STATE OF COLORADO

Eschberger - DNR, Amy <amy.eschberger@state.co.us>

Adequacy-Review Response on TR-10 / Cross Gold Mine / M1977-410

Rmittasch@nedmining.com <Rmittasch@nedmining.com> Wed, Apr 20, 2022 at 2:54 PM
To: Patrick Lennberg - DNR <patrick.lennberg@state.co.us>, "Eschberger - DNR, Amy" <amy.eschberger@state.co.us>
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Amy / Patrick

Please review our response, to your adequacy Review Letter - we incorporating these changes into the master document, upon your acceptance of these review items after your review if you'd like to contact us to go over them we will incorporate them and send you out the full TR 10 for the files. if there are any additional changes or modifications please during our discussions we can incorporate them immediately in this review response and correct them to the master document

if you have any questions, for clarification please feel free to contact Sean or myself for immediate response. We appreciate your attention to our revision.

Kind Regards,

Richard Mittasch, Vice President

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M1977-410_TR-10_Adequacy-Review (response ver6)_20Apr22 (final) .pdf
4810K

Caribou monitoring shed

DRMS Comment 1: Per the Board Order, the purpose of this revision shall be to modify the water management and treatment program for the site to sufficiently address all water quality issues, and to provide a surface water and groundwater monitoring program that meets all applicable requirements of Rules 3.1.6, 3.1.7, 6.3.3, and 6.3.4. The description of this revision provided on the cover sheet does not clearly state this purpose. To make it clear that this revision was submitted to address corrective action #1 of the Board Order, please modify the description provided on the cover sheet to match the language from the Board Order.

> **GIR Comment 1 Response:** *The purpose of Technical Revision 10 (TR10), as written, is to modify the site water management and treatment programs to sufficiently address all water quality issues, and to provide a surface water and groundwater monitoring program that meets all applicable requirements of Rules 3.1.6, 3.1.7, 6.3.3, and 6.3.4. This will be included in both the TR10 text and cover sheet/transmittal letter.*

DRMS Comment 2: On page 2, under section 1, the operator describes the purpose of this revision as being a "response to a Service of Notice of Violation/Cease and Desist Order (Number IO-211130-1) from Colorado Department of Public Health and Environment (CDPHE) dated November 30, 2021 in conjunction with Permit No. M-1977-410". This description does not refer to the Order issued by the Mined Land Reclamation Board (Board) on February 18, 2022 for Violation No. MV-2021-017, in which, submittal of this revision is a required corrective action. Please modify the language in this section to clarify that TR-10 is being submitted to address corrective action #1 of the Board Order issued for Violation MV- 2021-017.

> **GIR Comment 2 Response:** *Technical Revision 10 (TR10) is presented by Grand Island Resources, LLC (GIR) to incorporate the pilot treatment system implemented in early November 2021 and in response to a Service of Notice of Violation/Cease and Desist Order (Number IO-211130-1) from Colorado Department of Public Health and Environment (CDPHE) dated November 30, 2021, in conjunction with Permit No. M-1977-410, and the "corrective action" item (1.) listed in the Order issued by the Mined Land Reclamation Board on February 18, 2022, in relation to Violation No. MV-2021-017.*

DRMS Comments 3a-3d: The Division has the following comments pertaining to Figure 1 – Water Management System:

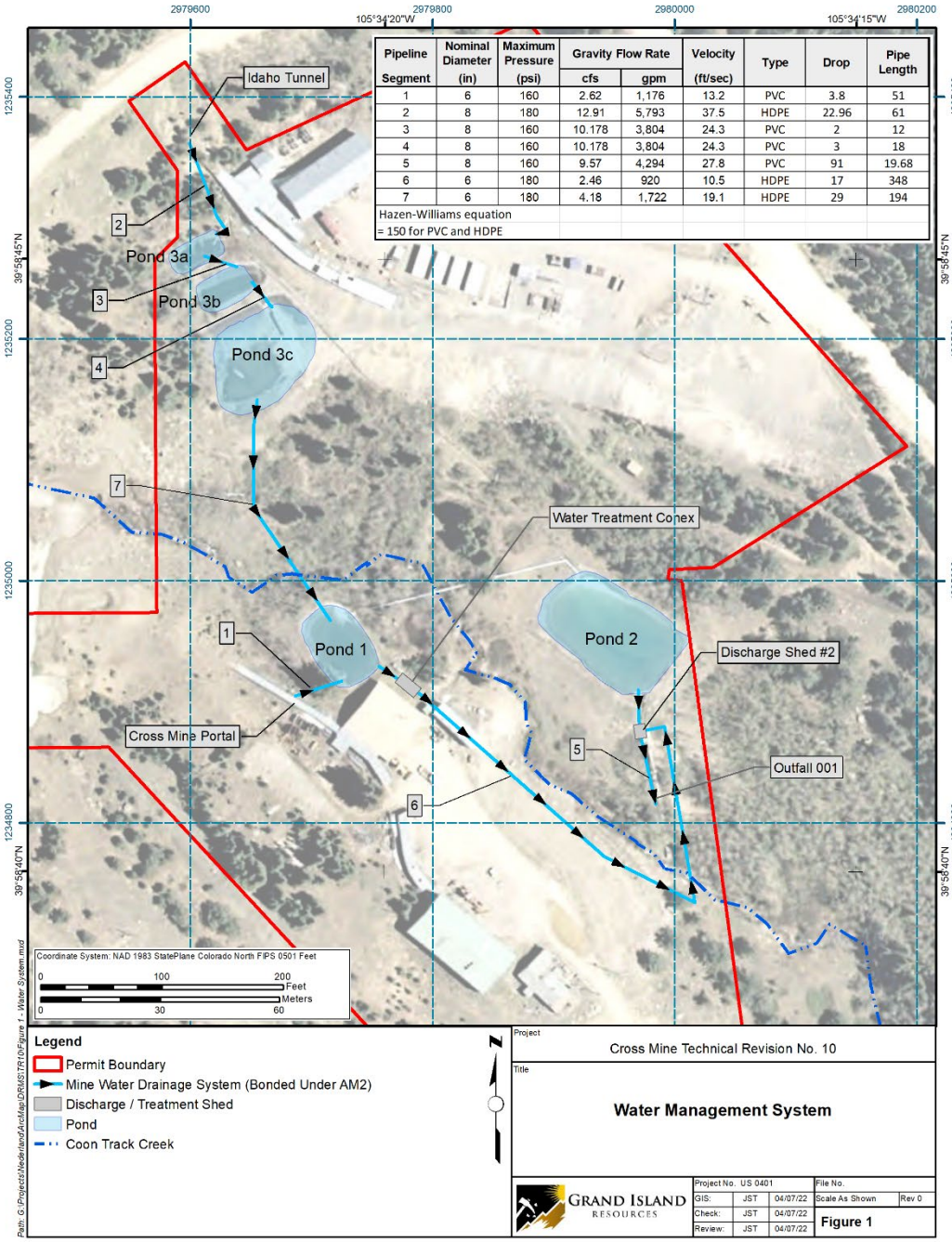
a. Please add the approved permit boundary (at least the portions visible in the view shown).

b. Please show the location of the permitted outfall on Coon Track Creek.

c. Please include arrows on the pipelines indicating the flow direction.

d. Please differentiate the pipelines recently installed to support the new water treatment system.

GIR Comment 3a-3d Response: *Please see revised map below:*



Pipeline Segment	Nominal Diameter (in)	Maximum Pressure (psi)	Gravity Flow Rate cfs	Gravity Flow Rate gpm	Velocity (ft/sec)	Type	Drop	Pipe Length
1	6	160	2.62	1,176	13.2	PVC	3.8	51
2	8	180	12.91	5,793	37.5	HDPE	22.96	61
3	8	160	10.178	3,804	24.3	PVC	2	12
4	8	160	10.178	3,804	24.3	PVC	3	18
5	8	160	9.57	4,294	27.8	PVC	91	19.68
6	6	180	2.46	920	10.5	HDPE	17	348
7	6	180	4.18	1,722	19.1	HDPE	29	194
Hazen-Williams equation = 150 for PVC and HDPE								

DRMS Comment 3e: Please clarify whether discharge from the Cross Mine receives any pre-treatment (e.g., lime) prior to entering the new treatment system.

GIR Comment 3e Response: *Water generated underground at the Cross mine is directed to the Juliet raise, an existing feature which connects the lower Cross mine levels to the tunnel level. Natural settling occurs prior to pumping at the winze to Pond 1. The historical addition of lime to waters going down the Juliet raise was discontinued in 2021.*

DRMS Comment 3f: Please clarify whether discharge from the Caribou Mine (Idaho Tunnel) receives any pre- treatment (e.g., lime) prior to entering the new treatment system. What treatment, if any, occurs via the existing "Caribou Water Treatment Shed"?

GIR Comment 3f Response: Authorized water treatment consists exclusively of the addition of lime and it was normally performed for Cross Mine waters. *Lime was added as trial basis on a couple of occasions to the Caribou Water at Pond 3b settling pond (location of Pond 3b in revised Figure 1 above), expected results were not achieved and therefore the practice was stopped. "Caribou Water Treatment Shed" labelling has been removed from Figure 1.*

DRMS Comment 3g : Please clarify whether untreated water from Pond 1 can still flow directly to Pond 2, and if so, under what conditions.

GIR Comment 3g Response: *While the overflow to Pond 2 exists from Pond 1, careful monitoring of the automated treatment system for the past 3 months has enabled moderating of flow rates from the Idaho Tunnel (Caribou) and Cross discharge into Pond 1, and no overflow has occurred. Pond 2 no longer discharges into Coon Track Creek, and current discharge includes only treated water from Pond 1. However, the Pond 1 overflow piping still exists in the event of an emergency.*

DRMS Comment 3h: Please clarify whether untreated water from Pond 3c can still flow directly to Pond 2, and if so, under what conditions.

GIR Comment 3g Response: *Pond 3c piping into Pond 2 remains operational at this time; however, the installation of an operational pipeline between Pond 3c and Pond #1 precludes direct discharge into Pond #2; discharge of Pond 3c has not occurred in the past 3 months, the connection remains in place to prevent Pond 3c berm overtoping in an emergency situation (e.g., freezing of water preventing discharge of Pond 3c via pipe segment 7).*

DRMS Comment 3i: Please clarify if untreated water from Pond 2 can still flow directly to Coon Track Creek via each of the two existing discharge lines, and if so, under what conditions.

GIR Comment 3i Response: *No discharges directly from Pond 2 to Coon Track Creek have occurred for in the past 3 months and all water discharged into Coon Track Creek is treated water pumped from Pond 1 and into the water treatment connex. Should overflow conditions into Pond 2 were to occur, the water would be pumped back to Pond #1 for treatment. Currently Pond two has sufficient capacity to contain overflow events without discharging to Coon Track Creek.*

DRMS Comments 4a-4b: The Division has the following comments pertaining to Table 1 – Effluent Discharge Limitations for Outfall 001A:

DRMS Comment 4a: Please reference this table in the text to provide context for the information presented in the table.

DRMS Comment 4b: The only parameters included in this table are Lead and Whole Effluent Toxicity. However, it is the Division's understanding the operator's discharge permit requires monitoring for additional parameters. Please modify this table to include all monitoring parameters and associated limitations required by the discharge permit.

GIR Comment 4a-4b Response: *The Table has been revised (see Attachment A).*

DRMS Comment 5: Figure 2 – May 2021 Filtration Study that Compared the Effectiveness of Different Screen Size, May 31, 2021 is low resolution, making it difficult to read the data provided in this table. Please submit a higher resolution version of this table that is easier to read.

GIR Comment 5 Response: *Figure 2 has been enhanced accordingly below:*

Filtration Study	Caribou Tunnel Source Water PASS - FAIL Filtration size in microns				Cross Tunnel Source Water PASS - FAIL Filtration size in microns						
COMPLIANCE COMPOUND	Caribou UF	Caribou 5.0	Caribou 0.45	Caribou 0.10	Cross UF	Cross 5.0	Cross 0.45	Cross 0.10	30-Day Average	7-Day Average	Daily Maximum
Total Alkalinity	122.5	118.5	122.2	119.1	77.6	78.5	75.6	76.5			
Bicarbonate	122.5	118.5	122.2	119.1	77.6	78.5	75.6	76.5			
Carbonate											
Chloride	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6			
Fluoride	0.1			0.2							
Silica (as Si)	5.5	5.4	5.5	5.5	6.0	6.1	5.9	6.2			
Nitrate Nitrogen	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2			
pH	8.0	8.1	8.1	8.1	7.8	7.8	7.8	7.8	6.5-9	6.5-9	6.5-9
Sulfate	12.0	11.9	12.0	11.9	11.1	11.2	11.1	11.2			
Total Suspended Solids	108.0	ND	ND	ND	10.0	ND	ND	ND	30	45	
Turbidity	43.00	0.03	0.04	0.02	5.98	0.08	0.10	0.17			
Total Hardness	132.5	117.2	117.6	118.5	77.3	78.1	77.5	77.2			
Aluminum (ug/L here down)	2,782	2	4	3	148	8	6	9			
Antimony	2	ND	ND	ND	ND	ND	ND	ND			
Arsenic	4	ND	1	1	ND	ND	ND	ND			
Barium	111	53	53	51	58	55	55	55			
Beryllium	0	ND	ND	ND	ND	ND	ND	ND			
Boron	30	30	20	90	ND	ND	ND	ND			
Cadmium	1.30	0.10	ND	ND	2.90	2.80	2.70	2.70	0.60 to 0.89		2.2 to 3.7
Calcium	28,800	25,800	26,000	26,100	19,100	19,500	19,200	19,000			
Chromium	20	ND	ND	ND	ND	ND	ND	ND			
Cobalt	5	ND	ND	ND	1	0	0	0			
Copper	26	ND	ND	ND	8	4	4	4	13 to 19		18 to 28
Iron	5,894	ND	ND	ND	349	ND	ND	8			
Lead	156	0	0	0	20	2	2	2	3.6 to 5.4		85 to 135
Magnesium	14,720	12,850	12,790	12,960	7,200	7,140	7,180	7,220			
Manganese	909	25	25	25	62	45	44	44			
Mercury	NA				NA				1		2
Molybdenum	6	6	6	6	7	6	6	6			
Nickel	11	ND	ND	ND	1	1	1	1			
Potassium	2,800	1,400	1,400	1,400	1,300	1,200	1,200	1,200			
Silver	5.30	ND	ND	ND	0.60	ND	ND	ND	0.11 to 0.17		
Sodium	2,400	2,300	2,300	2,300	1,800	1,800	1,800	1,800			
Strontium	417	380	382	370	143	137	135	135			
Uranium	7	6	6	6	1	1	1	1			
Vanadium	11	ND	ND	ND	2	ND	ND	ND			
Zinc	251	18	21	16	343	325	319	316	176 to 262		182 to 301

DRMS Comment 6: On page 8, under section 4, the operator states "This GIR initiative for alternative treatment commenced well before the 'cease and desist' order was issued by CDPHE later in November 2011". The Division is not aware of a 'cease and desist' order issued by CDPHE in 2011. Did the operator mean to state "November 2021"? If so, please correct this date accordingly.

GIR Comment 6 Response: *This was a typo. The date has been changed as follows: This GIR initiative for alternative treatment commenced well before the 'cease and desist' order was issued by CDPHE later in November 2021.*

DRMS Comment 7: On page 10, under section 6, the operator states that overflow from Pond 1 would go to Pond 2 via overflow pipe, where it would be contained. If Pond 1 were to overflow into Pond 2, please describe what would happen to this untreated water. Does the operator have a way of treating water from Pond 2, if needed?

GIR Comment 7 Response: *While no water has gone as overflow from Pond 1 to Pond 2 in the past 3 months, had this occurred, the Pond 2 water would then be pumped back into Pond 1 for treatment. Influent into Pond #1 from the Cross Mine is via pumping*

with automated systems to manage influent-via flow meter monitoring and periodic checks from monitoring personnel. DRMS has approved a pipeline extension for the pipeline currently conveying water from the Idaho Tunnel/Caribou Mine to to Pond 1 extending such that excess and managed discharge would be conveyed to the Juliet raise in the Cross Mine thereby virtually eliminating Pond #1 overflow.

DRMS Comment 8: On pages 10 and 11, under section 6, the operator describes the new water treatment system operating at the site, which includes a combination of filtration and polishing components. The Division has the following comments pertaining to this system:

DRMS Comment 8a: Please describe the current frequency of filter bag changes. Does the operator expect this frequency to change throughout the year?

GIR Comment 8a Response: *Pressures before and after filtration are recorded on the Programmable Logic Controller (PLC) with the aid of separate pressure transducers located along the water treatment system. Filter bags are periodically changed when the pressure difference between influent and effluent reaches ~5-6 PSI. Currently filter bags are being replaced twice per week, this frequency is expected to double expected to double in the coming months when GIR returns to mining.*

DRMS Comment 8b: Please describe how the spent filter bags are disposed of. Are the spent filter bags considered hazardous waste?

GIR Comment 8b Response: *Spent filter bags are currently stored in totes in the water treatment connex. The solids contained within the bags will be tested to determine their chemical composition prior to disposal. There are no plans to clean and recycle the bags at this time. .*

DRMS Comment 8c: Please describe the current expected lifespan of the polishing vessel (using the Graver MetSorb© HMRG media).

GIR Comment 8c Response: *Graber laboratory scale testing prior to pilot plant system installation predicted an operational life of one year. The current system has been operational since November 2021. The system experience reduced treatment efficiency in March, GIR has flushed the system and treatment efficiency has been reestablished..*

The manufacture representative routinely visits the site and determines if the unit must be changed out. This determination is made via analytical testing. Given this system is a new addition to the site, a sampling program is in place to track the efficiency of removal from the vessels, and to spot a downward trend in

performance long before it must be changed out. When this is necessary, Environmental Site Solutions (ESS) will retrieve the spent Metsorb for proper disposal and the second vessel will be put into operation. Should for any reason the first vessel fail to operate correctly, it would be taken off-line, and the second vessel will be put into use without delay. During higher flow events, the vessels will run in parallel to achieve maximum treatment efficiency. At this time, only one vessel is necessary for compliance.

DRMS Comment 8d: Please describe how the spent polishing vessel will be disposed of. Would this vessel be considered hazardous waste?

The distributor, Environmental Site Solutions (ESS) will change out the spent media and has full responsibility for proper disposal and associated testing.

DRMS Comment 8e: While the operator refers to only one polishing vessel in use by the current treatment operation, the Division is aware of a 2nd vessel present in the new treatment shed (as shown on Figure 13 in Appendix A). Please clarify the use of the 2nd polishing vessel, if any. Is it considered a backup only, at this time?

The ESS vessel must be periodically backwashed in order to ensure throughput due to pressure buildup in the vessel. The frequency of the backwashing is dependent on the pressure differential across the media in the vessel. In order to perform a backwash, the piping configuration in the water treatment connex is rerouted and water from a post bag filter port is pumped in a reverse configuration through the vessel and is pumped back into Pond 1. Recently the process has been improved to optimize the recharging, cleaning, performance and therefore the lifespan of the filtering media within the vessel, lessening the frequency of backwashing and mitigating cost, by using discharge quality water post the water treatment system, being the "cleanest" water possible, then collecting the backwash water in a tank for testing of the water and materials within to develop the most effective and efficient process, in lieu of the continuation of recirculation and therefore treating the same water again. After a backwash, the piping configuration is reconfigured, and any backwashed material in the "backwash tank", previously pond 1, is treated by the system per normal operational procedures. The entire process takes approximately between 15 and 30 minutes depending on the loading of the vessel in use. The second vessel in question is there as a stand by vessel in case of an emergency and to mitigate lead time for a replacement vessel when the vessel in play reaches its performance capacity.

DRMS Comment 8f: Please provide a discussion regarding the mine discharge rates throughout different seasons of the year, and whether the current water treatment system is designed to handle maximum flows.

GIR Comment 8f Response: *The current system (with the use of only one of two Metsorb vessels) can handle up to about 150 gpm. With the addition of another Metsorb vessel, the system would handle up to 300 gpm. During high flow conditions, excess effluent waters will be discharged into the underground workings (Cross Mine) via the recently DRMS approved pipeline extension.*

DRMS Comment 8g: On page 11, last paragraph, first sentence, the operator states "The pilot system described above is fully operational and since the installation of continuous 24/7 treatment (January 2021)…". The date given is inconsistent with the timelines provided in the application. Please correct the date accordingly.

GIR Comment 8g Response: *The date should be changed to the following: The pilot system described above is fully operational and since the installation of continuous 24/7 treatment from December 15, 2021 to the current date.*

DRMS Comment 9: Tables 2 and 3 provide a summary of analytical results from sampling that occurred on January 17 and 18, 2022, to show the new water treatment system is producing results that are compliant with the discharge permit. Please add a column to these tables which includes the discharge permit limitations. Additionally, please explain why Zinc was detected in the Blank samples. Lastly, please provide any additional water quality data that has been collected since January 2022.

GIR Comment 9 Response: *A compliance table prepared with available analytical data (see Attachment B) clarifies the comments above and shows no exceedance for 6 sample events.*

Tables 2 and 3 have been combined and revised to include discharge permit limitations (see Attachment B).

In regards to the comment above, "please explain why Zinc was detected in the Blank samples," please see the explanation below, summarized from correspondence with Eurofins' laboratory personnel:

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 280-568643/1-A
Matrix: Water
Analysis Batch: 568968

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 568643

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.0	0.088	ug/L		03/15/22 14:57	03/17/22 13:26	1
Copper	ND		2.0	0.71	ug/L		03/15/22 14:57	03/17/22 13:26	1
Lead	0.232	J	1.0	0.23	ug/L		03/15/22 14:57	03/17/22 13:26	1
Zinc	2.03	J	10	2.0	ug/L		03/15/22 14:57	03/17/22 13:26	1

Regarding the Lead and Zinc observed in the Method Blank in the QA/QC laboratory package, values that are below the reporting limit (RL) but above the method detection limit (MDL) must be qualified with a "J" flag (example shown above) to denote that the value is an estimated detection since it is below the lab's reporting limit (which represents the lower limit of the instrument calibration range that can confidently qualify target analytes) but above the method detection limit (the lower limit of where the instrument can statistically differentiate an instrument response from background/noise).

Client Sample Results

Client: GS Mining Company LLC Job ID: 280-159667-1
Project/Site: Wastewater Discharge - Nederland, CO

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Client Sample ID: JULIET **Lab Sample ID: 280-159667-1**
Date Collected: 03/10/22 17:20 **Matrix: Water**
Date Received: 03/11/22 14:17

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	23		1.0	0.088	ug/L		03/15/22 14:57	03/16/22 15:45	1
Copper	660		2.0	0.71	ug/L		03/15/22 14:57	03/16/22 15:45	1
Lead	4200	B	1.0	0.23	ug/L		03/15/22 14:57	03/16/22 15:45	1
Zinc	3000	B	10	2.0	ug/L		03/15/22 14:57	03/16/22 15:45	1

Per Eurofins' Quality Assurance program and NELAP accreditation, corresponding analytes in field samples in the batch that are either detected above the RL or detected between the MDL and RL (J flagged) need to be qualified with a "B" flag. The "B" flagged value must be below the reporting limit or greater than 10x the value of the associated method blank detection. Please observe that the Lead and Zinc values are well beyond the 10x above the MB threshold for reporting the qualified data (example shown above). Long and short, the specified analyte values detected in both a blank and a mine water sample appear not to be of any concern, as noise below the RL will have no significance in evaluating the compliance of a mine water sample. However, since a "B" flag may represent laboratory cross-contamination, we may start using a check lab for duplicates to ensure that what is reported is correct.

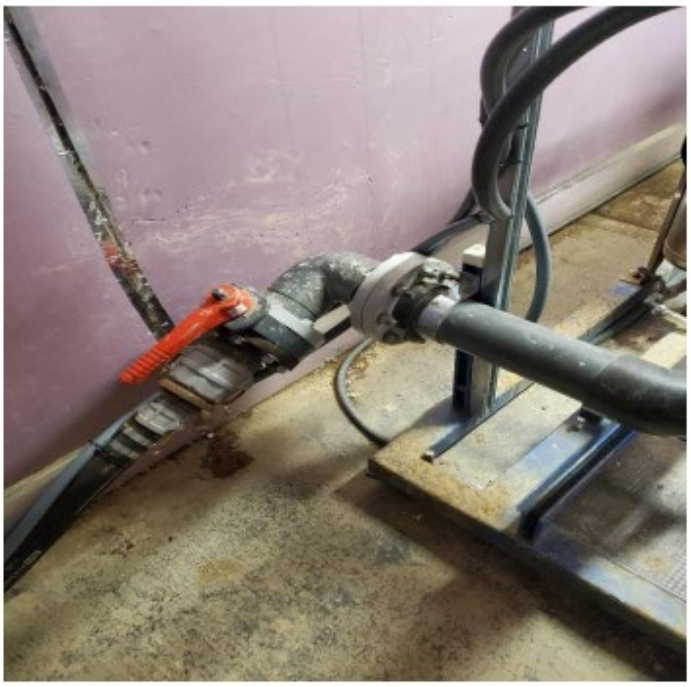
DRMS Comment 10: In Appendix A – Site Pictures, the Figure 9 caption reads "Cross Winze Valve Upgrade and XXX(Future Picture)". Additionally, below this caption, a statement reads "Insert picture of Cross Winze or pump or piping". Please add the intended photo or remove the confusing language which implies another photo was intended.

GIR Comment 10 Response: *Photo below:*

Figure 9 Cross Winze Valve Upgrade

DRMS Comment 11: In Appendix A – Site Pictures, Figure 14 shows a photo of the "backwash tank" located inside the new water treatment shed. Please provide some additional information on the purpose of this tank, the nature of the water present inside the tank, whether the tank must be emptied regularly, and if so, where the water is poured.

GIR Comment 11 Response: *See Figure description modified below:*



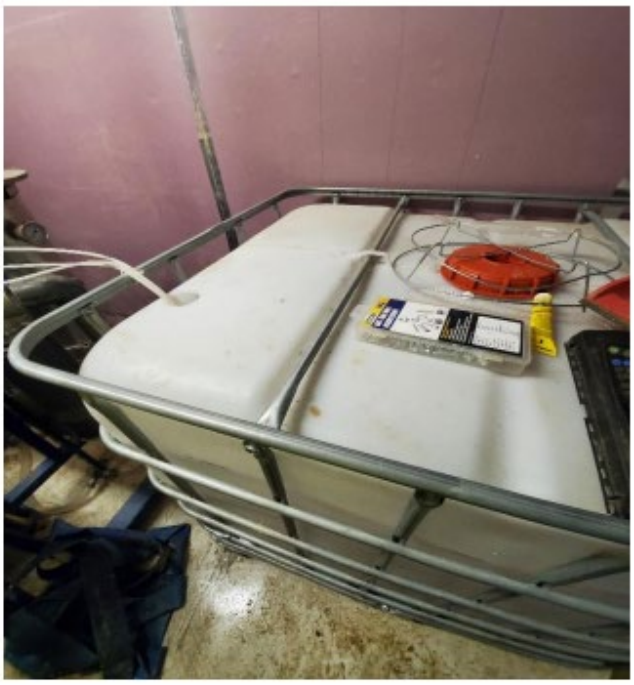


Figure 14 depicting isolation valve and backwash tank. Water in tank is emptied into Pond 1 for retreatment. Recently, this tank has been replaced with direct piping to Pond 1 for retreatment during a vessel backwash.

DRMS Comment 12: Please provide a bond estimate that includes costs for operating and maintaining the entire water treatment system on a monthly basis.

GIR Comment 12 Response: Monthly cost with underground work and work activities is averaging $6,723.75. Without underground activity Consumables costs should drop and the average monthly number would be slightly lower.

Cross Caribou Water Treatment

Operations, Maintenance and Monitoring

ANNUAL BASIS - averaged over the last three months of operation

ID	ITEM	QTY.	UNIT	UNIT COST	TOTAL	Notes
C-01	Filtration Media	416	ea.	$ 15.00	$ 6,240.00	Rep. once per week per filter (8 filters)
C-02	Polishing Media	2	ea.	$25,000.00	$ 37,500.00	Rep.every two years (2 vessels)
E-01	Filtration System Equipment	3	ea.	$ 300.00	$ 900.00	Operational Life 20 years
E-02	Polishing System Equipment	3	ea.	$ 1,500.00	$ 4,500.00	Operational Life 20 years
E-03	Control Valves	20	ea.	$ 30.00	$ 600.00	Operational Life 10 years
E-04	In-Plant Piping	50	ft.	$ 1.50	$ 75.00	Operational Life 10 years
E-05	External Piping	600	ft.	$ 1.25	$ 750.00	Operational Life 20 years
E-06	Instrumentation	12	ea.	$ 50.00	$ 600.00	Operational Life 15 years
O-01	Water Quality Sampling and Testing	24	ea.	$ 300.00	$ 7,200.00	Two Effluent Sample per month
O-02	Inspection and Sample Collection	416	hr.	$ 45.00	$ 18,720.00	One visit per week 8 hour day contractor
O-03	Data Processing and Reporting	48	hr.	$ 75.00	$ 3,600.00	4 hours per month contractor
				Total Annual Avg.	**$ 80,685.00**	
				Total Monthly Avg.	**$ 6,723.75**	

C = Consumables, E = Equipment,
O = Operations

DRMS Comment 13: The bond estimate calculated for Amendment No. 2 (AM-2; approved on February 8, 2022) includes costs for removing and disposing of a total of 777 feet of 6-inch diameter pipeline. According to Figure 1 – Water Management System, a total of 1,585.68 feet of pipeline is installed at the site, including a combination of 6-inch diameter and 8-inch diameter PVC and HDPE pipeline. Please provide a bond estimate that includes costs for removing and disposing of the additional 808.68 feet of pipeline.

GIR Comment 13 Response: *The prior Figure 1 was labeled incorrectly as all piping was included in the approved AM2. Figure 1 has been revised accordingly.*

DRMS Comment 14: The application includes a cover sheet for Appendix G – Standard Operating Procedures (SOP's) and Operation & Maintenance (O&M) Manuals. However, the Division could find no information submitted with this appendix. Please submit the information intended for Appendix G.

GIR Comment 14 Response: *The SOP is presented in Attachment C.*

DRMS Comment 15: A groundwater monitoring plan is included in Appendix H. However, the Division could not find a surface water monitoring plan as required by corrective action #1 of the Board Order issued for Violation No. MV-2021-017. Please modify the monitoring plan provided to include both a groundwater and surface water monitoring plan. The surface water monitoring plan must include at a minimum, sampling locations along Coon Track Creek at a point upgradient of the mine site, at the discharge point, and at a point downgradient of the mine site. The list of surface water sampling parameters must include, at a minimum, the parameters required under the CDPHE discharge permit.

GIR Comment 15 Response: *The surface water monitoring program is attached as Attachment D.*

DRMS Comment 16: On page 10 of the groundwater monitoring plan, under section 5.3, the operator is proposing to use one of the three existing wells, the Cabin Well, as the point of compliance. The operator states the Cross Well is not a preferred choice for monitoring because it is influenced by mine dewatering and is located near the center of surface activity rather than downgradient of all activities that could potentially affect groundwater quality. The operator states the Caribou Well is installed upgradient of the permitted mine workings and lies across a probable groundwater divide (Coon Track Creek) from the Cross Mine. Based on the information provided thus far, the Division agrees that, of the three existing wells, the Cabin Well may be better suited as a point of compliance. However, monitoring from the other two existing wells could provide valuable data for understanding groundwater at the site (including characterizing any potentially impacted groundwater quality). Therefore, please include all three existing wells in the groundwater monitoring plan.

GIR Comment 16 Response: *GIR does not agree that the Cross well be added to the sampling, but will do so as directed. The response to comments provides further detail that the Cross well is influenced by pumpage from the winze. Attachment E shows the drawdown of the Cross well due to pumpage of the winze (currently ongoing and feeding to Pond 1). Given the fact that the Cross well is influenced so much by the winze pumpage, sampling may not add any meaningful information, and could confuse assessing upgradient to downgradient transport of any metals. Being in a cone of depression most of the year means that even if the Cross-well water contains dissolved metals, it is not flowing down-gradient when pumping of the winze is occurring.*

DRMS Comment 17: Please add the following two sampling locations to the groundwater monitoring plan: water from the Cross Mine prior to entering the treatment system and water from the Caribou Mine prior to entering the treatment system. Additionally, please be sure these monitoring locations are included on all applicable maps showing the proposed monitoring locations.

GIR Comment 17 Response: *Concurrent with water sampling, the two effluent samples will be collected, as stated by DRMS as influent to the water treatment system, the effluent is monitored currently and will continue at end of pipe Outfall 001.*

DRMS Comment 18: Please describe the "probable groundwater divide" and how it may affect using water level data from the Caribou Well to generate the potentiometric map.

GIR Comment 18 Response: *Upon review of geological data available, GIR amended the interpretation in the updated groundwater report as the suggested Junction Ranch fault down-gradient from the mine does not appear to exist at the mines based on drilling. Water flow and storage between the Cross and Caribou mine is also influenced by the unmapped Potosi Mine between the Cross and Idaho tunnel. Resistivity surveys conducted last summer show extensive stoping created massive voids that fill from snow melt as access shafts are still open. This makes the fracture flow regime more complicated than simply citing a divide between the two mines and Coon Track Creek.*

DRMS Comment 19: On page 11 of the groundwater monitoring plan, under section 5.5, the operator states the analytical parameters for sampling (presented in Table 4) will consist of the most stringent of the criteria contained in Tables 1-4 of the Water Control Commission (WQCC) Regulation No. 41. However, the operator goes on to state that Regulation No. 41 (at 5 CCR 1002-41 2) exempts the Cross Gold Mine groundwater from complying with Agricultural use standards when "…other information demonstrates that agricultural use is not being made of the groundwater and is not likely to be made…". The operator states the sub-alpine to alpine climate of the mine area is unsuitable for agriculture, and accordingly, the list of proposed sampling parameters presented in Table 4 does not include the Agricultural specific standards

listed in the Interim Narrative Standard Table 3 of WQCC's Regulation No. 41 - The Basic Standards for Ground Water.

Please be advised, the "exemption" referred to by the operator [and detailed in section 41.4(B)(2) of Regulation No. 41] applies only to classified groundwater areas. Because the Cross Gold Mine is located in an unclassified groundwater area, and the operator has not provided groundwater data demonstrating existing ambient quality as of January 31, 1994, the site must comply with the Interim Narrative Standard set by the WQCC in Regulation No. 41 – The Basic Standards for Ground Water. The Interim Narrative Standard requires that groundwater quality be maintained for each parameter at that quality which meets the most stringent criteria set forth in Tables 1 through 4 of The Basic Standards for Ground Water.

Therefore, please revise the sampling parameter list provided in Table 4 to include the following parameters and associated standards:

Aluminum, dissolved	5 mg/l
Boron, dissolved	0.75 mg/l
Cobalt, dissolved	0.05 mg/l
Copper, dissolved	0.2 mg/l
Fluoride, dissolved	2 mg/l
Lithium, dissolved	2.5 mg/l
Selenium, dissolved	0.02 mg/l
Vanadium, dissolved	0.1 mg/l
Zinc, dissolved	2 mg/L

GIR Comment 19 Response: *It seems that this request is unreasonable especially if you read Rule 3.1.7(1c): "Unclassified areas: Operations that may affect the quality of groundwater which has not been classified by the WQCC shall protect the existing and reasonably potential future uses of such groundwater."*

We will make these additions to the groundwater analyte table in the TR10 but we totally disagree in adding these expensive tests and lower standards specifically devised for agriculture. We have begrudgingly added them but will fight it if we exceed the standards. Because of the prevailing short growing season, elevation of nearly 10,000 feet and poor natural growth medium, it is not possible to grow any agricultural products both at the mine site and within a several mile radius. Being held to standards that are non-applicable is something that we will continue to challenge as analytical costs are expensive, and we feel the requirement of complying with an agricultural standard case is 'unreasonable.'

DRMS Comment 20: On page 11 of the groundwater monitoring plan, under section 5.6, the operator states the quarterly sampling results will be reported to the Division within 30 calendar

days of the operator's receipt of a complete analytical results package from the laboratory. Please commit to providing the quarterly water monitoring reports by the following deadlines:

- First quarter report due by May 1st of every year.
- Second quarter report due by August 1st of every year.
- Third quarter report due by November 1st of every year.
- Fourth quarter report due by February 1st of the following year.

GIR Comment 20 Response: *If the objective of DRMS is to get a true picture of background conditions by April after April 28, 2022 then the first sampling event will be reported on August 1, 2023. Matching true seasons in the alpine environment to understand change is critical in establishing baseline conditions. However, we will adhere to the groundwater reporting schedule as requested. We plan to use the transducers to tell us (for example) when the snowmelt is causing groundwater levels to rise. We will capture this with transducer monitoring and recording. We also want to sample when we have low flow conditions, which normally occurs in January with snow cover and frozen ground inhibiting infiltration. We will produce an interpretation of the data in the 5th reporting event and talk above such things as background conditions where mining is not occurring and natural attenuation of anomalies if any. We will recommend eliminating analytes that are background and those that have neither relevancy nor evidence of exceeding standards.*

DRMS Comment 21: Please commit to providing the Division a written report within five (5) working days when there is evidence of groundwater discharges exceeding applicable groundwater standards or permit conditions imposed to protect groundwater quality, in accordance with Rule 3.1.7(9). Please be advised, this notice requirement would apply to any exceedance of the approved groundwater monitoring standards set for the point of compliance well(s).

GIR Comment 21 Response: *GIR commits to providing a written report letter receipt from the laboratory within 5 business days should there be exceedances beyond the standards agreed upon herein. Based upon verbal conversations with DRMS on April 13, 2022, the purpose of the groundwater samples are to establish analyte background levels and to understand if there may be issues.*

DRMS Comment 22: On page 11 of the groundwater monitoring plan, under section 5.6, the operator states the quarterly monitoring report will include a potentiometric surface (water table) map constructed from measurements made during sampling events and will note any exceedances of Regulation 41 Tables 1- 4 water quality standards. Please commit to <u>also</u> including the following with the quarterly monitoring reports:

a. A map showing the approved groundwater and surface water monitoring locations.

b. The laboratory data packages and Chain of Custody sheets.

c. Field sheets for the sampling event(s).

GIR Comments 22a, 22b and 22c Response: *GIR commits to providing a potentiometric surface map, plus the groundwater and surface water sample location figures with exceedances noted, if any. The report shall include the laboratory data packages, chain of custody forms, and field sheets. The sampling map for groundwater has been added to the revised report.*

DRMS Comment 23: On pages 11 and 12 of the groundwater monitoring plan, under section 6, the operator describes the water quality sampling conducted at the site on November 9 and December 17, 2021, referred to as "baseline groundwater sampling". The water quality data for these two sampling events is presented in Tables 5 and 6. The operator indicates this data reveals "clear trends in water quality". The Division has the following comments pertaining to the data provided in Tables 5 and 6:

a) Please update these tables to include a footnote stating the November 2021 samples were not correctly filtered in the field. Additionally, please provide a discussion on how the samples were incorrectly filtered in the field and what affects this had on the laboratory data.

b) Please provide the field sampling data sheets from the November and December 2021 sampling events.

c) This "baseline" data set is incomplete as it does not include all sampling parameters required by WQCC's Interim Narrative Standard for unclassified groundwater, and it was collected from only two sampling events (one of which was incorrectly collected in the field) that occurred a little more than a month apart. No discernible trends can be determined from this data. In order to establish "baseline" groundwater quality conditions, the operator will need to provide five consecutive quarters of groundwater monitoring data that include all sampling parameters and standards required by the Interim Narrative Standard. Please describe how the operator intends to collect the required baseline groundwater data in a manner that ensures groundwater quality at the site is not impacted by site activities in any way during the collection period.

GIR Comment 23a, 23b and 23c Response: *DRMS has specified in their comments of March 25, 2022, that the standards to which GIR must apply in the next 5 quarters Sampling protocols are provided in the groundwater monitoring plan which will reduce the potential for inconsistent or incomplete data going forward.*

d) Given the current Board-Ordered deadline of approving this revision no later than April 28, 2022, the Division expects the required five quarters of baseline

groundwater monitoring data will need to be provided in a subsequent revision. Therefore, please commit to submitting a subsequent Technical Revision, which includes five quarters of groundwater sampling data from all three existing wells plus the two additional sampling points requested above (inside Cross Mine and Caribou Mine), for all parameters and standards required by the Interim Narrative Standard. This revision must include an evaluation of the data obtained, including a side-by-side comparison of the laboratory results for each parameter with its associated Interim Narrative Standard. In its review of this subsequent revision, the Division will reassess the sampling parameters and standards for the continued monitoring program.

GIR Comment 23d Response: *GIR commits to the submittal of a Technical Revision as requested by DRMS.*

DRMS Comment 24: There is no discussion in the sampling plan regarding Quality Assurance and Quality Control (QA/QC) sampling (e.g., rate of duplicate collection, rinsate blanks, field blanks, trip blanks). Please update this sampling plan to address how QA/QC sampling will be conducted at the site for both surface and groundwater sampling.

GIR Comment 24 Response: *Refer to Attachment G. It will address groundwater, surface water and effluent sampling procedures and QA/QC samples.*

DRMS Comment 25: Please provide a generalized cross-section of the site which includes the approximate mine pool level of the Cross Mine (at both natural and dewatered conditions), groundwater levels in the Cross Well and Cabin Well, and shows the approximate location of any applicable surface features, including mine features and Coon Track Creek.

GIR Comment 25 Response: *Please refer to the attachment H that has been added to support the two potentiometric maps in the groundwater report.*

DRMS Comment 26: Please provide a generalized cross-section of the site which includes the approximate mine pool level of the Caribou Mine (at both natural and dewatered conditions), groundwater levels in the Caribou Well and Cabin Well, and shows the approximate location of any applicable surface features, including mine features and Coon Track Creek.

GIR Comment 26 Response: *The two conceptual cross sections referenced above and depicting natural conditions and winze pump rate can be found in Attachment H.*

DRMS Comments 27a-d: The Division has the following comments regarding Map 2 – Site Map – Groundwater Monitoring Plan:

a) Please change the map title to “Surface and Groundwater Monitoring Plan”.

b) Please clearly label all proposed surface and groundwater monitoring locations.

c) Please clearly label the proposed compliance well.

d) Please be sure the mine features shown on this map correlate with those shown on the maps approved in AM-2. For example, this map shows a "Temporary Ore Storage" area located just south of the Cross Warehouse, which was removed from the maps in AM-2.

GIR Comment 27a and 27b Response: *A new combination groundwater, surface water and effluent sampling map can be found in Attachment F.*

GIR Comment 27c Response: *All sampling locations and respective compliance wells will be labeled. Our plans are to perform synoptic sampling events (i.e., all sampling will occur in 1 day).*

GIR Comment 27d Response: *Changes have been made as noted in prior Attachment F.*

ATTACHMENT A

*Permit Discharge Limitations per **DRMS Comment 4b**:*

Outfall 001A

ICIS Code	Effluent Parameter (2021)	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)					
	January	0.103		Report	Continuous	Recorder
	February	0.103		Report	Continuous	Recorder
	March	0.129		Report	Continuous	Recorder
	April	0.148		Report	Continuous	Recorder
	May	0.374		Report	Continuous	Recorder
	June	0.458		Report	Continuous	Recorder
	July	0.265		Report	Continuous	Recorder
	August	0.148		Report	Continuous	Recorder
	September	0.129		Report	Continuous	Recorder
	October	0.103		Report	Continuous	Recorder
	November	0.103		Report	Continuous	Recorder
	December	0.103		Report	Continuous	Recorder
00010	Temp Daily Max (°C) April-Oct, beginning September 1, 2014			Report	Continuous	Recorder
00010	Temp Daily Max (°C) Nov-March, beginning September 1, 2014			Report	Continuous	Recorder
00010	Temp MWAT (°C) April-Oct, beginning September 1, 2014		Report		Continuous	Recorder
00010	Temp MWAT (°C) Nov-March, beginning September 1, 2014		Report		Continuous	Recorder
00400	pH (SU)			6.5-9	2 Days/Month	Grab
00530	TSS, effluent (mg/l)	30	45		Monthly	Grab
84066	Oil and Grease (visual)			Report	2 Days/Month	Visual
03582	Oil and Grease (mg/l)			10	Contingent	Grab
00978	As, TR (µg/l)	Report			Monthly	Grab
01309	As, PD (µg/l)			Report	Monthly	Grab
01113	Cd, TR (µg/l)	50		300	Monthly	Grab
01313	Cd, PD (µg/l), until December 31, 2016					
	October through March	1.7		Report	2 Days/Month	Grab
	April through June	1.6		Report	2 Days/Month	Grab
	July through September	2.1		Report	2 Days/Month	Grab

01313	Cd, PD (µg/l), beginning January 1, 2017					
	January	0.63		2.3	2 Days/Month	Grab
	February	0.63		2.5	2 Days/Month	Grab
	March	0.60		2.4	2 Days/Month	Grab
	April	0.60		2.5	2 Days/Month	Grab
	May	0.62		2.6	2 Days/Month	Grab
	June	0.89		3.7	2 Days/Month	Grab
	July	0.75		3.1	2 Days/Month	Grab
	August	0.82		3.2	2 Days/Month	Grab
	September	0.87		3.0	2 Days/Month	Grab
	October	0.89		3.6	2 Days/Month	Grab
	November	0.69		2.8	2 Days/Month	Grab
	December	0.63		2.2	2 Days/Month	Grab
04262	Cr+3, TR (µg/l)			Report	Monthly	Grab
01314	Cr+3, PD (µg/l)	Report			Monthly	Grab
01220	Cr+6, Dis (µg/l)	Report		Report	Monthly	Grab
01119	Cu, TR (µg/l)	150		300	2 Days/Month	Grab
01306	Cu, PD (µg/l)					
	January	13		18	2 Days/Month	Grab
	February	13		20	2 Days/Month	Grab
	March	13		19	2 Days/Month	Grab
	April	13		20	2 Days/Month	Grab
	May	13		20	2 Days/Month	Grab
	June	13		20	2 Days/Month	Grab
	July	16		25	2 Days/Month	Grab
	August	17		25	2 Days/Month	Grab
	September	19		28	2 Days/Month	Grab
	October	19		28	2 Days/Month	Grab
	November	14		22	2 Days/Month	Grab
	December	13		18	2 Days/Month	Grab
00980	Fe, TR (µg/l)	Report		NA	Monthly	Grab
01114	Pb, TR (µg/l)	300		600	2 Days/Month	Grab
01318	Pb, PD (µg/l)					
	January	3.8		85	2 Days/Month	Grab
	February	3.8		94	2 Days/Month	Grab
	March	3.6		90	2 Days/Month	Grab
	April	3.6		94	2 Days/Month	Grab
	May	3.8		97	2 Days/Month	Grab
	June	5.4		140	2 Days/Month	Grab
	July	4.6		118	2 Days/Month	Grab
	August	5		122	2 Days/Month	Grab
	September	5.3		115	2 Days/Month	Grab

	October	5.4		135	2 Days/Month	Grab
	November	4.2		108	2 Days/Month	Grab
	December	3.8		85	2 Days/Month	Grab
01319	Mn, PD (µg/l)	Report		Report	Monthly	Grab
71900	Hg, Total (µg/l)	1		2	Monthly	Grab
50286	Hg, Tot (µg/l) (low level)	Report		Report	Quarterly	Grab
01322	Ni, PD (µg/l)	Report		Report	Monthly	Grab
01323	Se, PD (µg/l)	Report		Report	Monthly	Grab
01304	Ag, PD (µg/l)					
	January	0.12		2.9	2 Days/Month	Grab
	February	0.12		3.2	2 Days/Month	Grab
	March	0.11		3	2 Days/Month	Grab
	April	0.11		3.1	2 Days/Month	Grab
	May	0.12		3.2	2 Days/Month	Grab
	June	0.17		4.7	2 Days/Month	Grab
	July	0.14		3.9	2 Days/Month	Grab
	August	0.16		4.1	2 Days/Month	Grab
	September	0.17		3.8	2 Days/Month	Grab
	October	0.17		4.5	2 Days/Month	Grab
	November	0.13		3.6	2 Days/Month	Grab
	December	0.12		2.8	2 Days/Month	Grab
01094	Zn, TR (µg/l)	750		1500	Monthly	Grab
01303	Zn, PD (ug/l)					
	January	186		184	2 Days/Month	Grab
	February	186		203	2 Days/Month	Grab
	March	176		194	2 Days/Month	Grab
	April	176		202	2 Days/Month	Grab
	May	182		208	2 Days/Month	Grab
	June	262		301	2 Days/Month	Grab
	July	221		253	2 Days/Month	Grab
	August	241		263	2 Days/Month	Grab
	September	257		248	2 Days/Month	Grab
	October	262		291	2 Days/Month	Grab
	November	202		232	2 Days/Month	Grab
	December	186		182	2 Days/Month	Grab
51202	Sulfide as H2S (mg/l)	Report		NA	Monthly	Grab
	WET, chronic					
TKP6C	Static Renewal 7 Day Chronic *Pimephales promelas*			NOEC or IC25 ≥ IWC	Quarterly	3 Grabs / Test
TKP3B	Static Renewal 7 Day Chronic *Ceriodaphnia dubia*			NOEC or IC25 ≥ IWC	Quarterly	3 Grabs / Test

ATTACHMENT B

*Table 2. Sequential compliance samples collected and analyzed for the last reported per **DRMS Comment 9**:*

Outfall 001A Compliance Sample Results														
Analyte or Test	Test Type	Unit(s)	29-Dec-21	13-Jan-22	27-Jan-22	Jan 2022 30-day avg	Permitted Jan 30-day avg Max	Permitted Jan Daily Max	15-Feb-22	28-Feb-22	Feb 2022 30-day avg	Permitted Feb 30-day avg Max	Permitted Feb Daily Max	15-Mar-22
Physical Properties														
pH	N/a	s.u.	Min=7.6 Max=8.8	--	--	Min=6.7 Max=8.5	Not Required	6.5 - 9	--	--	Min=7.6 Max=8.4	Not Required	6.5 - 9	--
Solids, TSS	N/a	mg/L	ND	--	ND	0	30	Not Required	ND	--	0	30	Not Required	ND
Temp	N/a	°C	--	--	--	3.37	Not Required	Not Required	--	--	3.64	Not Required	Not Required	-
Organics														
Oil & Grease	HEM	mg/L	N/a	N/a	N/a	N/a	Not Required	10	N/a	N/a	N/a	Not Required	10	N/a
Inorganics														
Sulfide as H_2S	N/a	mg/L	ND	--	ND	0	Report	N/a	ND	--	0	Report	N/a	ND
Metals														
Ag	PD	ug/L	ND	ND	ND	0	0.12	2.9	ND	0.056	0.028	0.12	3.2	ND
As	PD	ug/L	ND	--	ND	0	Not Required	Report	ND	--	0	Not Required	Report	ND
As	TR	ug/L	ND	--	ND	0	Report	Not Required	ND	--	0	Report	Not Required	ND
Cd	PD	ug/L	ND	ND	ND	0	0.63	2.3	ND	ND	0	0.63	2.5	ND
Cd	TR	ug/L	ND	--	ND	0	50	300	0.19	--	0.19	50	300	0.19
Cr 3+	PD	ug/L	ND	--	ND	0	Report	Not Required	ND	--	0	Report	Not Required	ND
Cr 3+	TR	ug/L	ND	--	ND	0	Not Required	Report	ND	--	0	Not Required	Report	ND
Cr 6+	Dissolved	mg/L	ND	--	ND	0	Report	Report	0.005	--	0.005	Report	Report	ND
Cu	PD	ug/L	ND	ND	ND	0	13	18	ND	1.3	0.65	13	20	ND
Cu	TR	ug/L	ND	ND	ND	0	150	300	ND	--	0	150	300	0.84
Fe	TR	ug/L	46	--	24	24	Report	N/a	ND	--	0	Report	N/a	23
Hg	Tot	ug/L	ND	--	ND	0	1	2	ND	--	0	1	2	ND
Hg	Total, low level	ug/L	--	ND	--	0	Report low level	Report low level	0.003	--	0.003	Report low level	Report low level	ND
Mn	PD	ug/L	ND	--	ND	0	Report	Report	4.7	--	2.35	Report	Report	12
Ni	PD	ug/L	ND	--	ND	0	Report	Report	ND	--	0	Report	Report	0.56
Pb	PD	ug/L	1	ND	ND	0	3.8	85	0.86	3.3	2.08	3.8	94	0.98
Pb	TR	ug/L	1	ND	ND	0	300	600	0.9	0.86	0.88	300	600	0.95
Se	PD	ug/L	ND	--	ND	0	Report	Report	ND	--	0	Report	Report	ND
Zn	PD	ug/L	ND	ND	ND	0	186	184	16	12	14	186	203	31
Zn	TR	ug/L	14	--	ND	0	750	1500	10	--	10	750	1500	22

*Table 3. Wet Sample Results for the 1st Quarter 2022 per **DRMS Comment 9**:*

Client: Grand Island Resources, LLC **CO-0032751** **SCG Project No.: 422123.B**
Site: 00IA **Project: Quarterly WET**

Abstract with Results

Test Concentrations:	Control (0%), 18%, 37%, 73%, 87%, 100%
Number of Organisms/Concentration:	10 for *Ceriodaphnia dubia* 40 for fathead minnow
Replicates at each Concentration:	10 for *Ceriodaphnia dubia* 4 for fathead minnow

	Ceriodaphnia dubia	**fathead minnow**
Test vessel size/Exposure volume	30ml/15ml	500ml/200ml
Sub-lethal NOEL/IC25	100%/>100%	100%/>100%
Pass/Fail Status	**PASS**	**PASS**
Temperature Range (°C)	24.1 - 25.3	24.1 -25.7
Dissolved Oxygen Range (mg/L)	6.8 - 8.4	4.1- 7.3
pH Range	7.8 - 8.3	7.8 - 8.3
	Control (*Cerio/FHM*)	**Effluent Sample**
Hardness (mg/Las CaCO3)	89/93	127/140/118
Alkalinity (mg/L as CaCO3)	58/63	110/103/107
Total residual chlorine (mg/L)	<0.01	<0.01
Total ammonia (mg/Las NH3)	<0.03	0.08/0.12/0.11

ATTACHMENT C

*See SOP below in reference to **DRMS comment 14:***

Cross-Caribou Mine Water Treatment – SOP-001 WTP Controls

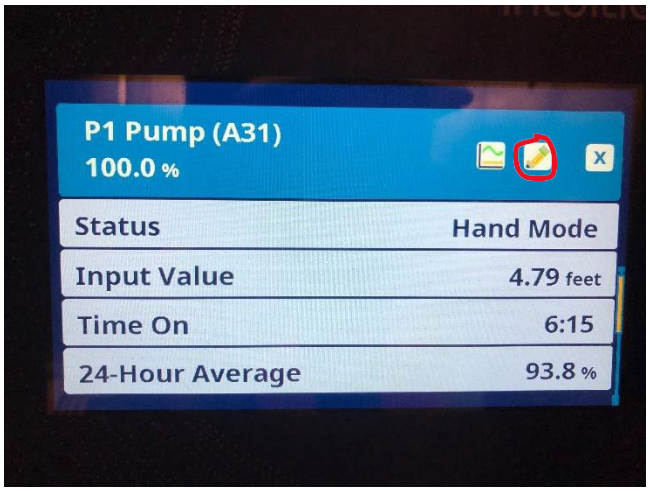
This Standard Operating Procedure (SOP) is dedicated to running the interim water treatment system. It includes shutting down the system, changing out the bag filters, adjusting the Cross Mine water to Pond 1 and starting up the system.

Shutting Down the System

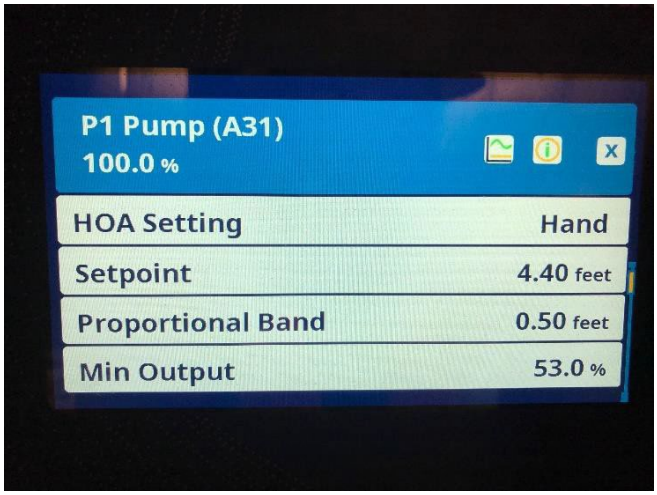
1. Go to the programmable logic control (PLC) display located in the water treatment system connex. It is mounted on the left side of the bag filter system.

2. Ensure it is displaying the home screen pictured below. If not touch the home icon on the top left corner of the screen. Once on the home screen, touch the P1 Pump (A31) icon.

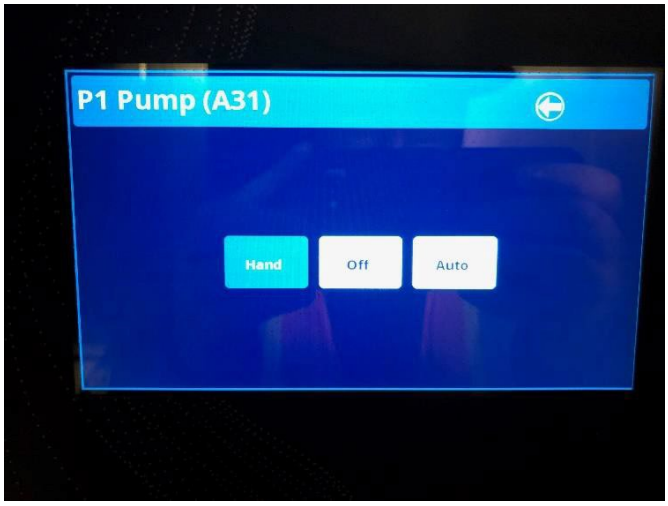
3. Once on the P1 Pump (A31) page, touch the pencil icon shown in the picture below.



4. Once the pencil icon has been pressed, it enables changes to the P1 Pump (A31). Touch the HOA Setting bar shown in the picture below.



5. Once the HOA Setting bar has been pressed, the screen below will appear. Click the Off icon. The influent pump will ramp down and shut off.



6. Once the influent pump has ramped down, ensure that both the valve after the Metsorb vessel, pictured below, and the valve after the bag filter system are closed. This needs to be done to stop from draining the media vessel.

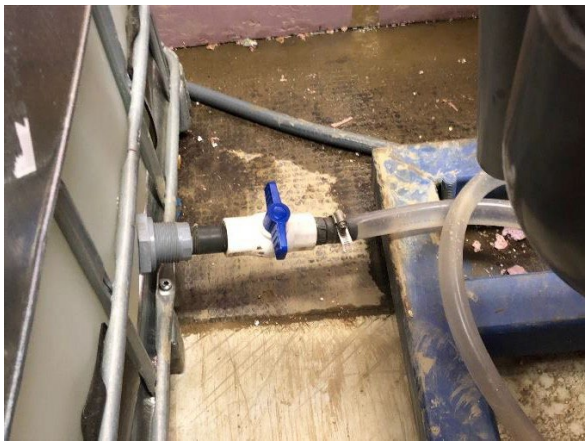
Changing the Bag Filters/Turning the System On

1. Ensure that Steps 1-6 of Shutting Down the System have been completed.

2. Once those steps have been completed open up each of the 1/4” valves on the top of each bag filter housing shown in the picture below.

3. Open up each of the valves located on the bottom of each bag filter housing shown in the picture below.

4. Open up the valve going into the tote on the right side of the bag filter unit shown in the picture below. This allows all of the bag filter housings to drain.



5. Unscrew the three nuts located on the top of each bag filter housing shown in the picture below and remove the top of the housing. Remove the compression spring inside of the housing noting the orientation it was in for reinstallation later.

6. Once the bag filter housing has drained, remove the spent bag filters and place them inside of the black and yellow tote next to the water tote.

7. Install new 5-micron bag filters in each housing. They are located in boxes on the far side of the second Metsorb vessel. Ensure that the white seal it fully seated within the filter basket in the bag filter housing.

8. Return the compression spring, return the top back on the housing and tighten the bolts from Step 5.

9. Close the valves in Step 3 and Step 4.

10. Open the valves in Step 6 of Shutting Down the System.

11. The PLC should be showing Step 5 of Shutting Down the System. If not, follow steps 1-4 of Shutting Down the System to return to that screen. Once at that screen, touch Auto. This will put it back into PLC control and the influent pump will start running.

12. Once water starts following through the system the ¼" valve and tubing on top of each bag filter housing will continue to bleed the air from the housing. Once all air is bleed and a flow stream of water is flowing from the housings, close each of the ¼" valves.

Turning Off/On the Cross Mine Pump & Throttling the Flow to Pond 1

This is to be done each morning until the Pond 1 level returns to 4.6-4.7 feet. This valve is displayed on the home screen of the PLC. It is shown as P1 Level.

Shutting Off the Cross Mine Pump

1. Enter the Cross Snow Shed with a W65 self-rescue along with all other required PPE. A head light or flashlight will be needed.

2. Walk until you come to a split and stay left towards the Winze. Right are the split there will be multiple control boxes. Turn the switch on the control box shown below from Manual to Off. Regard the No and Yes written in marker on the control box.

Turning On the Cross Mine Pump

1. Repeat steps 1-2 on Turning Off the Cross Mine Pump but turn the switch from Off to Manual.

2. The valves that either allow water to Pond 1 or recirculate back in the Cross workings need to be checked to ensure to correct amount flow is going into Pond 1. They are located a few more feet past the control boxes walking towards the Winze. The valves have been marked as shown in the pictures below. Ensure the mark lines up with the angle of the valve handle as shown.

3. Once the pump is in manual function and the valves have been checked, there is a flowmeter display located approximately 50 feet from the door going into the Cross Shop. If you're walking into the Cross Mine it will be on the righthand side. It is pictured below. Ensure that the flow is somewhere between 2000-2500 g/h. If it is not, use the valves to manipulate the flow into that range.

ATTACHMENT D

GRAND ISLAND RESOURCES LLC
SURFACE WATER MONITORING PLAN (SMP)
CROSS AND CARIBOU MINES
NEDERLAND, COLORADO

PREPARED BY:
GRAND ISLAND RESOURCES LLC
CROSS AND CARIBOU MINES
4415 CARIBOU ROAD
NEDERLAND, CO 80466

Table of Contents

CERTIFICATION

Name and Location of Project:
Grand Island Resources, LLC
Cross and Caribou Mines
4415 Caribou Road
Nederland, CO 80466

SMP Administrator:
Name: Richard Mittasch
Address: 4415 Caribou Road, Nederland, CO 80466
Phone Number: 720-893-3749

Name, Address, Phone Number, and Email Address
Richard Mittasch – Operator and Administrator
4415 Caribou Road
Nederland, CO 80466
720-893-3749
rmittasch@nedmining.com

INTRODUCTION

This Surface Water Monitoring Plan (SMP) was prepared and is submitted by Grand Island Resources (GIR) in compliance with Code of Colorado Regulations, Division of Reclamation, Mining, and Safety (DRMS), Rule 3.1.6 Water – General Requirements. The Plan is included as Part of Technical Revision 10 as mandated by Mined Land Reclamation Board Findings of Fact, Conclusions of Law, and Order, issued to Grand Island Resources on February 18, 2022 (File No. M-1977-410. MV-2021-017), Corrective Action 1.

The SMP addresses Hydrology and Water Quality of the prevailing hydrologic balance of the GIR permitted properties in Nederland, Colorado. The site consists of a Historic Mining District and, therefore, the surface facilities have existed for decades. Characterization data will be obtained from ambient surface water along Coon Track Creek which traverses the site and constitutes the only surface water outfall from the currently active operations area in the property.

Site specific stream flow or surface water quality data are not available for Coon Track Creek or North Beaver Creek into which Coon Track Creek and Hicks Gulch discharge. North Beaver Creek flows into Middle Boulder Creek at Nederland, CO. GIR utilized the USGS StreamStats (v4) to estimate streamflow statistics for the GIR Site watershed; because the site watersheds are less than 1 square mile in area, GIR compared the StreamStats results with Stream flow data from Middle Boulder Creek at Nederland, CO, USGS Station ID 06725500. The estimated values correlated and therefore GIR will use the results for planning purposes.

SITE DESCRIPTION

The site is an active gold and silver mine (Colorado Division of Reclamation, Mining, and Safety 110 (2) Permit M1977-410, issued 11/3/1980), located 3 miles west of Nederland, Colorado on lands adjacent to the Roosevelt National Forest, at a mean elevation of approximately 9700 feet, Mean Sea Level (MSL). The permit boundary is located on private land owned or controlled by GIR (Figure 1).

WATERSHED HYDROLOGIC CHARACTERISTICS

The purpose of this SMP is to address Hydrology and Water Quality of the prevailing hydrologic balance of the property. DRMS requested that GIR collects water quality sample at a location upstream and a location downstream of the permitted area; GIR inspected the watershed reporting and through the site and selected two locations based on accessibility and features of Coon Track Creek. The two Sample Points are labelled 2022-01 and 2022-02 for upstream and downstream, respectively. The upper watershed from the top of the divide to Sample Point 2022-01 comprises 0.54 square mile basin, and, from Sample Point 2022-01 downstream to Sample Point 2022-02 the watershed has an area of 0.79 square miles (i.e., an additional 0.25 square mile basin), both sampling locations are depicted on Figure 1.

The Hydrologic Characteristics of the Watersheds are presented on Table 3.1.1

Table 3.1.1. Watershed Hydrologic Characteristics

Description	Sample Point 2022-01	Sample Point 2022-02	Units
Watershed			
Watershed area	0.54	0.79	square miles
Percentage of barren from NLCD 2011 class 31	0.6%	0.4%	
Percentage of cultivated crops and hay, classes 81 and 82, from NLCD 2011	0.0%	0.0%	
Percentage of developed (urban) land from NLCD 2011 classes 21-24	0.0%	0.0%	
Percentage of forest from NLCD 2011 classes 41-43	40.9%	52.5%	
Percent of area covered by grassland/herbaceous using 2011 NLCD	52.9%	43.2%	
Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.6%	1.5%	
Percent of area covered by shrubland using 2011 NLCD	0.0%	0.0%	
Percent snow and ice from NLCD 2011 class 12	0.0%	0.0%	
Percent of open water, class 11, from NLCD 2011	0.0%	0.0%	
Percentage of wetlands, classes 90 and 95, from NLCD 2011	5.5%	3.7%	
Minimum basin elevation	9,850.0	9,550.0	ft A.M.S.L.
Elevation of the stream outlet in feet above NAVD88	9,845.0	9,552.0	ft A.M.S.L.
Mean Annual Precipitation	32.1	31.7	inches
Runoff-curve number as defined by NRCS (http://policy.nrcs.usda.gov/OpenNonWebContent.aspx?content=17758.wba)	70.3	69.3	dimensionless
Percentage of area of Hydrologic Soil Type A from SSURGO	0.0%	0.0%	
Percentage of area of Hydrologic Soil Type B from SSURGO	2.4%	12.8%	
Percentage of area of Hydrologic Soil Type C from SSURGO	90.5%	74.9%	
Percentage of area of Hydrologic Soil Type D from SSURGO	0.0%	0.0%	
Percentage of clay soils from STATSGO	10.6%	10.6%	
Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0.0%	0.0%	
Time of concentration in hours	0.84	0.98	hours

VEGETATION

The following vegetation information is taken from the "Cross Mine Vegetation Ecological Site Survey and Assessment" prepared by Walsh Environmental Scientists and Engineers, LLC, March 12, 2008.

This study was conducted to identify, delineate, and describe the plant communities at the Cross Mine, Boulder County, Colorado. The Cross Mine is located five miles west of Nederland, Colorado adjacent to the Roosevelt National Forest, at an elevation of approximately 9,700 ft., MSL. The site is bisected by Coon Track Creek, a tributary of Beaver Creek which flows into Middle Boulder Creek before delivering flows to Barker Reservoir.

Identification Methods

Walsh ecologists performed a plant community identification via a series of site inspection visits staring with a kick-off meeting on May 24, 2006. Additional site visits were conducted on June 12 and October 5, 2006. Initial plant community identifications were made from a recent aerial photograph of the site. The site was traversed on foot and these identifications were confirmed or modified with additional observations and information. Confirmed community boundaries were drawn over the aerial photo image and digitized. A brief description of each community was composed, including a list of dominant plant species. Thirteen plant communities (comprising 25.1 acres) were described and mapped. These include 11 upland and two wetland communities. Each community is described below.

Upland Plant Communities

Aspen Woodland

Aspen woodland is the most widespread plant community on the site, comprising three individual polygons and representing 7.33 acres (29.2 percent) of the site.

This community is dominated by a relatively closed quaking aspen (Populus tremuloides) canopy. A few scattered limber coniferous species contribute a minor component to this canopy and include limber pine (Pinus flexilis) and lodgepole pine (Pinus contorta) as well as subalpine fir (Abies bifolia), Engelmann spruce (Picea engelmannii) and blue spruce (Picea glauca).

A lush understory is dominated by graminoids including mountain brome (Bromus marginatus), Timothy (Phleum pratense), and bluegrasses (Poa spp.) Wood's rose (Rosa woodsii) and shrubby cinquefoil (Pentaphylloides floribunda) represent a limited shrub stratum. A diverse forb component is dominated by Alsike clover (Trifolium hybridum), yarrow (Achillea lanulosa),

wild strawberry (Fragaria vesca), silver lupine (Lupinus argenteus), and black-eyed Susan (Rudbeckia hirta).

Limber/Lodgepole Pine Parkland

The limber/lodgepole pine parkland includes three polygons comprising 5.44 acres (21.7 percent) of the site. Parklands refer to areas of scattered trees with canopy cover of 50 percent or less. In these areas, limber and lodgepole pine trees are scattered amidst meadows comprising the same species found in the upland meadow community.

Aspen/Lodgepole Pine Parkland

Aspen/lodgepole pine parkland includes less than a half-acre (1.1 percent) of the site. Aspen and lodgepole pine trees are scattered throughout open meadows with an herbaceous component comprising essentially the same species as found in the upland meadows. This portion of the site represents areas not having vegetation due to on-going mining activities.

Disturbed Upland Meadow

The second-most extensive community of the project site, the disturbed upland meadow area, comprises 4.3 acres (17.3 percent) of the site. It appeared that this community more closely resembles the upland meadow areas. However, the plant community has been modified in response to surface disturbances caused by human activities such as livestock grazing and construction. Fewer native species occur in these areas, which are notably dominated by planted pasture or reclamation grasses such as smooth brome, Timothy, and Kentucky bluegrass (Poa pratensis).

Lodgepole Pine Parkland

The lodgepole pine parkland comprises less than an acre (2.7 percent) of the site. This parkland community is named for the lodgepole pine scattered throughout a generally upland meadow herbaceous community dominated by Timothy and smooth brome, intermixed with yarrow and wild strawberry. Common juniper, shrubby cinquefoil, and mountain snowberry (Symphoricarpos oreophilus) represent a scattered shrub story.

Planted Grasses

This community comprises less than an acre (1.8 percent) of the site. These areas appear to be locations where the native plant community has been completely removed during human activities and replaced by planted pasture and reclamation grasses such as smooth brome, mountain brome, Timothy, and Kentucky bluegrass.

Rocky Outcrop

A rock outcrop includes approximately a tenth of an acre (0.6 percent) in the north portion of the site. This feature supports a few trees and shrubs including subalpine fir, Englemann spruce, lodgepole, limber pine, and broom huckleberry (Vaccinium scoparium). Forbs such as pussytoes and golden banner (Thermopsis montana) were also present.

Spruce/Fir Woodland

Limited spruce/fir woodland occurs in the north part of the site, comprising approximately a third of an acre (1.5 percent of land). This community is characterized by a dense Englemann spruce and subalpine fir canopy with a sparse understory of shrubs including broom huckleberry, twinberry honeysuckle (Lonicera involucrata), fireweed (Chamerion danielsii), whisk broom parsley (Harbouria trachypleura), and heartleaf arnica (Arnica cordifolia).

Upland Meadow

The upland meadow compromises a small portion of the northern part of the site and accounts for less than an acre (2.9 percent of the site). The area is characterized by Kentucky bluegrass and prairie sagewort forb (Artemisia ludoviciana) as co-dominants in a species-rich herbaceous community. Other common grasses include smooth brome (Bromopsis inermis), Timothy, Canada bluegrass (Poa compressa), and sun sedge (Carex pensylvanica subsp. heliophila). The most common forbs include sedum (Amerosedum lanceolatum), pussytoes (Antennaria parviflora), fringed sage (Artemisia frigida), wild geranium (Geranium richardsonii and G. viscossisimum), yarrow (Achillea lanulosa), fringed thistle (Cirsium centaureae) and wild strawberry.

The only weed noted includes scattered small populations of Canada thistle (Breea arvensis) at the community edges where it grades into more mesic areas. (The SWMP includes a commitment to control noxious weeds which may occur within the proposed permit area.). Scattered, low-growing shrubs include Wood's rose, shrubby cinquefoil, broom huckleberry and common juniper (Juniperus communis). Occasional clumps of Scouler's willow (Salix scouleriana) also occur in the upland meadow.

Willow/Spruce/Fir Woodland

The willow/spruce/fir woodland represents an intermediate community that grades into both the spruce/fir woodland as well as the willow woodland. This community represents slightly more than an acre (4.1 percent) of the site. The canopy is dominated by a number of willow species including Geyer (Salix geyeriana), plane-leaf (S. planifolia), mountain (S. montana), and sandbar (S. exigua) intermixed with Colorado blue spruce (Picea pungens) and subalpine fir. This community also supports a diverse shrub story with dense stands of thin-leaf alder (Alnus

incana subsp. Tenuifolia) and bog birch (Betula pumila) as well as wax currant (Ribes cereum), prickly currant (R. lacustre), twinberry honeysuckle and Wood's rose.

A lush herbaceous understory includes wild strawberry, wild geranium, large-leaved avens (Geum macrophyllum), yellow bedstraw (Galium verum), bluebells (Mertensia ciliata), dandelion (Taraxacum officinale), clover (Trifolium spp.), and death camas (Zigadenus venenosus).

Willow Woodland, a Wetland Community

The willow woodland community occurs adjacent to the creek channel, in the most mesic portion of the site. This woodland comprises almost a half-acre (1.7 percent) of the site. The area is characterized by a dense willow canopy composed of the same species found in the willow/spruce/fir woodland. The same dense shrub and lush herbaceous components that are present in the willow/spruce/fir woodland also occur in this community.

SURFACE WATER FLOW ESTIMATE AND MEASUREMENT

The purpose of this SMP is to obtain water quality data from surface water in Coon Track Creek upstream and downstream of the mining complex. Characterization data will be obtained from ambient surface water along the portions of Coon Track Creek traversing the site which constitutes the only surface water outfall from the currently active operations area of the property. Surface water flow data will be collected concurrently with water quality sampling campaigns.

Surface water flow regression analyses were performed by GIR, via USGS StreamStats platform, with the purpose of making tangible flow quantity and variability within the section of Coon Track Creek that traverses the site. The results, described in the following subsections, indicate high seasonal flow variability. The watershed reporting through the site is relatively small (0.74 square miles). Located in mountainous terrain with a drainage way characterized by steep gradient results in a quick response to precipitation and snow melt. Those characteristics were considered in the determination of proper water flow measuring strategies. In consultation with DRMS during a conference call held on April 12, 2022, DRMS and GIR agreed that the installation of flumes or weirs is not essential to DRMS' purpose and therefore, surface water flows will be estimated via bucket and stopwatch.

As indicated under Section 3, GIR selected two Sample Points (namely 2022-01 and 2022-02) to comply with DRMS' mandate pertaining to water quality and water quantity upstream and downstream of the mining complex.

MEAN MONTHLY FLOW

The monthly surface water flows on Coon Track Creek through the site vary greatly throughout the year. As an example, the watershed to Sample Point 2022-01 the monthly mean from varies from an estimated ~45 gallons per minute (0.10cfs) to ~ 2,700 gallons per minute (6.04cfs) in February and June, respectively. The following table provide monthly estimates in cubic feet per second for both Sampling Points.

Table 4.1.1. Mean Monthly Surface Water Flow

Description	Sample Point 2022-01	Sample Point 2022-02	Units
Watershed			
Watershed area	0.54	0.79	square miles
Monthly Mean Flow Statistics			
January Mean Flow	0.11	0.16	ft^3/s
February Mean Flow	0.10	0.15	
March Mean Flow	0.10	0.14	
April Mean Flow	0.16	0.25	
May Mean Flow	2.08	2.92	
June Mean Flow	6.04	8.10	
July Mean Flow	2.16	2.90	
August Mean Flow	0.83	1.12	
September Mean Flow	0.40	0.55	
October Mean Flow	0.27	0.38	
November Mean Flow	0.19	0.27	
December Mean Flow	0.13	0.19	

PEAK FLOW ANNUAL EXCEEDANCE PROBABILITY (AEP) ESTIMATES

The estimated Annual Exceedance Probability (AEP) of instantaneous peak flow for the Coon Track Creek at Sampling Point 2022-01, indicate that peak flow in excess of 5,700 gallons per minute (12.7cfs) is likely to occur while peak flow in excess of 19,500 gallons per minute (43.4cfs) are unlike to occur. These results are used to verify the suitability of the stream gauging station currently installed on site. The table below provide the range of estimated AEP values for both Sampling Points.

Table 4.2.1. Peak-Flow Probability Estimates

Description	Sample Point 2022-01	Sample Point 2022-02	Units
Watershed			
Watershed area	0.54	0.79	square miles
Peak-Flow Statistics (maximum instantaneous flow annual exceedance			
50-percent AEP flood	12.70	17.40	ft^3/s
20-percent AEP flood	18.20	24.70	
10-percent AEP flood	21.60	29.40	
4-percent AEP flood	26.50	35.90	
2-percent AEP flood	31.10	42.20	
1-percent AEP flood	34.50	46.70	
0.5-percent AEP flood	37.20	50.30	
0.2-percent AEP flood	43.30	58.60	

7-DAY MEAN LOW FLOW RETURN PERIOD

Mean Low Flow statistics reflect estimated of the lowest flow event in the stream that would be expected to occur over a period of record. For this SMP, a 7-day average period was selected by GIR. The recurrence frequency and corresponding flow low estimate for both Sampling Points are provided on the following table.

Table 4.3.1. 7-Day Mean Low Flow Probability Estimates

Description	Sample Point 2022-01	Sample Point 2022-02	Units
Watershed			
Watershed area	0.54	0.79	square miles
Low-Flow Statistics (mean low flow @ return period)			
7 Day 2 Year Low Flow	0.03	0.04	ft^3/s
7 Day 10 Year Low Flow	0.01	0.02	
7 Day 50 Year Low Flow	0.02	0.02	

7-DAY MEAN MAXIMUM FLOW RETURN PERIOD

Mean Maximum Flow statistics reflect estimated of the highest flow event in the stream that would be expected to occur over a period of record. For this SMP, a 7-day average period. The recurrence frequency and corresponding maximum flow estimate for both Sampling Points are provided on the following table.

Table 4.4.1. 7-Day Mean Maximum Flow Probability Estimates

Description	Sample Point 2022-01	Sample Point 2022-02	Units
Watershed			
Watershed area	0.54	0.79	square miles
Flood-Volume Statistics (mean maximum flow @ return period)			
7 Day 2 Year Maximum	8.41	11.20	ft^3/s
7 Day 10 Year Maximum	11.90	16.10	
7 Day 50 Year Maximum	15.80	21.40	

FLOW DURATION

Flow duration estimates constitute the percentage of time that flow in a drainageway is likely to equal or exceed certain values. The estimated flow and duration for both Sampling Points in Coon Track Creek are shown on table 4.5.1. As can be expected, small watersheds in steep terrain result in fast response hydrographs; this appears tangible when comparing the 10 percent duration flow with the 20 percent duration flow (i.e., an approximate 4.9-fold reduction in flow).

Table 4.5.1. Flow Duration % of Time

Description	Sample Point 2022-01	Sample Point 2022-02	Units
Watershed			
Watershed area	0.54	0.79	square miles
Flow-Duration Statistics (flow exceedance as percentage of the time)			
10 Percent Duration	2.93	4.00	ft^3/s
25 Percent Duration	0.60	0.84	
50 Percent Duration	0.20	0.28	
75 Percent Duration	0.10	0.14	
90 Percent Duration	0.04	0.07	

WATER QUALITY

GIR inspected the watershed upstream and downstream of the currently permitted treated water discharge Outfall 001 and determined that two Sample Points (namely 2022-01 and 2022-02) are required to address water quality upstream and downstream of the mining complex.

The Sample Point locations were discussed and agreed upon between DRMS and GIR during a conference call held on April 12, 2022, including the Sampling Frequency and Analytical Parameters.

SAMPLE POINTS AND FLOW GAUGING STATION LOCATIONS

2022-01

Water Quality Sampling Point 2022-01 is located upstream of the GIR Mining Complex encompassing 0.54 square miles of watershed, it is intended to provide surface water quality in Coon Track Creek from undisturbed land. (Latitude 39.97904, Longitude -105.57585). See Figures 1 and 2.

2022-02

Water Quality Sampling Point 2022-02 is located downstream of the CDPHE Water Treatment Outfall-001 and downstream of the GIR Mining Complex encompassing 0.74 square miles of watershed. (Latitude 39.975787, Longitude -105.569328). See Figures 1 and 2.

SAMPLE COLLECTION FREQUENCY

DRMS and GIR agreed to collect and test surface water samples with the same frequency and concurrently with the groundwater sampling quarterly events, if field conditions allow access to the Sampling Points and that flow in Coon Track Creek can be observed.

ANALYTICAL PARAMETERS

DRMS and GIR agreed to test surface water constituents to match the parameters prescribed in the current CDPHE Water Quality Division Water Discharge Permit for the Facility, the parameters are provided below:

1. Ag
2. As
3. Cd
4. Cr+3
5. Cr+6
6. Cu
7. Fe
8. Hg
9. Mn
10. Ni
11. Pb
12. Se
13. Sulfide (as H2S)
14. Zn
15. Oil and Grease (mg/l and visual)
16. pH (su)
17. Temperature
18. TSS

SAMPLE COLLECTION PROTOCOLS

Flow sampling will be done visually with a bucket as it likely the flow rates will be highly variable seasonally and overbank flow will occur during snowmelt and heavy rainfall event in the Spring. Samples will be collected with a standard water sample cup on a pole that will be decontaminated in the manner described in the

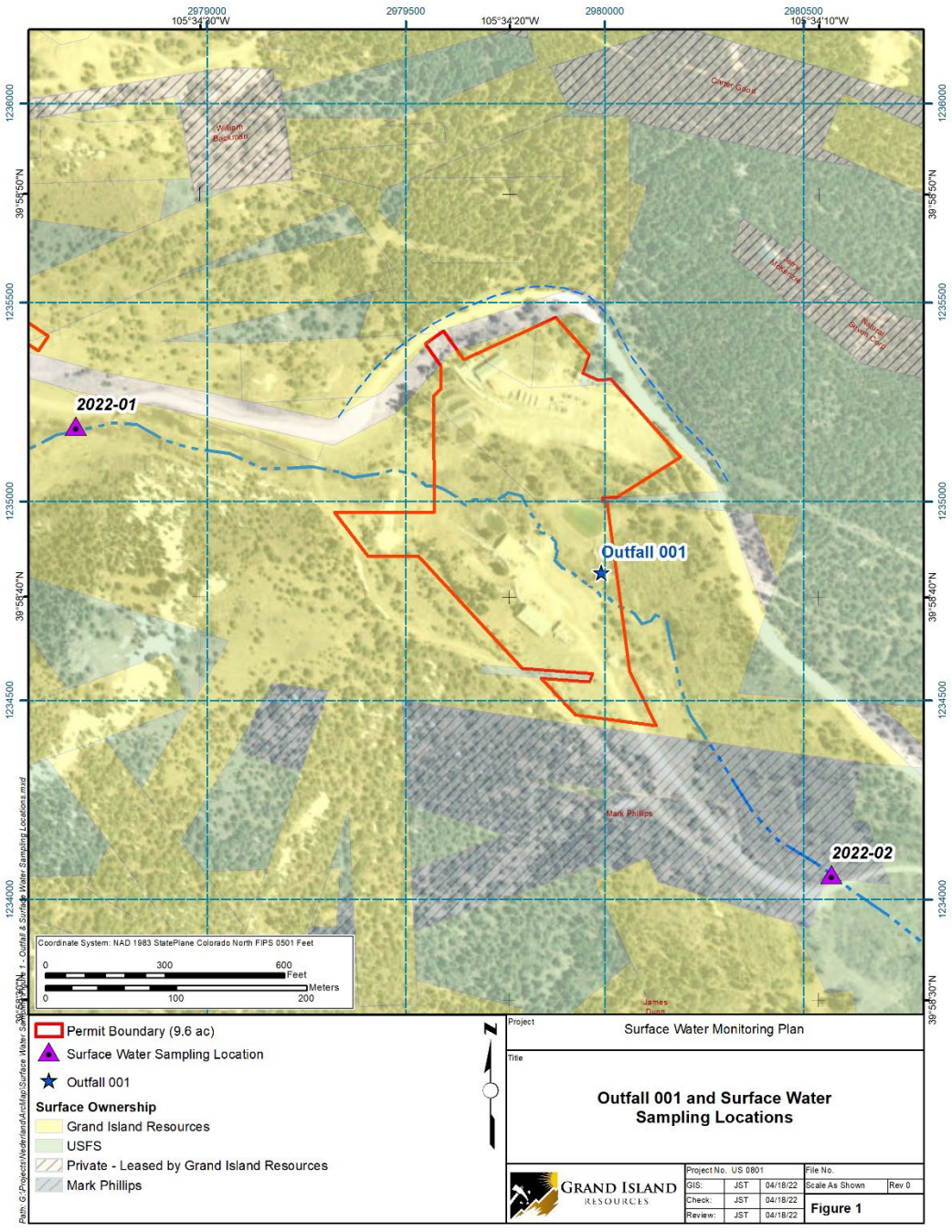


Figure 1: Outfall 001 and Surface Water Sampling Locations, which shows property ownership and permit boundaries.

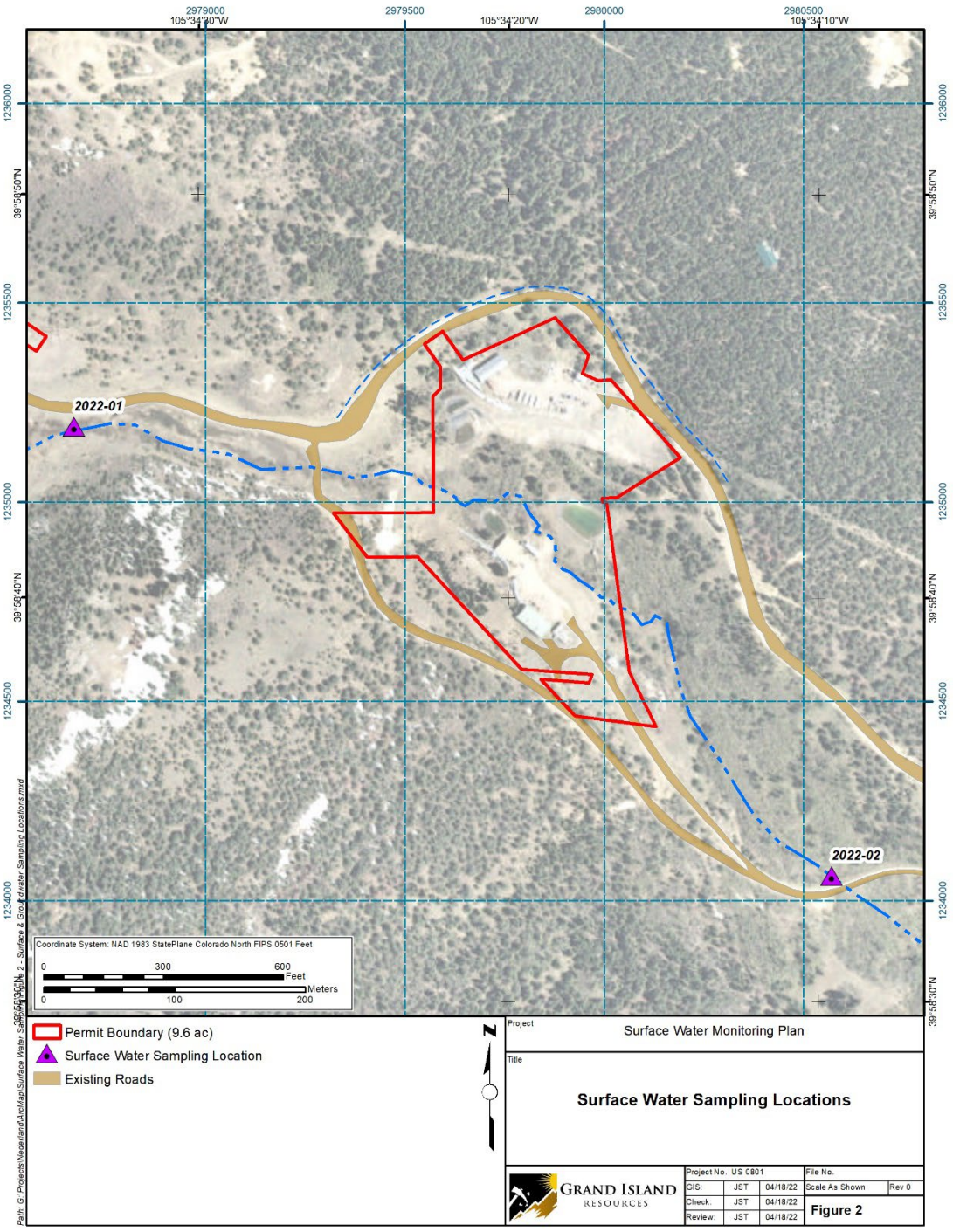
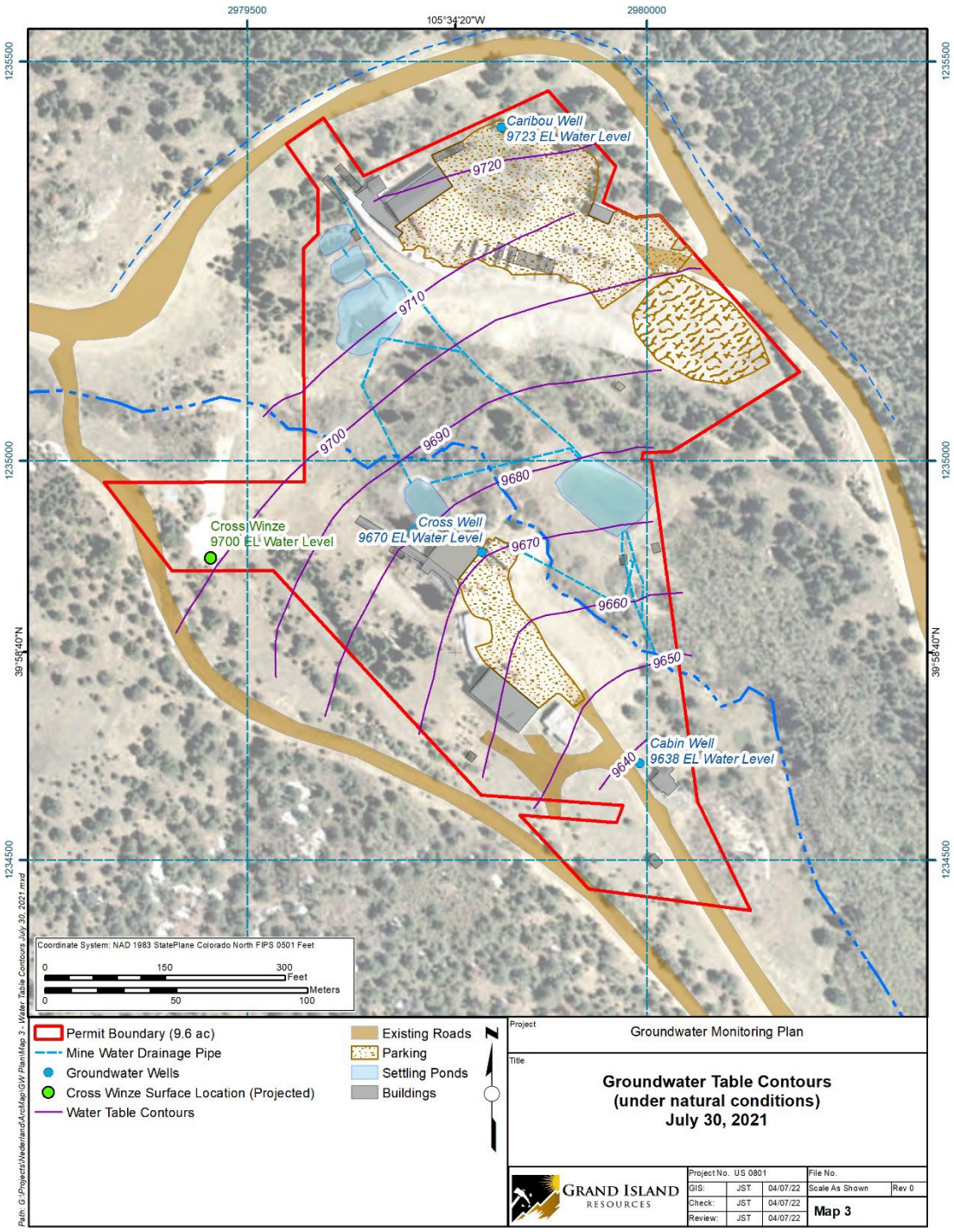
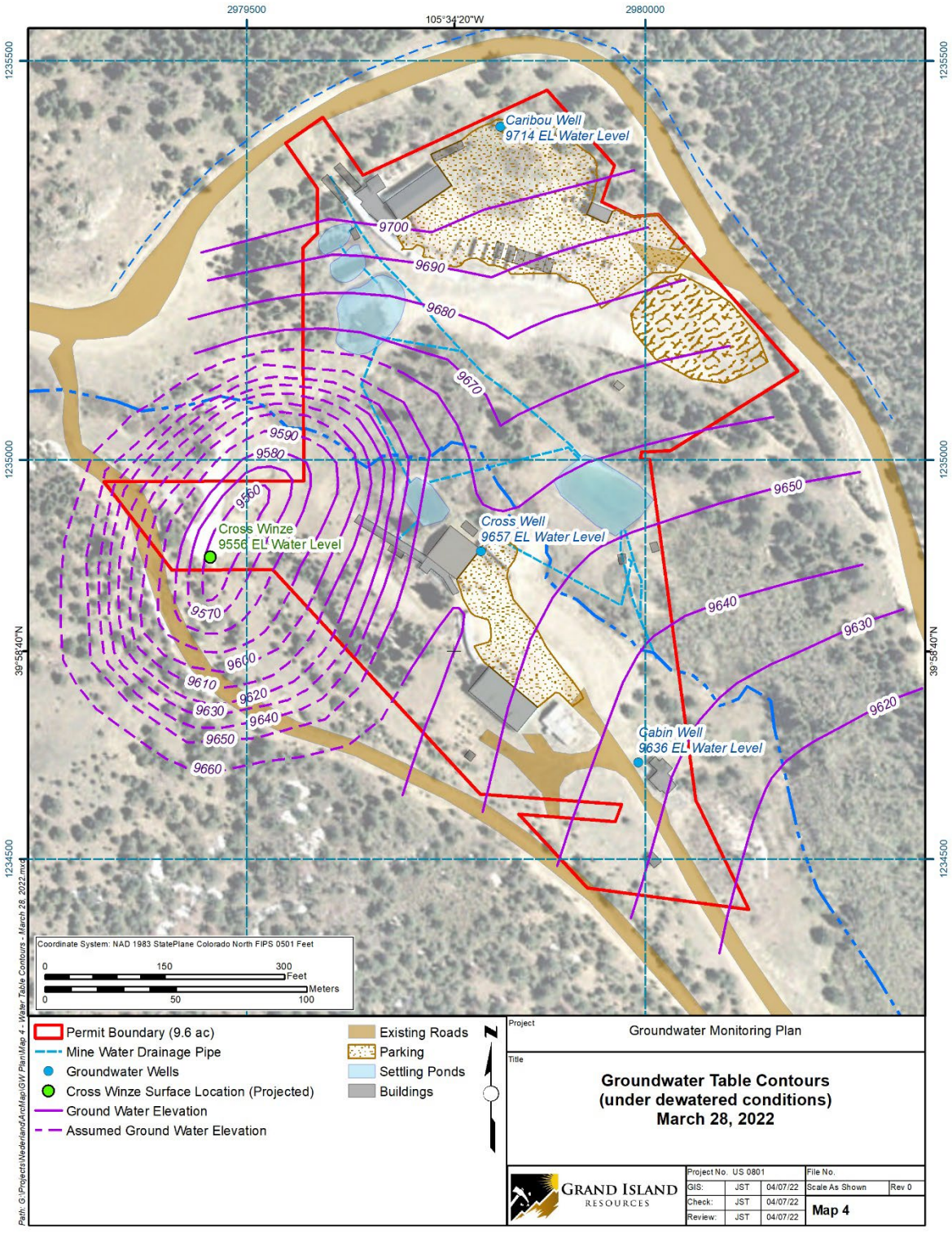


Figure 2: Surface Water Sampling Locations, which shows permit boundaries and the locations of Sample Points 2022-01 and 2022-02, also referenced in the Tables above.

ATTACHMENT E

*See below for multiple figures which clarify **DRMS Comments 25 and 26**:*

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Caribou Well
9714 EL Water Level
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Cross Well
9657 EL Water Level
Gabin Well
9636 EL Water Level
9700
9690
9680
9670
9590
9580
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9600
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9620
9630
9640
9650
9660
Coordinate System: NAD 1983 StatePlane Colorado North FIPS 0501 Feet
0 150 300 Feet
0 50 100 Meters
Permit Boundary (9.6 ac)
Mine Water Drainage Pipe
Groundwater Wells
Cross Winze Surface Location (Projected)
Ground Water Elevation
Assumed Ground Water Elevation
Existing Roads
Parking
Settling Ponds
Buildings
N
Project
Groundwater Monitoring Plan
Title
Groundwater Table Contours
(under dewatered conditions)
March 28, 2022
GRAND ISLAND RESOURCES
Project No. US 0801
File No.
GIS: JST 04/07/22
Scale As Shown
Rev 0
Check: JST 04/07/22
Review: JST 04/07/22
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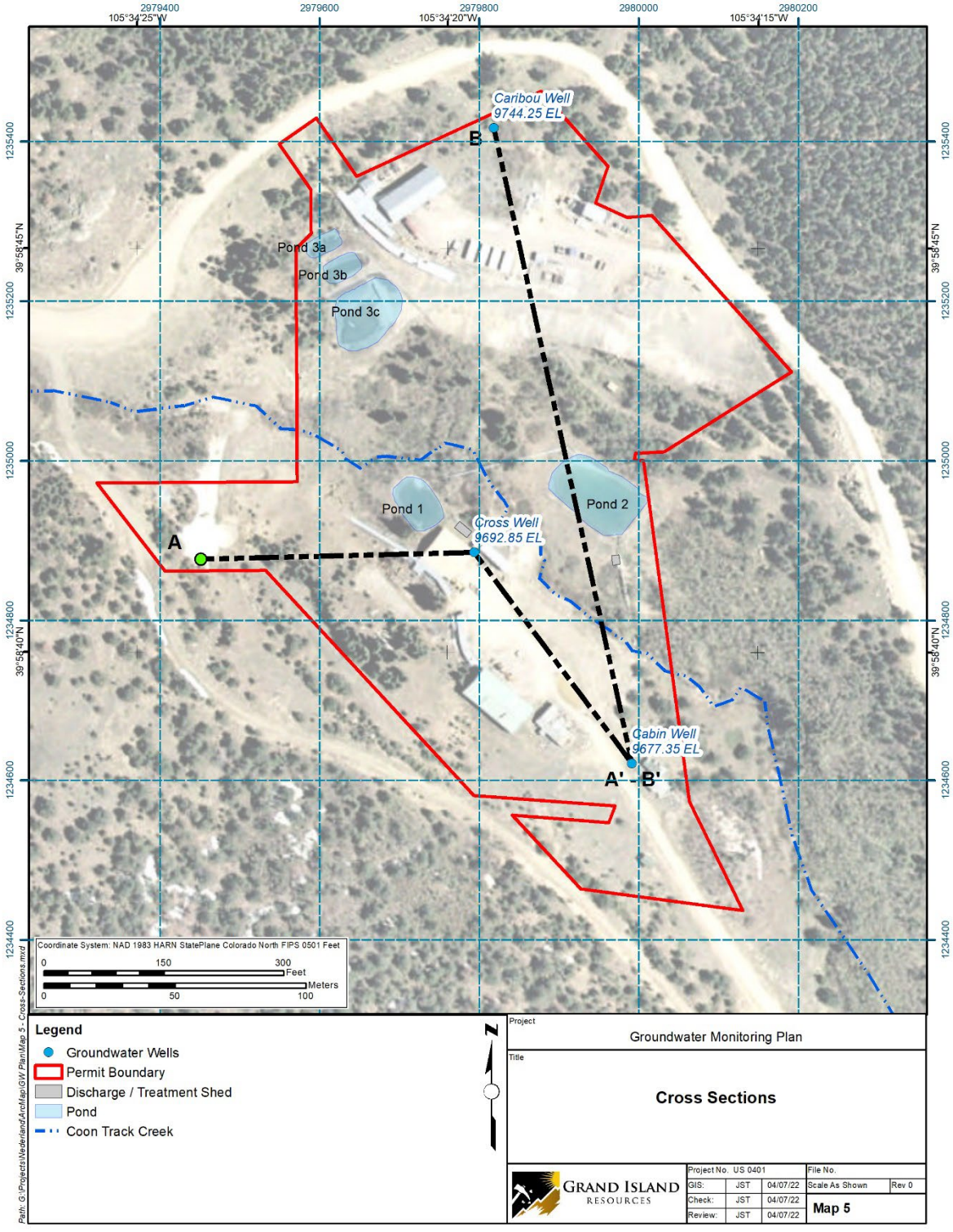
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1234800
1234600
1234400
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39°58'40"N
Caribou Well
9744.25 EL
B
Pond 3a
Pond 3b
Pond 3c
Pond 1
Pond 2
Cross Well
9692.85 EL
A
Cabin Well
9677.35 EL
A' - B'
Coordinate System: NAD 1983 HARN StatePlane Colorado North FIPS 0501 Feet
0 150 300 Feet
0 50 100 Meters
Legend
Groundwater Wells
Permit Boundary
Discharge / Treatment Shed
Pond
Coon Track Creek
N
Project
Groundwater Monitoring Plan
Title
Cross Sections
GRAND ISLAND RESOURCES
Project No. US 0401
File No.
GIS: JST 04/07/22
Scale As Shown
Rev 0
Check: JST 04/07/22
Review: JST 04/07/22
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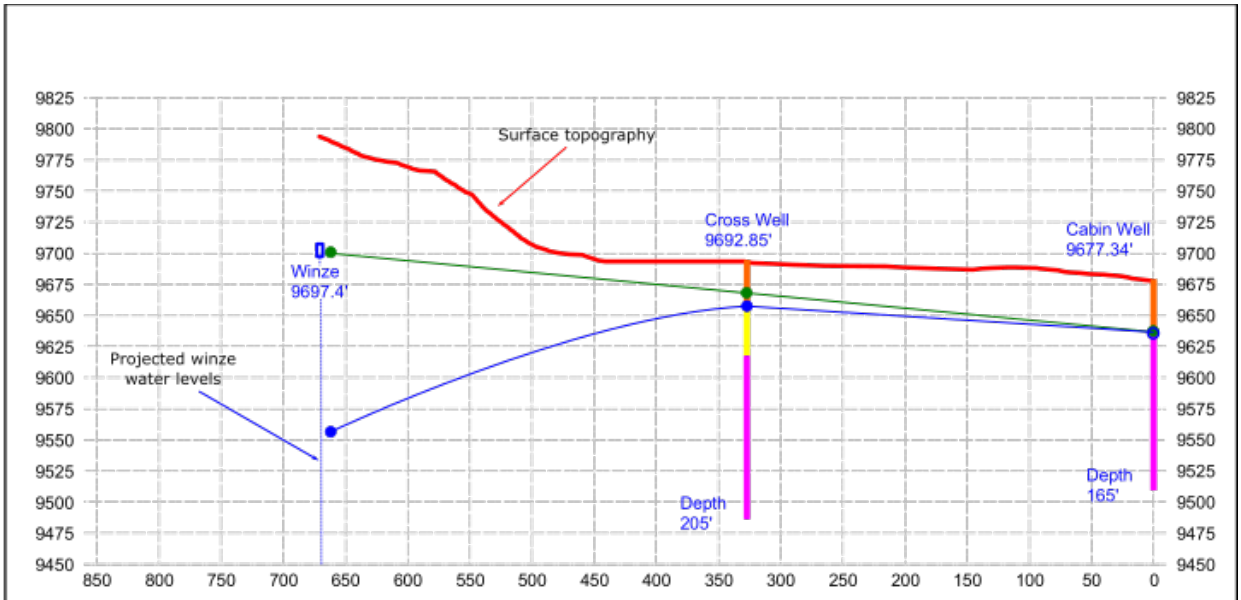
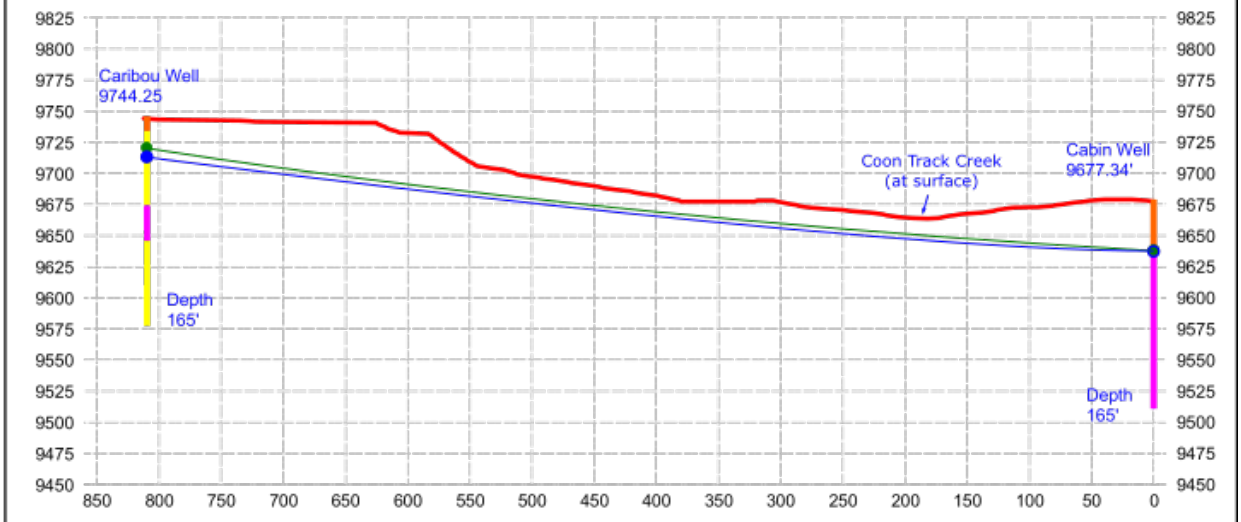


Cross Section A-A'
Winze to Cross Well to Cabin Well



Cross Section B-B'
Caribou Well to Cabin Well

Legend

- Depth in well - 07/30/2021 - normal conditions
- Groundwater table - 07/30/2021 - normal conditions
- Depth in well - 03/28/2022 - dewatered conditions
- Groundwater table - 03/28/2022 - dewatered conditions

Well Driller Log Descriptions

Fill/overburden | Granite (monzonite) | Schist (gneiss)

Project: Groundwater Monitoring Plan

Title: **Topographic Sections with Well and Winze Depths and Conceptual Water Table at Natural and Dewatered Conditions**

GRAND ISLAND RESOURCES

Project No. US 0401			File No.	
GIS:	JST	04/07/22	Scale As Shown	Rev 0
Check:	JST	04/07/22	Figure 1	
Review:	DAS	04/07/22		

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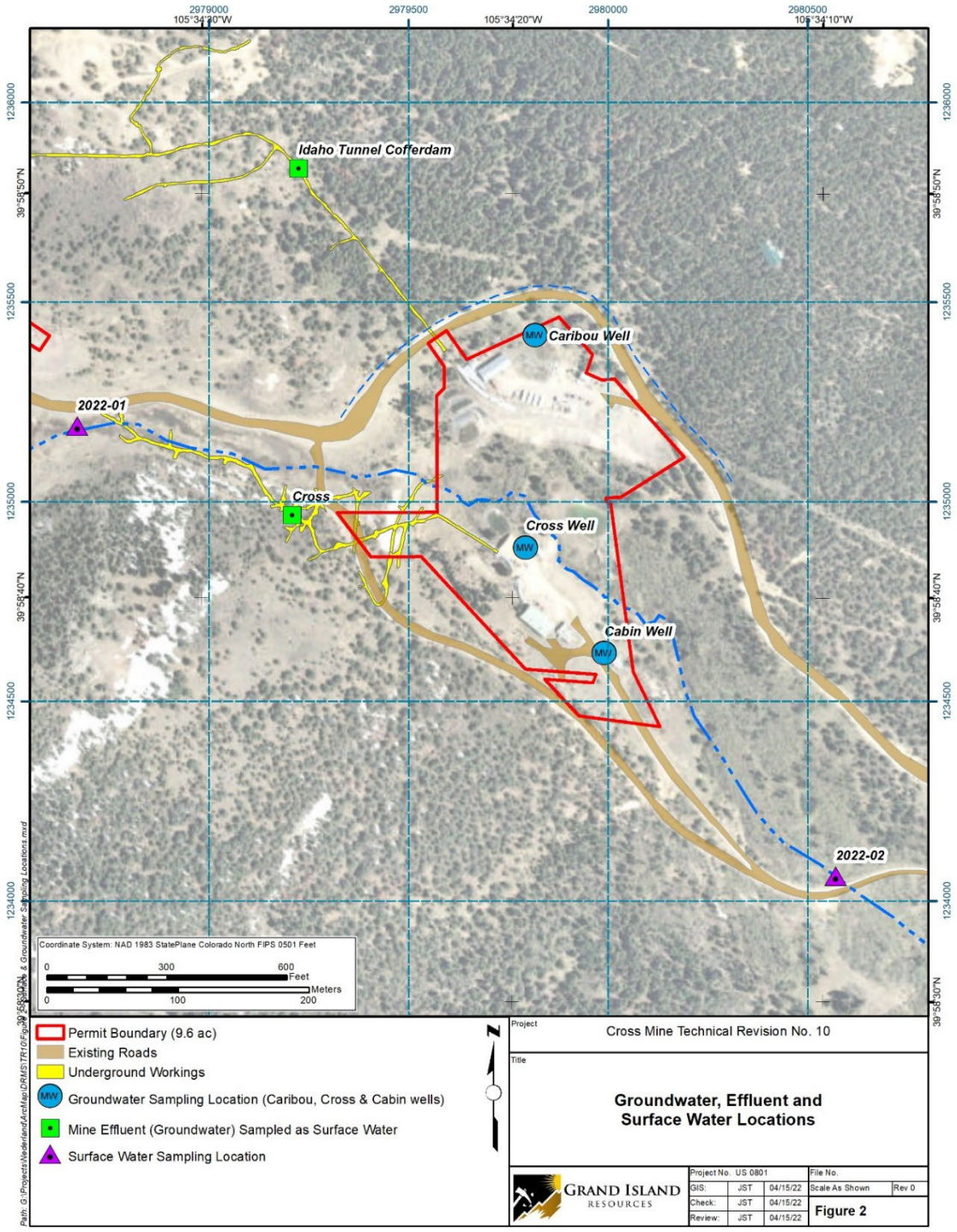
ATTACHMENT F

*Clarifies **DRMS Comment 27b.**, see figure below:*



ATTACHMENT G

STANDARD OPERATING PROCEDURE

GROUNDWATER, SURFACE WATER AND EFFLUENT SAMPLE COLLECTION AND QA/QC

April 15, 2022

1.0 PURPOSE AND SCOPE

The purpose of this document is to define the standard procedure for collecting groundwater samples from wells and surface water samples from streams and underground effluent. This Standard Operating Procedure (SOP) gives descriptions of equipment, field procedures and quality assurance/quality control (QA/QC) procedures necessary to collect, preserve and document these respective water sample types.

2.0 GENERAL EQUIPMENT

For any of the water sample categories there is common equipment as follows:

- Field logbook, field data sheets, and black pen
- Engineers tape (10ths, 100ths feet)
- Turkey baster for decontamination soapwater
- Paper towels
- Liquinox soap for decontextualization of instrumentation between sample collection
- Distilled or deionized water
- Sprayer filled with deionized water
- Appropriate health and safety equipment, including safety glasses and latex gloves

The following equipment for sample collection, sample labeling, filtering, packing, documentation, and performing chain-of-custody procedures:

- Sample bottles that are specific to the analytes to be tested. Obtaining sample bottles and preservatives from the selected analytical laboratory, including several extra sample bottles in case breakage or other problems occur is the best practice. Sample bottles can be either pre-preserved or preservatives can be added in the field in accordance with laboratory guidelines for the target analytes.
- Laboratory Sample labels

- Field book and data forms
- Chain of Custody Form
- Black permanent markers and pens
- Clear plastic tape
- Fiber tape
- Custody seals
- Large (30 gallon) trash bag
- Gallon ziplock freezer bags
- Ice
- Shipping documentation
- Disposable 0.45-micron filters if filtering samples (re: groundwater and effluent)
- Silicon or Tygon® tubing
- Peristaltic pump.
- Knowledge of the requisite PQL's for the laboratory to determine the appropriate analytical method and MDL's.
- Assorted tools (knife, screwdriver, etc.)
- Gas-powered electric generator for a peristaltic pump for filtering samples if required or access to a vehicle battery
- pH meter (with automatic temperature compensation)
- Specific conductivity meter
- Turbidity meter
- Plastic squeeze bottle filled with deionized water
- Polyethylene or glass container (for field parameter measurements)
- Chemical-free paper towels or Kimwipes
- Calculator
- Field notebook
- Black waterproof pen
- Appropriate health and safety equipment

The following equipment is necessary for performing decontamination between sampling locations:

- Alconox or Liquinox soap (or equivalent)
- Deionized water
- Decontamination buckets/pails
- Paper towels
- Plastic brushes
- Sprayers
- Plastic sheeting

For surface water and effluent sampling, additional equipment may be required as follows:

- Hip boots or waders
- Life jacket
- One litter or more polyethylene sampling beaker on a pole for reaching difficult collection points
- Underground PPE including headlamp and self-rescuer
- Appropriate MSHA training for working underground

The physical location of the investigator when collecting a sample may dictate the equipment to be used. If surface water samples are required, direct dipping of the sample container into the stream is desirable. Collecting samples in this manner is possible when sampling from accessible locations such as stream banks or by wading or from low platforms, such as small boats or piers. Wading or streamside sampling from banks, however, may cause the re-suspension of bottom deposits and bias the sample. Wading is acceptable if the stream has a noticeable current (is not impounded), and the samples are collected while facing upstream. If the stream is too deep to wade, or if the sample must be collected from more than one water depth, or if the sample must be collected from an elevated platform (bridge, pier, etc.), supplemental sampling equipment must be used. To collect a surface water sample from a water body or other surface water conveyance, a variety of methods can be used: • Dipping Using Sample Container • Scoops • Peristaltic Pumps • Discrete Depth Samplers • Bailers • Buckets • Submersible Pumps • Automatic Samplers Regardless of the method used,

precautions should be taken to ensure that the sample collected is representative of the water body or conveyance.

2.1 Field Parameter Measurements

Use the following apparatus and supplies for measuring pH in the field:

- Portable pH Meter or combination portable pH/mV/Temperature Meter Model
- Spare electrolyte cartridge, if required
- Electrode Storage Solution
- Extra batteries
- Beakers
- Buffer solutions of pH 4, 7, and 10
- Deionized or distilled water and wash bottle
- Kimwipes or equivalent.

Use the following apparatus and supplies for measuring conductivity in the field:

- Conductivity Meter or combination Conductivity/TDS Meter
- Extra battery
- Calibration solutions which bracket expected range of measurements
- Deionized water
- Wash bottle
- Kimwipes
- Beakers.

Use the following apparatus and supplies for measuring turbidity in the field:

- Turbidimeter Meter
- Extra battery

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Groundwater Well Purging

The objective of purging before sample collection is to thoroughly flush the static ground water from the well and filter pack (i.e., saturated borehole volume) and provide representative formation water for sample collection. The amount of water that that needs to be purged and how to determine that the resulting sample will be representative of the formation is a frequently debated issue. The two most common methods are purging a set number of saturated borehole volumes and/or casing volumes, usually between 3 and 10, and demonstrating the stability of field parameters (e.g., pH, conductivity, temperature, and turbidity) over a specified volume. Although this SOP discusses a minimum purge volume and stability of field parameters, the best procedure to help collect a representative sample requires on-site evaluation of all field conditions, which includes purge volume, stabilization of field parameters, well construction, hydrologic properties of the formation, and parameters of interest. Due to the variability of site conditions, no one procedure can ensure that a representative sample will be collected without the possibility of over- or under-purging some wells.

The purpose of well purging is to (1) remove stagnant water from the well and (2) obtain representative water samples from the geologic formation while minimizing disturbance to the collected samples. In most cases, purge the well three saturated borehole volumes and until field parameters stabilize. If the well has been pumped or bailed dry twice, it has been completely purged. In the case of domestic or industrial wells with transducers, the pumpage rate could be calculation again be calculated against recharge rates derived from pump testing.

Before purging a well, perform the following procedures:

- Before evacuating or sampling, decontaminate all well probes, bailers, and other sampling devices. Do not decontaminate dedicated downhole pumps.
- Place clean plastic sheeting around the well.

- Open the well and measure static water level using the installed transducer.
- Calculate the saturated borehole volume as specified in Section 4.2.
- Calibrate field parameter measurement equipment.
- Obtain an initial sample from the bailer or purge pump for field measurements (e.g., temperature, conductivity, and pH measurements) and observation of water quality.
- Begin purging three saturated borehole volumes of water with a bailer or pump. Take temperature, specific conductance, and pH measurements after evacuating each 1/4 to 1/2 (if practical) saturated borehole volume. Generally, pH values within ± 0.1 pH unit and conductivity within ± 10% throughout one saturated borehole volume indicate good stability of the water chemistry. If the chemistry is not stable, continue purging.
- When evacuating a well using a pump, place the pump intake as follows:
  - for low recovery wells (wells that pump dry at low rates), place the pump intake at the bottom of the screened interval
  - for high recovery wells (wells that experience little drawdown with pumping), place the pump near the top of the water level to ensure the removal of stagnant water from the well bore. Purge the well at a rate that will not significantly draw down the well.
- Bail or pump dry low-yielding wells during evacuation. If possible, let low-yielding wells recover before purging them dry again. If recovery is very slow, obtain samples as soon as sufficient water is available, but samples must be collected within 24 hours.

3.2 Calculating Saturated Borehole Volume

Monitoring wells should be purged before sampling so that representative ground water is sampled, not the potentially biased water stored in the well casing and filter pack. If the quality of purge water is questionable, water should be purged from the monitoring well before collecting samples and directed to an appropriate drain or storage pond for treatment if necessary. Removing all stored water in most cases is not feasible or practical. Therefore, before collecting ground water samples, purge an undetermined amount of water from the monitoring well until representative formation water can be sampled.

The amount of water to purge will vary from well to well based on specific well characteristics. No one method of calculating the required purge volume will always work. The usual method to estimate purge volumes is to calculate a number of casing volumes or saturated borehole volumes. Casing volumes account for only the water in the well casing and does not account for the water in the annular borehole space, which is independent of the casing size. Calculating the saturated borehole volume accounts for all the water within the borehole and casing. If purging procedures were completely efficient, the saturated borehole volume would be the minimum volume of water to purge to remove the potentially biased water from the borehole. Because mixing does occur, the minimum purge volume must be greater than one saturated borehole volume. The degree of mixing within the borehole during purging is difficult to estimate and, therefore, the range of recommended purge volumes varies from 3 to 10 saturated borehole volumes. Three saturated borehole volumes has been selected as the best way to estimate purge volumes. Some wells will require purging more than three saturated borehole volumes and some less.

The basic formula is volume equals pi times the radius squared times depth ($V=\pi r^2 d$). To calculate saturated borehole volume, the casing and borehole radii and the height of water in the casing and the filter pack must be known. Measure the water level in the field and obtain the borehole and casing radii from the well completion data.

4.0 Surface Water and Effluent Sampling Procedures

Access to the intended sampling location must carefully be planned to avoid slips and falls. Coordination of sampling with operations personnel is critical to avoid risks other than those associated naturally such as equipment, blasting, etc. While locations in most instances have been surveyed, marking locations for follow-up surveying is advisable to ensure that sampling at the location in the future is at the same exact location.

Adequate footing is essential and avoidance of standing up flow direction must be avoided, if possible, to ensure that sediment load is not stirred up influencing the TSS of the sample. If waters are inadvertently disturbed, a waiting period of several minutes should be undertaken to allow the natural conditions to stabilize. Decontaminated polyethylene beakers, if necessary, often attached to a pole for extra reach are generally used to collect the sample but avoid dragging the bottom. Often the surface water sample can be collected directly into the contain if not pre-acidified.

4.1 Surface Water and Effluent Sampling Methods

Flush the sample collection beaker or sample bottle several times with the target water to ensure that it is further purged of any decontamination from dust in the wind, pollen, dirt. Decontamination soap and other foreign materials as sticks, grass and detritus. Do NOT collect a sample directly from a water source into a pre-acidified vessel as doing so run the risk of neutralizing the pH. Prior to usage the decontaminated sampling vessel should be inserted and transported in a clean and dedicated plastic baggie that is discarded between decontamination.

Due to changing temperatures associated with transporting a sample outside or underground, temperature and other measurements should be done as soon as the sample is collected. Fill the containers for analysis likewise should be done as soon as possible again to minimize change in water chemistry and oxidation state.

While transfer of surface and effluent samples to collection bottles is similar to groundwater, other parameters in the collection as slightly different and command advanced planning to ensure proper QA/QC.

5.0 Preparation for Obtaining Water Samples

Prior to starting any sampling program, take the time to plan and organize your equipment and procedures. Sample documentation, preservation, handling, packaging, and chain-of-custody and knowledge of sampling procedures are necessary prior to sampling. Collect all water samples as follows:

1. Assemble decontaminated sampling equipment. Assemble the filtering apparatus if filtering the sample is required.
2. Make sure that sample labels have been filled out for each sample bottle.
3. Place labels on bottle and tape over.
4. Retrieve additional samples and slowly fill the sample bottles for all other analyses and QA/QC samples. Cap the sample bottles quickly.
5. Filter samples that require filtration with a disposable filter apparatus and peristaltic pump or electric submersible pump.
6. Slowly pour an unfiltered portion into the sample container for field parameter (e.g., pH, specific conductance, and temperature) analyses, perform the in-field analyses, and record the results.
7. Preserve samples as specified by the laboratory for the analytes to be measured.
8. Place sample bottle in baggies.
9. Place samples on ice in a cooler.
10. Record time of sampling. Where wells are in close proximity attempt to collect synoptic samples or during the same day.
11. Complete field documentation and chain of custody record.

6.0 Field Quality Assurance/Quality Control Procedures and Samples

Quality Assurance/Quality Control samples are critical to evaluate the appropriateness and accuracy of both field and laboratory data. Collect QA/QC samples during water sampling, as specified in the project planning documents. All QA/QC samples should be analyzed at the same time and in the same batches as the primary samples.

QA/QC samples help identify potential sources of sample contamination and help evaluate potential error introduced by sample collection and handling. Label all field QA/QC samples with QA/QC identification numbers (i.e., "02" for duplicate samples, "03" for field blanks, "04" for rinsate samples, and "MS" for matrix spike samples) and send them to the laboratory with the other samples for analyses.

6.1 Duplicate Samples

To check for the natural sample variance and the consistency of field techniques and laboratory analysis, collect duplicate samples side-by-side with primary samples. For ground water sampling, collect a duplicate sample while collecting the primary sample. Fill the primary sample bottle(s) first and the duplicate sample bottle(s) for the same analysis second until all necessary sample bottles for both the primary and duplicate samples have been filled. Use different filter and tubing for the primary and duplicate samples. Handle the duplicate ground water sample in the same manner as the primary sample. Assign the duplicate sample the QA/QC identification number "02"; follow standard procedures for documentation, preservation, handling, packaging, and chain-of-custody procedures; store the sample in an iced cooler; and ship it promptly to the laboratory so that analyses can be performed within required holding times.

Collect one duplicate sample for every 2 primary samples collected so that a rate of at least 5 percent of primary samples collected is achieved. For example, if you collect from 2 or more primary samples during a sampling event, collect one duplicate sample for QA/QC.

Collect duplicate QA/QC samples so that they represent the time of collection, different sampling teams, field conditions, and sampling equipment variability. For example, if ambient conditions are altered that could impact sample quality, the QA/QC sampling frequency may be increased. Collect duplicate samples throughout the sampling event, not just at the end.

6.2 Field Blanks

Collect field blanks by filling sample containers in the field with deionized water from the same source that is used for decontamination. Assign the sample the QA/QC identification number "03"; follow SOP #7 for documentation, preservation, handling, packaging, and chain-of-custody procedures; store the sample in an iced cooler; and ship it promptly to the laboratory so that analyses can be performed within required holding times.

Collect one field blank sample for every 20 samples primary collected, so that a rate of at least 5 percent of primary samples collected is achieved. For example, if you collect from 1 to 20 primary samples during a sampling event, collect one field blank sample; and if you collect from 21 to 40 primary samples during a sampling event, collect two field blank samples.

6.3 Rinsate Samples

An equipment rinsate sample of sampling equipment is intended to be used to check if decontamination procedures have been effective. For the well sampling operation, collect a rinsate sample from the decontaminated sampling equipment (bailer or pump) and filter equipment before using it to obtain the sample. To collect a rinsate sample from a bailer, rinse deionized water over the decontaminated bailer and transfer it to the sample bottles. To collect a rinsate sample from an electric submersible pump, transfer the final deionized water rinse that is pumped through the discharge hose to sample bottles. The same parameters that will be analyzed in the ground water samples will be analyzed in the rinsate samples. Assign the rinsate sample the QA/QC sample identification number "04"; follow SOP #7 for documentation, preservation, handling, packaging, and chain-of-custody procedures; store the sample in an iced cooler; and ship it promptly to the laboratory so that analyses can be performed within required holding times.

Collect one rinsate sample for every 2 primary water samples collected so that a rate for rinsate samples of at least 5 percent of primary samples collected is achieved. Collect rinsate blank samples so that they represent the time of collection, different sampling teams, field conditions, and sampling equipment variability. For example, if ambient conditions are altered that could impact sample quality, the QA/QC sampling frequency may be increased. Collect rinsate blank samples throughout the sampling event, not just at the end. Collect one rinsate blank sample for each type of sampling equipment by a submersible pump, you would collect two rinsate samples — one from the bailer and one from the pump). If the pump is already installed, take the rinsate same of the portal pump used for filtration.

6.4 Matrix Spike Samples

Matrix spike (MS) samples are required to evaluate potential matrix effects on sample analyses for all inorganic parameters. The laboratory will spike matrix spike samples for the inorganic parameters. Depending on the specific laboratory and sample volume collected, the matrix spike samples may be split from an existing sample or may require a separate sample. To samples that you collect specifically for matrix spike analysis, assign the QA/QC identification “MS”; follow SOP #7 for documentation, preservation, handling, packaging, and chain-of-custody procedures; store the sample in an iced cooler; and ship it promptly to the laboratory so that analyses can be performed within required holding times. The samplers will identify all samples selected for matrix spike split analysis on the Chain of Custody Form. Specify one matrix spike sample for each sample shipment group of 20 samples or less.

Some samples may not require Matrix Spike Samples until sufficient data is known about the data to assess that there may be an issue with the precision of the laboratory.

7.0 Documentation

7.1 Water Data Sheets

Complete a groundwater or surface data sheet for all water samples (Appendices A and B) at each sampling location. Be sure to completely fill in the data sheet. If items on the sheet do not apply to a specific location, label the item as not applicable (NA). The information on the data sheet includes the following:

- Well name or site identification number
- Date and time of sampling
- Person performing sampling
- Site conditions such as weather, temperature, barometric pressure, etc
- Depth to water before sampling
- Estimated flow rate, channel depth and width if surface or effluent water
- Volume of water purged if well before sampling
- Conductivity, temperature, pH, and turbidity during evacuation (note number of well volumes)
- Time samples are obtained
- Sample identification number(s)
- QA/QC samples taken (if any)
- Number of pictures taken and direction of the lens of the camera
- How the samples were collected (i.e., bailer and pump).

6.2 Field Notes

Keep field notes in a bound field book. Record the following information using waterproof ink:

- Names of personnel
- Weather conditions
- Date and time of sampling
- Location and well number
- Condition of the well
- Decontamination information
- Initial static water level and total well depth
- Calculations (e.g., calculation of evacuated volume)
- Calibration information, sample methods used, or reference to the appropriate SOP
- Final sample parameters
- Sample control number

Many of these details are provided with others on the groundwater sample data sheets (Appendix A) and the surface water sample data sheets (Appendix B). Many of the parameters in the data sheets will not be necessary and effluent sampling underground may require a specific data sheet to be created as neither the groundwater nor surface water sampling conditions are quite different underground.

APPENDIX A

GROUND WATER SAMPLING DATA SHEET

GROUND WATER SAMPLING DATA SHEET

IDENTIFICATION Project Number:

Sample Location_____ Date _____ Start Time _____ Stop time_____ Page__of

Sample Control Number_____ Samplers

WEATHER CONDITIONS

Ambient Air Temperature: _____ °C☐ °F☐ Not Measured ☐ **Wind**: Heavy☐ Moderate☐ Light☐

Precipitation: None☐ Rain☐ Snow☐ Heavy☐ Moderate☐ Light☐ Sunny☐ Partly Cloudy☐

INITIAL WELL MEASUREMENTS (Measurements in feet made from top of well casing)

Static Water Level____ Total Depth_____Top of Screen_____ Filter Pack Interval_____ Borehole Diameter(inches)

2-inch = 0.1632 gal/ft 4-inch = 0.6528 gal/ft 6-inch = 1.4688 gal/ft Casing Volume:_____ gallons

Well Casing ID_____ Well Casing OD_____ Protective Casing Stickup___ Well Casing Stickup____ Feet of Water

Well purged with: _____

FINAL WELL MEASUREMENTS

Static Water Level__ Total Depth___ Total Volume Purged__ Saturated Borehole Volume (gal)___ Max Pumping Rate

INSTRUMENT CALIBRATION

pH Meter: Meter Number_____ **Conductivity Meter:** Meter Number

Buffer____ Measured Value_____ Temp.____ °C Standard_____mS/cm Measured Value_____mS/cm Temp.___°C

Buffer____ Measured Value_____ Temp.____ °C Standard_____mS/cm Measured Value_____mS/cm Temp.___°C

Turbidity Meter:_____ Standard ____NTU Measured Value_____NTU Standard ____NTU Measured Value_____NTU

FIELD PARAMETER MEASUREMENTS DURING PURGING

Time	Volume (gallons)	pH	Cond. (µS/cm)	Temp. °C☐ °F☐	Turbidity Visual Est.☐ Measured☐	Comments

FINAL SAMPLE PARAMETERS

Sample Date	Sample Time	Discharge cfs☐ gpm☐	pH	Cond. (µS/cm)	Temp. (°C)	Turbidity Visual Est.☐ Measured☐		

Duplicate Sample-02 (sample control number/time_____)

Field Blank-03 (sample control number/time_____)

Rinsate Sample-04 (sample control number/time_____)

Matrix Spike-MS (sample control number/time_____)

_____ (sample control number/time_____)

Notes:

Sampler's Signature

APPENDIX B

SURFACE WATER SAMPLING DATA SHEET

SURFACE WATER SAMPLING DATA SHEET

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ		TROL BOARD (1-6 July 2008) Entered in d-base (initial/date)	Pg of Pgs
***StationID:** ______________________	*Date (mm/dd/yyyy): / /	*Group:	*Agency:
***Funding:** __ __ __ __ __ __ __ __	ArrivalTime: DepartureTime:	*SampleTime (1st sample):	*Protocol:
*Personnel:	*Purpose (circle all that apply): WaterChem WaterTox FieldObs FieldMeasure	*PurposeFailure:	

***Location**: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	**Lat (dd.ddddd)**	**Long (ddd.ddddd)**	OCCUPATION METHOD: Walk-in Bridge R/V __________ Other
GPS Device:		**Target:**		-	STARTING BANK (facing downstream): LB / RB / NA
Datum: NAD83	Accuracy (ft / m):	***Actual:**		-	Point of Sample (if Integrated, then -88 in dbase)

Field Observations (SampleType = FieldObs)

SITE ODOR:	None,Sulfides,Sewage,Petroleum,Mixed,Other	WADEABILITY: Y / N / Unk	BEAUFORT SCALE (see attachment):	DISTANCE FROM BANK (m): / STREAM WIDTH (m): / WATER DEPTH (m):
SKY CODE:	Clear, Partly Cloudy, Overcast, Fog	WIND DIRECTION (from): N W E S		HYDROMODIFICATION: None, Bridge, Pipes, ConcreteChannel, GradeControl, Culvert, AerialZipline, Other LOCATION (to sample): US / DS / WI /
OTHERPRESENCE:	Vascular,Nonvascular,OilySheen,Foam,Trash,Other____			**PHOTOS** (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode): 1: (RB / LB / BB / US / DS / ##)
DOMINANTSUBSTRATE:	Bedrock, Concrete, Cobble, Gravel, Sand, Mud, Unk, Other________________			
WATERCLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)	PRECIPITATION:	None, Fog, Drizzle, Rain, Snow	2: (RB / LB / BB / US / DS / ##)
WATERODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other_____	PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None	
WATERCOLOR:	Colorless, Green, Yellow, Brown			3: (RB / LB / BB / US / DS / ##)
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs			

Field Measurements (SampleType = FieldMeasure; Method = Field)

	DepthCollec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O_2 (mg/L)	O_2 (%)	Specific Conductivity (uS/cm)	Salinity (ppt)	Turbidity (ntu)	Stage Ht (units _____)		
SUBSURF/MID/ BOTTOM/REP													
SUBSURF/MID/ BOTTOM/REP													
SUBSURF/MID/ BOTTOM/REP													
Instrument:													
Calib. Date:													

Samples Taken (# of containers filled) - Method=Water_Grab | **Field Dup YES / NO:** (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry

SAMPLE TYPE: Grab / Integrated | COLLECTION EQUIPMENT: Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other ____________________

	DepthCollec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface													
Sub/Surface													

COMMENTS:

Run:										Sample Processing Date:					
Sample ID #:															
	Site Code:														
	# Small Wells														
	# Large Wells														
	Empty Wells														
Yellow +	MPN														
	# Small Wells														
	# Large Wells														
Yellow + Fluorescence (+)	False Positives														
	MPN														
Temp/Time	Start		4Hr. Check			14 Hr. Check			18 Hr. Check			22 Hr. Check, if needed			

	FIELD DUPLICATES				LAB DUPLICATES			
	Normal Sample #				Normal Sample #			
	Duplicate Sample #				Duplicate Sample #			
		MPN	95% CI Lower	95% CI Upper		MPN	95% CI Lower	95% CI Upper
TOTAL COLIFORM	*Normal*				*Normal*			
	Duplicate				*Duplicate*			
	Mean		Pass	Needs Review	*Mean*		Pass	Needs Review
E. COLI	*Normal*				*Normal*			
	Duplicate				*Duplicate*			
	Mean		Pass	Needs Review	*Mean*		Pass	Needs Review
BLANKS	*Field Sample #*		Pass	Needs Review	*Lab Sample #*		Pass	Needs Review

Mean = Mean of Normal and Duplicate, which is then compared to the individual corresponding CI's to determine acceptability of data

Sampler Signature / Date / Time Arrived:	Placed in Incubator By / Date / Time:	Trays Read By:
Processor / Date / Time:	Pulled from Incubator By / Date / Time:	Entered into database:

NOTES: