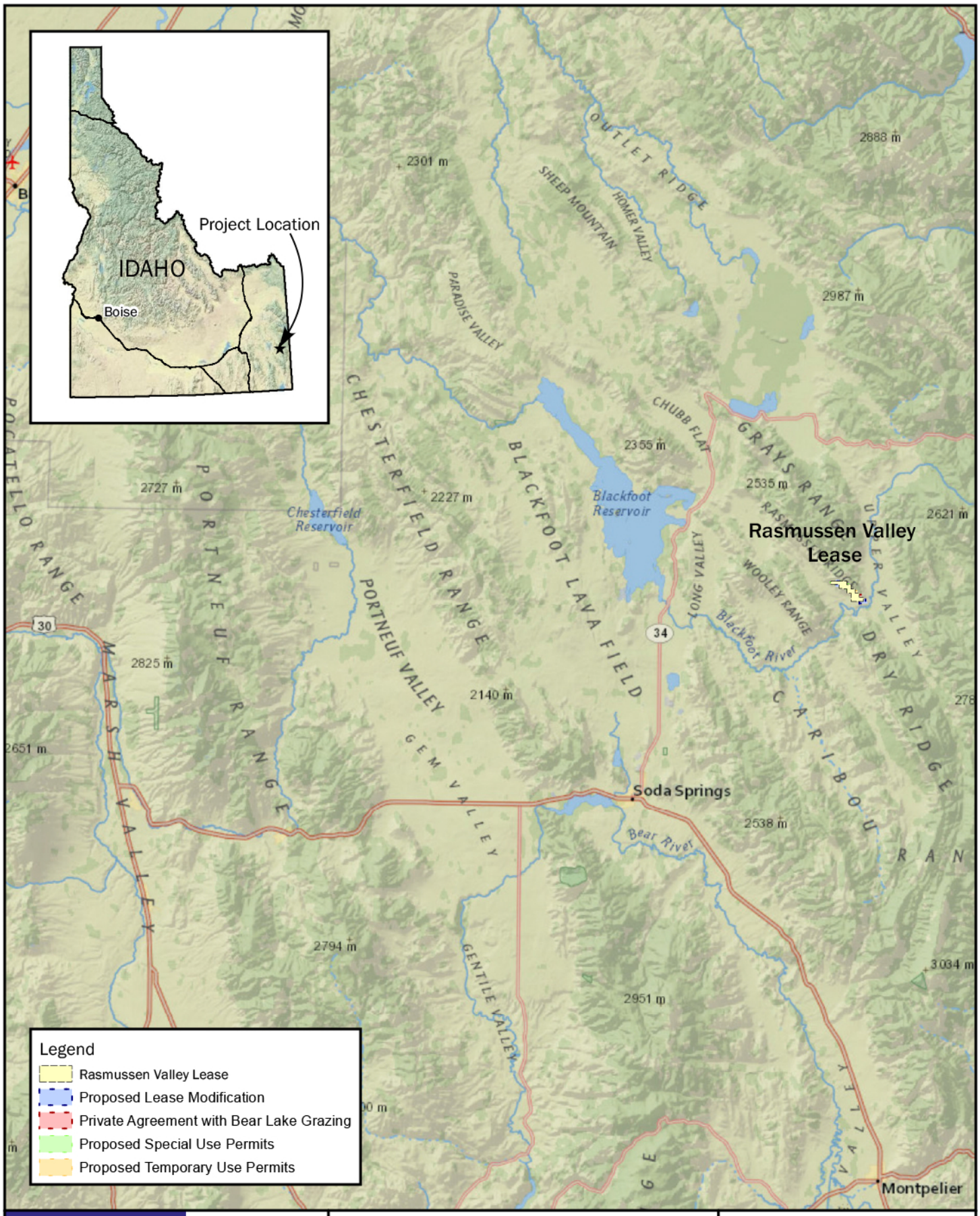

Brown AND Caldwell

Date: 05/28/15
Project No: 147223
Client: Agrium

Basemap: National Geographic

0 2.5 5 10 Miles
1 inch = 8 miles

N

Figure 1
Site Location Map
Draft Environmental Monitoring Plan
Rasmussen Valley Mine Project

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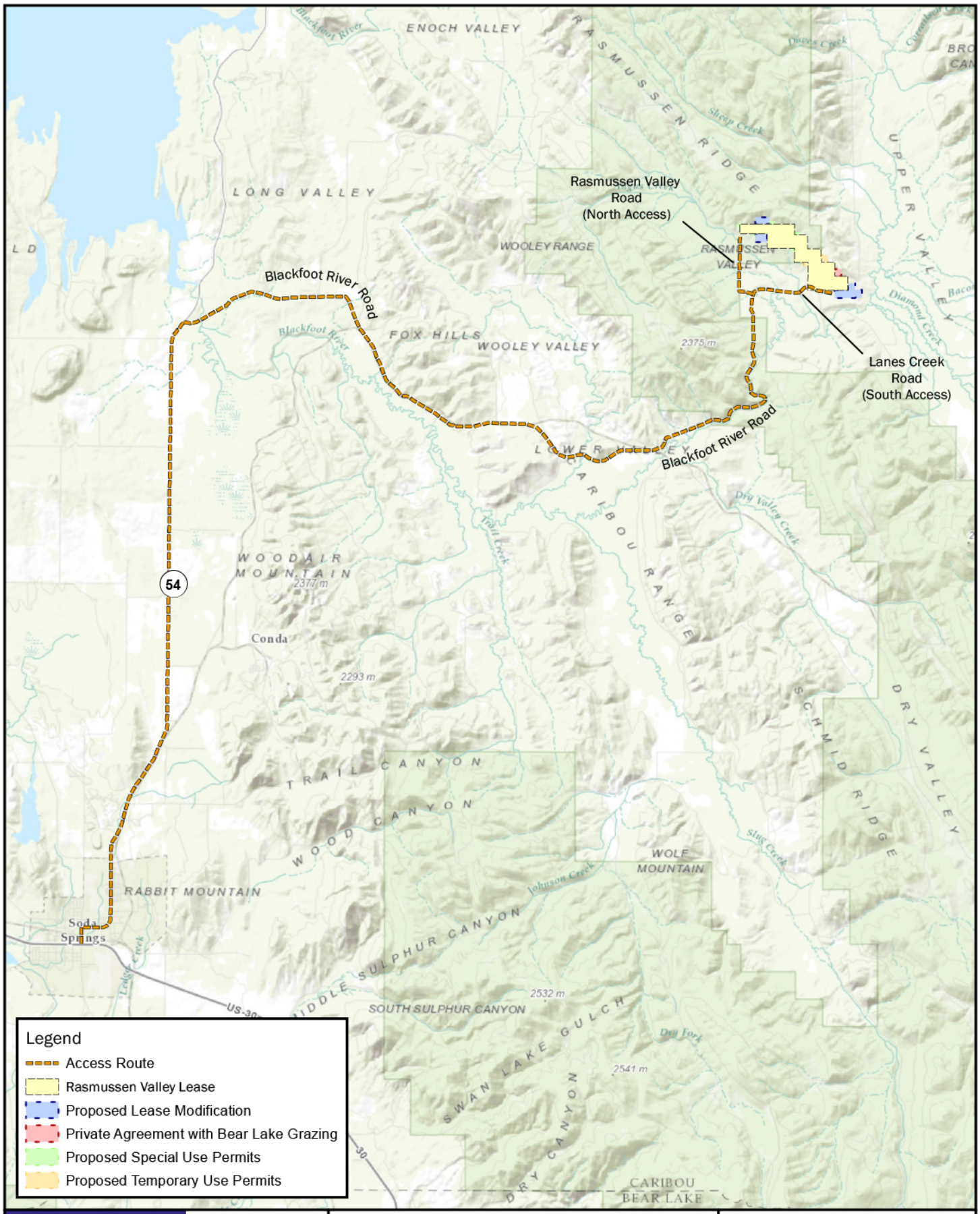

Brown AND Caldwell

Date: 05/28/15
Project No: 147223
Client: Agrium

Basemap: National Geographic

0 1.25 2.5 5 Miles
1 inch = 2 miles

Figure 2
Site Access Map
Draft Environmental Monitoring Plan
Rasmussen Valley Mine Project

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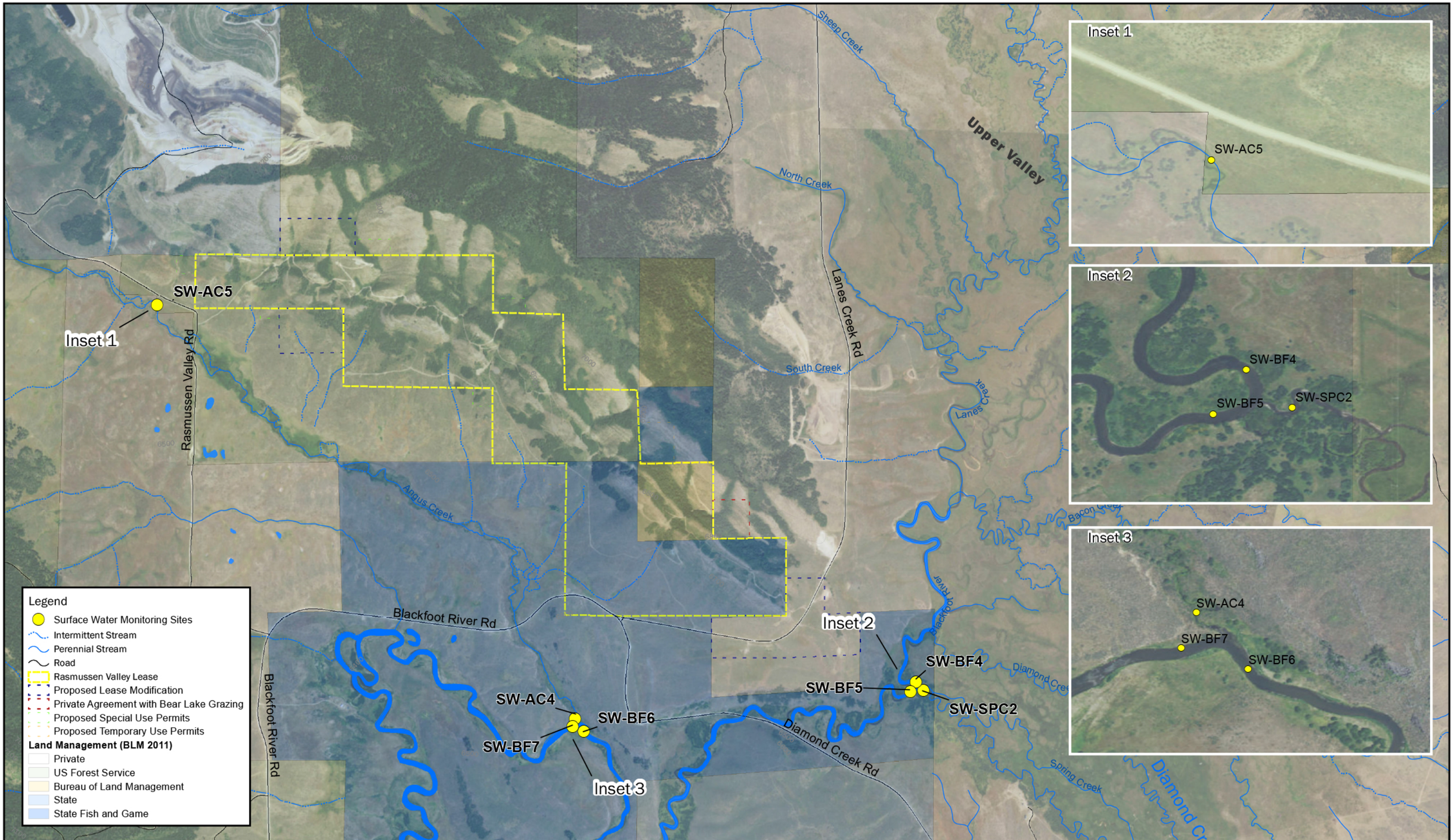

Brown AND Caldwell

Date: 5/28/2015
Project No: 147223
Client: Agrium

0 800 1,600 3,200 Feet
1 in = 1,600 ft

N

Figure 3
Surface Water Monitoring Locations
Draft Environmental Monitoring Plan
Rasmussen Valley Mine Project

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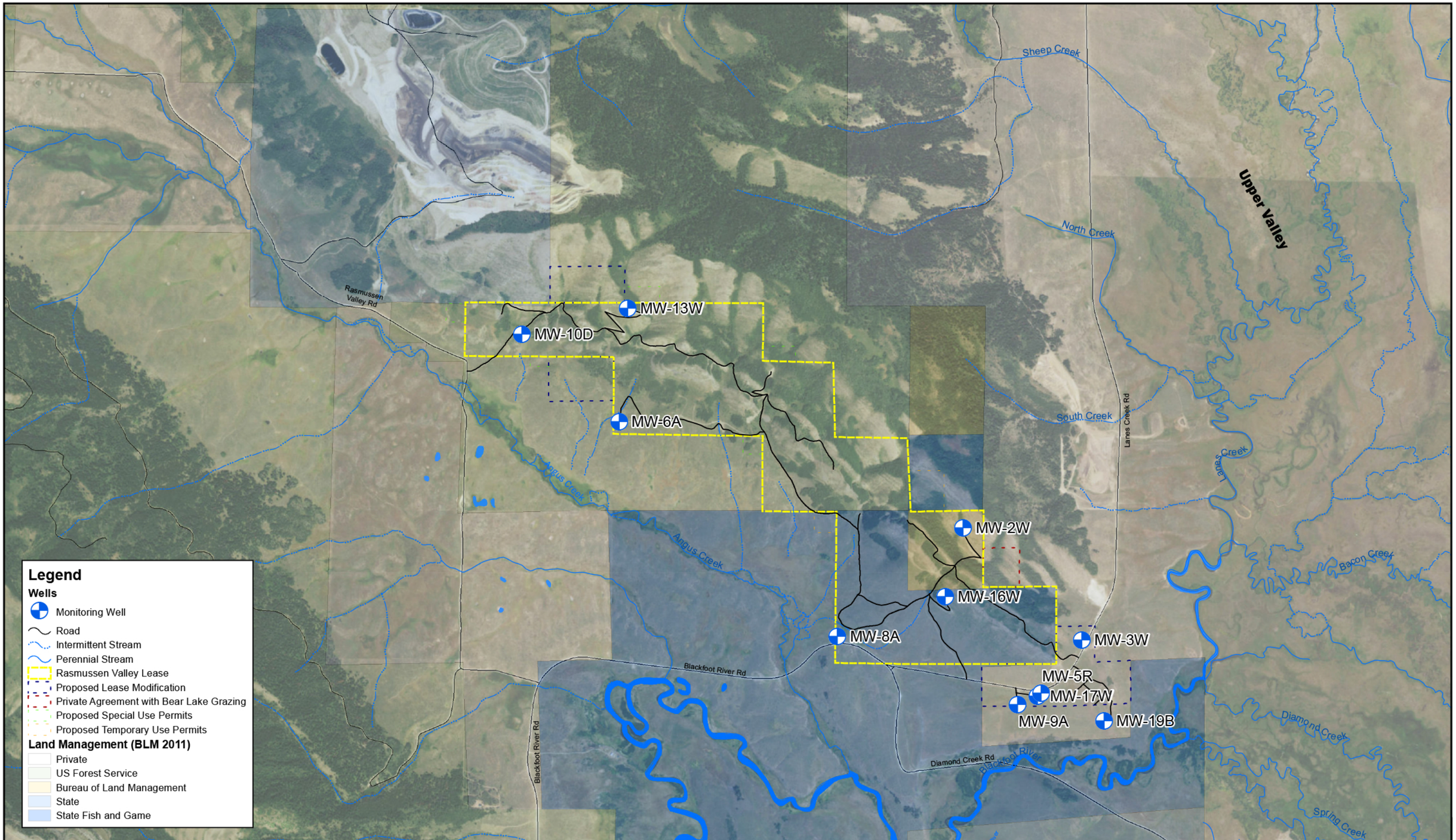

Brown AND Caldwell

Date: 05/28/15

Project No: 145424

Client: Agrium

0 800 1,600 3,200 Feet

1 in = 1,600 ft

N

Figure 4
Groundwater Monitoring Well Locations
Draft Environmental Monitoring Plan
Rasmussen Valley Mine Project

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Appendix A: Quality Assurance Project Plan (to be developed for Final EMP)

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Appendices B, C, and D: Media-Specific Field Sampling Plans (to be developed for Final EMP)

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