STATE OF COLORADO

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

Schwartzwalder Mine Revised AM-06

Elizabeth Busby <ebusby@ensero.com> Mon, Aug 29, 2022 at 2:01 PM
To: "Amy Eschberger - CDRMS (amy.eschberger@state.co.us)" <amy.eschberger@state.co.us>
Cc: "michaela.cunningham@state.co.us" <michaela.cunningham@state.co.us>, Allan Steckelberg <asteckelberg@ensero.com>, Billy Ray <bray@ensero.com>, "jim@ColoradoLegacy.Land" <jim@coloradolegacy.land>, Jim Harrington <jimharrington@ensero.com>, Paul Newman <paul@coloradolegacy.land>, Eric Williams <eric@coloradolegacy.land>, "Poncelet, Nicole" <Nicole.Poncelet@denverwater.org>, "Daniel.Arnold@DenverWater.org" <daniel.arnold@denverwater.org>, Evelyn Rhodes <erhodes@arvada.org>, "bwyant@arvada.org" <bwyant@arvada.org>

Dear Ms. Eschberger,

Thank you for reviewing and providing comments on AM-06 for the Schwartzwalder Mine. I have sent two hard copies of the response to comments matrix and revised document to your office (FedEx Tracking No. 7777 5127 4729). Additionally, those on this email will receive an invitation to download electronic copies of the submittal from an Ensero SharePoint site.

Here is a direct link:

There is no password, you should be able to click and download the files directly. If you have any access issues please contact me directly, my information is below.

Elizabeth Busby, PE, PMP

Senior Project Manager

ENSERO solutions

305 W. Magnolia St PMB 225
Fort Collins, CO 80521-2804
P. 970-632-2240 | C. 970-222-0404

https://www.ensero.com/ | ebusby@ensero.com

Insightful Strategies. Enduring solutions.

August 29, 2022

Ms. Amy Eschberger
Division of Reclamation, Mining, and Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

Subject: Response to Fourth Adequacy Review
Application Amendment #6
Mine Land Reclamation Permit M-1977-300, Schwartzwalder Mine, Golden, Colorado

Dear Ms. Eschberger:

Colorado Legacy Land, LLC (CLL) has revised *Mine Land Reclamation Permit M-1977-300, Application Amendment #6* for the Schwartzwalder Mine, to address the reviewer's comments in the fourth adequacy review. Enclosed is a copy of the revised Application Amendment and comment summary table. If you have any questions regarding the subject document, please don't hesitate to contact me.

Sincerely,

Jim Harrington, Managing Director
COLORADO LEGACY LAND
Jim@ColoradoLegacy.Land

cc: Michael Cunningham - DRMS, Senior Environmental Protection Specialist, michaela.cunningham@state.co.us
Paul Newman – CLL, Managing Director, paul@coloradolegacy.land
Eric Williams – CLL, Managing Director, eric@coloradolegacy.land
Billy Ray – Ensero Solutions, Site Manager, bray@ensero.com
Allan Steckelberg – Ensero Solutions, VP of Construction & Risk, asteckelberg@ensero,com
Elizabeth Busby – Ensero Solutions, Project Manager, ebubsy@ensero.com

(This page intentionally left blank.)

M-1977-300 APPLICATION AMENDMENT #6, COMMENT AND RESPONSE SUMMARY TABLE

COMMENT NO.	COMMENT	RESPONSE TO COMMENT

COLORADO DIVISION OF RECLAMATION AND MINING SAFETY

Comment No.: 1

Comment:

Exhibit E–Reclamation Plan (Rule 6.4.5):

The Division asked for a detailed reclamation plan for removing the water treatment plant, including a description of all components of the plant and associated infrastructure which would require demolition and/or removal for reclamation, and the anticipated disposal location(s) for these materials. This description must specify any materials requiring disposal in a facility that accepts hazardous and/or radioactive materials.

Alternatively, the operator may provide a recent detailed bid from an independent contractor for completing this work. The operator stated in its July 21, 2022 adequacy response that a detailed bid for removing the plant was provided. However, the "bid" provided does not include the name of the independent contractor or the date the bid was prepared. It also does not provide enough details on the scope of work, including the type, quantity, and dimensions/volume of equipment and materials to be removed, and the anticipated disposal location(s). In order for the Division to accept the operator's bid for the reclamation bond, it must include the information listed above.

Alternatively, the operator must provide a description of all components of the plant and associated infrastructure which would require demolition and/or removal for reclamation, and the anticipated disposal location(s) for these materials, as previously requested. This information is needed in order for the Division to calculate the required financial warranty for decommissioning the water treatment plant.

Response to Comment:

Kessler Reclamation LLC provided the bid to demolish the water treatment plant onsite. A copy of this bid in included in this submittal. Kessler Reclamation has worked at the site previously for Cotter and CLL – they demolished the old water treatment (WTP) plant in the valley, widened the road up to the Minnesota Adit, installed the 60HP intake pump, constructed the north waste rock pile diversion channel, constructed the WTP on the mesa (the same WTP that the attached bid is to demolish), and are currently performing the alluvial valley excavation project.

The layout of the water treatment plant is shown on Figure 7-1 in Exhibit U of AM-06. The reverse osmosis (RO) skids, cartridge filters, and ion exchange (IX) vessels are skid-mounted and may be easily disassembled and removed and are expected to have salvage value. The RO membranes will be disposed of in the Minnesota adit with other RO membranes. The main electrical panel, structural steel, PLC (programmable controller logic), and other tools (e.g. air compressor and parts storage) will all be salvaged.

The volume of demolition debris and building materials for the WTP are listed Appendix F of Technical Revision 23. This table includes the tanks outside of the footprint of the WTP. The storage connex's and job trailers are owned by subcontractors and would be picked up at their cost.

Attachment F – Minnesota Adit Disposal Inventory

	Item	Trucked Placement Volume (cu.ft.)	New Waste Treatment Plant Description
1	Building, Steel Frame	5,760	Steel - Structural + Siding
2	Building, Concrete Foundation	5,760	Concrete
3	Fan + Frame	180	Steel
4	Fan Duct	53	Steel
5	Liner, PVC	179	PVC-Plastic
6	Empty Mix Tanks, Tall	848	Fiberglass
7	Empty Mix Tanks, Short	157	Fiberglass
8	Pipe, Misc.	40	PVC-Plastic
9	Power Box	7	Steel
10	Clarifiers	1,008	Steel
11	Clarifier stairs	450	Steel
12	Empty Tanks	2,651	Fiberglass
13	Empty Tanks, Clear Water	353	Fiberglass
14	Empty Tank, Plastic - Potable Water	79	Plastic
15	Rock, Dirt and Debris	1,089	Rock
	Total	18,614	

Items 1, 3, 4, 9, 13, and 14 are expected to the salvaged or recycled. Items 10 and 11 have already been salvaged and removed from site already. Items 2 and `15 are expected to be broken and covered in place. Items 5, 6, 7, 8, and 12 are expected to be demolished and hauled offsite for disposal. These line items total 3,875 cubic feet or 143 cubic yards (CY) of debris. The Foothills Landfill is 10 miles one-day from the site, a standard highway dump truck can hold 10-14 CY of debris. Therefor approximately 10 trips of 20-miles each are expected for offsite disposal. These demolition and disposal costs are included in the bid provided.

The IX resin is the only material in the WTP that requires specialty offsite disposal, Energy Fuels USA Inc.'s White Mesa Mill (6425 S. Highway 191, Blanding, Utah, 84511) received the resin in November of 2018. The only fee associated with this disposal

M-1977-300 APPLICATION AMENDMENT #6, COMMENT AND RESPONSE SUMMARY TABLE		
COMMENT NO.	COMMENT	RESPONSE TO COMMENT
		is the transportation to White Mesa Mill, Energy Fuels recovers uranium from the resin and returns regenerated resin to the site in lieu of a typical disposal fee. The most recent transportation invoice for $2,763.29 was adjusted by inflation (14% from 2018 to 2022) to $3,150.15 and included in the surety bond table shown in Exhibit L. The IX resin is only exchanged when it's fully loaded. The IX system is a secondary treatment technology and is used to polish the RO effluent only when the operator decides to add the redundancy. Even if it were to be used all the time, it would load less than 10 lbs of uranium per season, and each IX vessel is capable of loading several hundred pounds of uranium, meaning it will take many decades to require one IX change out. Thus, if a demolition were to occur only a limited amount of resin is expected to require to be shipped for disposal at White Mesa Mill.
2	**Exhibit E–Reclamation Plan (Rule 6.4.5):** Based on the results of the last two in-situ treatments of the mine pool, which showed less of a reduction in uranium concentrations than was observed after earlier in-situ treatments, the operator suggests the mine pool chemistry may have reached a point at which continued in-situ treatments may not achieve substantially reduced uranium concentrations below the current concentrations of approximately 15 to 20 mg/L. This is attributed to calcium uranium carbonate complexes that effectively limit the rate and extent of uranium reduction and removal that can be expected by stimulating microbial activity (via in-situ treatments). Accordingly, the operator is now proposing to utilize in-situ treatments only for maintaining uranium concentrations at the current levels (rather than reducing uranium concentrations). Please clarify whether in-situ treatments are still expected to be conducted approximately every two years, as previously indicated.	CLL expects to conduct in-situ treatments no more frequently than every two years.
3	**Exhibit E–Reclamation Plan (Rule 6.4.5):** The operator suggests that stability of the mine pool should be considered primarily on the effectiveness of the current pump/treat regime in keeping the mine pool below the regulatory limit (while producing water that meets discharge standards) and most importantly, in establishing a hydraulic gradient away from Ralston Creek. The operator compares observed quarterly groundwater elevations in bedrock wells MW-13, MW-15, and MW-18 to the mine pool elevation (below the regulatory limit) to demonstrate an inward hydraulic gradient is maintained. Quarterly groundwater elevation data collected from these wellsfrom2019 through 2021is presented in Table E-3. Figure E-4 provides a bedrock groundwater contour map based on water levels measured in these three wells during the Q2 2020 sampling event. While the Division believes the operator has demonstrated physical stability of the mine pool by keeping it below the regulatory limit of 150 feet below Steve Level (in accordance with the Modified Board Order, dated October 4, 2012), the Division believes there is insufficient data available to fully demonstrate that a hydraulic gradient away from Ralston Creek is maintained. The Division recommends the operator install an additional bedrock monitoring well south of the creek, in the area between the existing alluvial monitoring wells MW-7 and MW-12 (now inoperative due to the alluvial valley excavation project),and just northwest of the "groundwater divide" illustrated on Figure E-4.The Division believes the groundwater elevations observed in a bedrock well at this location would close the gap in the current dataset and better demonstrate whether an inward hydraulic gradient is maintained at the mine. Please provide a schedule for installing the requested well and incorporating it into the quarterly sampling program. Additionally, please commit to submitting a Technical Revision within 30 days of completing installation of the well, which includes a final construction report and an updated groundwater monitoring plan and map.	CLL will commit to installing a new groundwater well to further demonstrate the inward hydraulic gradient. The expected schedule for installing this well is as follows: • Fall 2022/ Spring 2023: Complete alluvial valley excavation project, including Final Status Survey Report which documents the cleanup is complete. • Summer 2023: Scoping meeting to determine construction details of well (e.g. location, depth, diameter). Scoping meeting attendees shall include CLL, DRMS, and other project stakeholders as appropriate. • Summer 2023 / Fall 2023: Well installation and development. Submittal of Technical Revision (within 30 days of completing installation of the well), including a final construction report and an updated groundwater monitoring plan and map.
4	**Exhibit E–Reclamation Plan (Rule 6.4.5):** While the alluvial valley excavation project is estimated to be approximately 95% completed, the current approved underground disposal locations for contaminated soils encountered during this project have reached capacity. In its July 21, 2022 adequacy response, the operator proposes to place additional contaminated soils excavated from the valley at the southeastern edge of the existing South Waste Rock	

M-1977-300 APPLICATION AMENDMENT #6, COMMENT AND RESPONSE SUMMARY TABLE		
COMMENT NO.	COMMENT	RESPONSE TO COMMENT
	Pile (SWRP).This material would be tied into the Black Forest Mine backfill area (approved in Amendment No. 5), capped with three feet of cover material (sourced from within the permit area), and seeded with the grass/wildflower mix provided in Table E-1.The Division has the following comments on this proposal:	
	a. Please describe the type of cover material to be used as a "cap" on the contaminated soils.	a. Cap material will be locally sourced from within the permit boundary from either the north side of Ralston Creek near the former laydown area, or from within the alluvial valley excavation area on the south side of Ralston Creek. Cap material will consist of unimpacted loamy soils (concentration of radium-225 less than or equal to 7pCi/g) so that these soils do not possess the potential to leach uranium above the EPA MCL to Ralston Creek. Section 17.1 Plant Growth Medium (Soils) of Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan (Whetstone Associates Inc., 2016) provides the following description of these cap soils: "Soils in the study area range from fine-loamy to loamy-skeletal in texture. Soil pH ranges from 5.1 to 9.0, Electrical conductivity and sodium adsorption ratios for soils in the study area range from 0 to 4 mmhos/cm and 0 to 2 respectively."
	b. Early documents in the permit file indicate material placed into the two waste rock piles consisted of approximately 50% mine development rock mixed with approximately 50% ore sorter reject. While the ore sorter reject had higher levels of uranium (up to 0.06% U_3O_8), mixing this material with the development rock (average of 0.01%U_3O_8) was expected to produce a final weighted average of approximately 0.03% U_3O_8 in the waste rock piles. Please describe how the uranium content of the proposed expansion material compares to that of the existing material in the SWRP. Could the expansion material have an increased potential to contaminate the alluvial groundwater system and/or creek, compared with the existing material in the SWRP?	b. The materials that CLL is currently removing from the alluvial valley are residuals associated with previous mining activities. Trench profiles in Appendix A of TR-14 show that the majority of soils are less than 100 pCi/g of natural uranium, which converts to 145 mg/kg of natural uranium or 0.0145% U_3O_8. Therefor these residuals are expected to have approximately half of the concentration than the previous SWRP materials. No, the expansion material does not have an increased potential to contaminate alluvial groundwater. The primary objective of the alluvial valley excavation project is to mitigate the potential for alluvial soils to leach uranium (above the EPA MCL) to shall groundwater or Ralston Creek. The uranium-impacted materials that will comprise the SWRP expansion are currently located in the alluvial valley adjacent to Ralston Creek. Therefore, these are not "additional materials" because they are currently onsite. Removing these materials from the subgrade and consolidating them under a cap, further away from Ralston Creek, will enhance the protection of surface water and groundwater resources.
	c. It appears the proposed SWRP expansion will be situated below two natural drainages. Please describe how water in these drainages will be managed in order to prevent erosion damage to the pile (especially before a sufficient vegetative cover has been established) and also to minimize infiltration into the pile (thus minimizing the potential for water contaminated by this material impacting the creek system).	c. Figure F-2 has been revised to include additional details on the natural drainages for clarity. During the construction of the SWRP expansion an earthen berm (approximately 1 to 2 feet in height) shall be constructed to mitigate erosion at the toe of the pile. The berm shall direct the water into the drainages and away from the SWRP materials. Additionally, CLL will armor the drainage channel near the toe of the SWRP with appropriately sized rip rap to mitigate any erosion damage at the slope transition from the hillside to the valley. The slope of the SWRP expansion ranges from 2:1 and 3:1 to match the surrounding natural topography, which will minimize infiltration into the pile.
	d. Because creek flows are currently routed around the mine site via the bypass pipeline, surface water monitoring locations along the section of the creek within the mine area are typically dry, including location SW-A001, which was intended to monitor for impacts to the creek from the SWRP. Based on the water quality data observed in existing alluvial monitoring wells near the SWRP (MW-0 and MW-19), the Division has some concerns about the existing SWRP being a potential contamination source to the creek. An extension of the footprint of this pile, especially if the additional material has higher levels of contaminants per volume, creates additional concerns. Therefore, the Division believes an increased monitoring frequency of the surface monitoring locations will be necessary after creek flows are re-established across the mine area, at least on a temporary basis, to better monitor for potential impacts to the creek. Please commit to sampling all approved surface water monitoring locations on a monthly basis after creek flows have been re-established across the mine area. The required sampling frequency will be reassessed after the Division has reviewed the monthly monitoring data submitted.	d. As detailed in AM-06, CLL already conducts monthly surface water monitoring of SW-AWD (upstream of waste rock piles) and SW-BPL (downstream of water rock piles) for compliance with their CDPHE Discharge Permit #CO-0001244. This compliance sampling includes a wide array of parameters including antimony, arsenic, boron, chromium III, chromium VI, copper, cyanide, fluoride, gross alpha, gross beta, molybdenum, nitrate + nitrite, pH, phosphorus, phosphate, radium 226+radium 228, silver, sulfate, total dissolved solids, total suspended solids, thallium, uranium, and zinc. In addition to these samples, CLL shall commit to collecting monthly surface water monitoring for dissolved uranium for two years from all surface water stations within the MLRP boundary. The on site sampling locations and frequency shall be documented in a Technical Revision along with the new monitoring well referenced above in Comment #3. This sampling effort shall begin once Ralston Creek flows are re-established across the site (i.e. not in the bypass pipeline).
5	**Exhibit L–Reclamation Costs (Rule 6.4.12):** The Division has the following comments specific to the Water Treatment Plant Operations section:	

M-1977-300 Application Amendment #6, Comment and Response Summary Table		
Comment No.	**Comment**	**Response to Comment**
	a. For the Discharge Permit Sampling task, the total cost was reduced from $238,584.00 to$198,820.00, for100 months of sampling rather than 120 months of sampling, as previously stated. In this application, the operator is proposing to operate the water treatment plant on a seasonal basis, up to 6 months per year. The costs associated with operation of the water treatment plant must cover a 20 year period. Therefore, please revise this task to include costs for sampling the plant discharge for a total of 120 months. b. For the Demolish Water Treatment Plant task, the total cost was reduced from $55,000.00 to $52,016.00. This adjustment appears to be based on the "bid" provided with the operator's last adequacy response. As noted above, the bid provided is not acceptable for a number of reasons, including it does not have the contractor name, date prepared, or the appropriate level of detail for the scope of work. If the operator is not able to provide an acceptable bid from an independent contractor for removing the water treatment plant, the Division will require additional information on the plant (detailed above) in order to calculate a sufficient bond amount for this task. Based on its experience reviewing and calculating demolition/removal costs for similar facilities, the Division expects the amount provided for this task will increase.	a. Revised as requested. b. Revised as requested.
6	The Division has the following comments specific to the Alluvial Valley Excavation section: **a.** As requested, the operator has added costs for removing and disposing of the upstream cutoff wall and bypass pipeline. These costs are based on the costs that were calculated in association with Technical Revision No. 18 (TR-18), which was approved in 2011. Given the cumulative rate of inflation of 31.7% that has occurred since the time of TR-18 approval, the Division will be adding an additional $30,928.00 (31.7% x $97,565.10) to the total costs provided for these tasks. This will bring the total costs for these tasks to $128,493.10.	a. Revised as requested. The unit cost for each item associated with TR-18 was increased by 31.7%.
7	**The Division has the following comments specific to the Environmental Monitoring section:** a. For the Groundwater Monitoring task, the total cost was reduced from $404,544.00 to $144,480.00, for sampling 4 wells and 1 spigot, rather than 13 wells (one well is only monitored for water levels) and 2 spigots on a quarterly basis over a 10 year period, as previously stated. The total number of samples was reduced from 560 to 200.The Division realizes that some of the alluvial groundwater monitoring wells at the site have been rendered inoperative due to the ongoing alluvial valley excavation project (which removed the soils surrounding these wells). However, the operator has not yet submitted a revised water monitoring plan and map to incorporate these changes. Therefore, the bond estimate must continue to include costs for sampling all approved monitoring locations on a quarterly basis over a 10 year period, until the approved monitoring plan has been formally updated (through AM-6 or a subsequent Technical Revision). Please revise this task accordingly. [Please note, if the operator chooses to update the water monitoring plan and map in AM-6, more than one section of the application may need to be updated to reflect these changes.] **b.** For the Monitoring Well Abandonment task, the total cost was reduced from $50,220.00 to$25,120.00, for sealing a total of 1,256 linear feet of monitoring wells (at $20/foot), rather than 2,511 linear feet, as previously stated. It is not clear why the linear footage and associated cost were revised, as the notes for this task still state that 13 monitoring wells totaling 2,511 linear feet will be abandoned. The bond estimate must continue to include costs for abandoning all approved monitoring wells until the monitoring plan has been formally updated and/or a copy of the final abandonment report for any sealed wells has been provided to our office. Please revise this task accordingly.	a. Revised as requested. b. Revised as requested.

M-1977-300 APPLICATION AMENDMENT #6, COMMENT AND RESPONSE SUMMARY TABLE		
COMMENT NO.	COMMENT	RESPONSE TO COMMENT
8	**Additional Item(s):** Please remember that, pursuant to Rule 1.6.2(1)(c), any changes or additions to the application on file in our office must also be reflected in the public review copy which was placed with the County Clerk and Recorder. Pursuant to Rule 6.4.18, you must provide our office with an affidavit or receipt indicating the date this was done. This "proof" should be submitted with your adequacy response.	Comment noted, thank you for the review.

APPLICATION AMENDMENT 6, MINE PERMIT M-1977-300
SCHWARTZWALDER MINE, GOLDEN, COLORADO

AUGUST 2022

COLORADO LEGACY LAND

PREPARED FOR:

COLORADO LEGACY LAND, LLC
333 W. HAMPTON, SUITE 935
ENGLEWOOD, CO 80110

PREPARED BY:

ENSERO SOLUTIONS US, INC.
333 W. HAMPTON, SUITE 935
ENGLEWOOD, CO 80110

COLORADO LEGACY LAND

APPLICATION AMENDMENT 6, MINE PERMIT M-1977-300, SCHWARTZWALDER MINE, GOLDEN, COLORADO

AUGUST 2022

ENSERO solutions

(This page intentionally left blank.)

TABLE OF CONTENTS

TABLE OF CONTENTS III
LIST OF TABLES V
LIST OF FIGURES VI
EXHIBIT A. LEGAL DESCRIPTION 1
EXHIBIT B. INDEX MAP 3
EXHIBIT C. PRE-MINING AND MINING PLAN MAP(S) OF AFFECTED LANDS 5
EXHIBIT D. MINING PLAN 7
EXHIBIT E. RECLAMATION PLAN 9

E.1. CONCEPTUAL CONSIDERATION 9
E.2. INTERCEPTION AND TREATMENT OF ALLUVIAL GROUNDWATER 11
E.3. ISOLATION OF RALSTON CREEK FROM SOURCES OF IMPACTS 11
E.4. MITIGATION PLAN FOR SOLID SOURCE TERM MATERIALS AND RECLAMATION PLAN FOR THE ALLUVIAL VALLEY 12
E.4.1. REPLANTING AND RESEEDING 14
E.5. MINE POOL MITIGATION 17
E.5.1. PHYSICAL STABILIZATION OF THE MINE POOL DEMONSTRATION 17
E.5.1.1. PHYSICAL STABILIZATION OF THE MINE POOL CONCLUSION 18
E.5.2. CHEMICAL STABILIZATION OF THE MINE POOL DEMONSTRATION 19
E.5.2.1. IN-SITU TREATMENTS 24
E.5.2.2. IN-SITU TREATMENT RESULTS 24
E.5.2.3. CHEMICAL STABILIZATION OF THE MINE POOL DISCUSSION 26
E.5.2.4. CHEMICAL STABILIZATION FUNCTIONAL DEFINITION 32
E.5.2.5. PHYSICAL AND CHEMICAL STABILIZATION CONCLUSION 32
E.5.3. TRACER TEST 34
E.5.4. WATER TREATMENT PLANT OPERATING STRATEGY 35
E.6. WATER QUALITY MONITORING PLAN 35

EXHIBIT F. RECLAMATION PLAN MAP 49
EXHIBIT G. WATER INFORMATION 53
EXHIBIT H. WILDLIFE INFORMATION 57
EXHIBIT I. SOILS INFORMATION 59
EXHIBIT J. VEGETATION INFORMATION 61
EXHIBIT K. CLIMATE INFORMATION 63
EXHIBIT L. RECLAMATION COSTS 65
EXHIBIT M. OTHER PERMITS AND LICENCES 71
EXHIBIT N. SOURCE OF LEGAL RIGHT-TO-ENTER 73
EXHIBIT O. OWNERS OF RECORD TO AFFECTED LAND (SURFACE AREA) AND OWNERS OF SUBSTANCE TO BE MINED 75
EXHIBIT P. MUNICIPALITIES WITHIN TWO MILES 77
EXHIBIT Q. PROOF OF MAILING OF NOTICES TO COUNTY COMMISSIONERS AND CONSERVATION DISTRICT 79
EXHIBIT R. PROOF OF FILING WITH COUNTY CLERK AND RECORDER 81

EXHIBIT S. PERMANENT MAN-MADE STRUCTURES....83
EXHIBIT U. DESIGNATED MINING OPERATION ENVIRONMENTAL PROTECTION PLAN....85
RULE 6.5. GEOTECHNICAL STABILITY EXHIBIT....87
RULE 8. EMERGENCY RESPONSE PLAN....89

SURFACE FACILITY EMERGENCY RESPONSE PROCEDURES....89
PHASE ONE: NOTIFICATION....90
INTERNAL NOTIFICATION....90
NOTIFICATION AND COORDINATION WITH EXTERNAL ENTITIES....91
PHASE TWO: OPERATIONS....92
STAGE 2 OPERATIONS – MULTIPLE RESPONDER....94
PHASE THREE: REMEDIATION....96
CLEAN UP....96
EMERGENCY RESPONSE EQUIPMENT....97
EMERGENCY RESPONSE TRAINING....98
EMERGENCY RESPONSE PLAN ~ INITIAL RESPONSE GUIDE....98
PHASE ONE: NOTIFICATION....98
PHASE TWO: OPERATIONS....99
GUIDELINES FOR SURFACE EMERGENCY RESPONSE OPERATIONS....99
FLAMMABLES....100
RADIOACTIVE MATERIALS....101
MAIN ACCESS ROAD AND LOCATION TRANSPORT RESPONSES....103
ACCESS NUMBERS FOR SURFACE ACTIVITY EMERGENCY RESPONSE....105
INCIDENT COORDINATORS FOR SURFACE EMERGENCY RESPONSE....105

ADDENDUM 1. NOTICE REQUIREMENTS [RULE 1.6.2(1)(B)]....107
APPENDIX 1. CONCEPTUAL SITE MODEL....109
APPENDIX 2. TRACER TEST....195
APPENDIX 3. SCHWARTZWALDER MINE – HYDROGEOLOGY ASSOCIATED WITH THE CURRENT WATER MANAGEMENT PROGRAM....209
APPENDIX 4. SOUTH WASTE ROCK PILE EXTENSION PLAN SET....211

LIST OF TABLES

TABLE E-1. SEED MIX 14

TABLE E-2. ESTIMATED REMAINING PLANTING QUANTITIES FOR TREES AND SHRUBS 16

TABLE E-3. OBSERVED GROUNDWATER GRADIENTS 21

TABLE E-4: COMPARISON OF SCHWARTZWALDER MINE POOL CONCENTRATIONS PRE AND POST IN-SITU TREATMENT 29

TABLE E-5: SUMMARY OF WATER TREATMENT PLANT OPERATIONS FOR FOUR CONSECUTIVE OPERATING YEARS 34

TABLE L-1. REVISED SCHWARTZWALDER MINE RECLAMATION COSTS 66

LIST OF FIGURES

FIGURE E-1: PHOTOS OF MINE OPENING CLOSURES 37
FIGURE E-2: POTENTIAL EXTENT OF ALLUVIAL VALLEY EXCAVATION 40
FIGURE E-3: SCHWARTZWALDER MINE POOL ELEVATION AND PROJECTED RECOVERY 41
FIGURE E-4: BEDROCK GROUNDWATER CONTOUR MAP 42
FIGURE E-5A: SCHWARTZWALDER MINE IN-SITU TREATMENT INJECTION LOCATIONS – 2013/2015 43
FIGURE E-5B: SCHWARTZWALDER MINE IN-SITU TREATMENT INJECTION LOCATIONS – 2017/2020 44
FIGURE E-6: SCHWARTZWALDER MINE IN-SITU TREATMENT - URANIUM CONCENTRATIONS 45
FIGURE E-7: SCHWARTZWALDER MINE IN SITU TREATMENT - MOLYBDENUM CONCENTRATIONS 46
FIGURE E-8: SCHWARTZWALDER MINE URANIUM AND MOLYBDENUM 3-YEAR TREND 47
FIGURE E-9: SCHWARTZWALDER MINE IN-SITU TREATMENT CONSTITUENT CONCENTRATIONS 48
FIGURE F-1: RECLAMATION PLAN MAP 51
FIGURE F-2: ALLUVIAL VALLEY RECLAMATION PLAN MAP 52
FIGURE G-1: CROSS SECTION OF MINE WORKINGS 55
FIGURE G-2: CROSS SECTION OF MINE WORKINGS, ZOOMED IN 56

EXHIBIT A. LEGAL DESCRIPTION

This Exhibit has not changed from the 2021 Mine Plan Amendment 5.

(This page intentionally left blank.)

EXHIBIT B. INDEX MAP

This Exhibit has not changed from the 2021 Mine Plan Amendment 5.

(This page intentionally left blank.)

EXHIBIT C. PRE-MINING AND MINING PLAN MAP(S) OF AFFECTED LANDS

This Exhibit has not changed from the 2021 Mine Plan Amendment 5.

(This page intentionally left blank.)

EXHIBIT D. MINING PLAN

This exhibit has not changed from the 1983 and 2001 Mine Plan Amendments. Mineral extraction ceased in 2000.

(This page intentionally left blank.)

EXHIBIT E. RECLAMATION PLAN

The Schwartzwalder Mine (Site) is a former underground uranium mine located on Colorado Legacy Land, LLC (CLL) property in Jefferson County near Golden, Colorado (Exhibit B). The mine was operated by Cotter Corporation N.S.L. (Cotter) from 1966 until May 2000, when mining operations were permanently terminated, and Site decommissioning and reclamation activities began. In March of 2018, CLL purchased the Schwartzwalder Mine and surrounding property from Cotter, acquiring title to 559.20 acres of real property including underlying mineral rights, certain water rights, and responsibility for meeting regulatory requirements for environmental protection and eventual Site closure. CLL property encompasses approximately 87 percent (%) of Section 25, T2S, R71W, of which 76.22 acres are permitted for reclamation under Colorado Mine Land Reclamation Permit (MLRP) M-1977-300 (Exhibit F). Figure E-1 presents photos of each mine opening closure shown in Exhibit F.

E.1. CONCEPTUAL CONSIDERATION

In accordance with Condition #2 of the Succession of Operators Plan, (letter dated February 20, 2018), a conceptual site model (CSM) of the Schwartzwalder Mine was provided to Colorado Division of Reclamation, Mining and Safety (DRMS) on November 6, 2018. The CSM was updated in December 2021 and is provided in Appendix 1. The CSM defines and describes the key environmental features of the Schwartzwalder Mine site (Site), with particular focus on the hydrologic and geochemical mechanisms that are expected to influence/control the flow and chemistry of water in and around the Site. A summary of the CSM is provided below.

- Uranium mining of the Schwartz Trend occurred from 1953 to 2000. The Schwartz Trend is a thin band of brittle garnet biotite gneiss and quartzite between the East Rogers and West Rogers Faults that hosted uranium ore and surrounding sub-ore enriched mineral deposits.
- The Ralston Creek Alluvium is largely confined to stream deposits of limited thickness and extent along Ralston Creek which was present pre-mining and was affected by waste rock deposited during mining activities.
- Colluvium and weathered bedrock contain limited amounts of groundwater located in a thin veneer on hillsides and in drainages tributary to Ralston Creek, which are localized, of limited areal extent, and strongly affected by seasonality. Groundwater in low-permeability bedrock is associated with regional faults and associated fracture systems that contain the limited occurrences of groundwater, which either recharge the mine when pumped down or can act as conduits of groundwater away from the mine when it is not pumped down.
- Climate and hydrology play a key role in any hydraulic connections between the mine workings and Ralston Creek.
    - Average annual precipitation of 18.66 inches per year (in/yr) is offset by an average evaporation rate of 35 to 40 in/yr.
    - Excess precipitation flows as runoff or shallow groundwater towards Ralston Creek.
- Currently a pipeline diverts Ralston Creek from upstream of the mine area to below the mine area. This bypass pipeline prevents Ralston Creek from interacting with contaminated alluvial soil. The alluvial

soil was identified in Technical Revision 14 as having the potential to leach uranium to shallow groundwater and adversely affect Ralston Creek. Upon the completion of the alluvial valley excavation project, Ralston Creek will be allowed to flow through its natural channel and the bypass pipeline will be removed.

- Historical sources, e.g., waste rock dumps and alluvial waste rock fill, have contributed to a limited amount of mass loading of Ralston Creek with uranium and metals, and has affected the alluvial groundwater quality.
    - Waste rock dumps: In 2020, CLL constructed a diversion channel on the North Waste Rock Pile (NWRP). This channel diverts run-on water around the NWRP. Subsequent to the installation of this diversion, mass loading from the NWRP into Ralston Creek is now considered de minimus as observed seeps in the area of the NWRP have been largely eliminated.
    - Alluvial waste rock: As described above, a bypass pipeline now prevents Ralston Creek from interacting with the contaminated alluvial valley soil. Similarly, alluvial groundwater in the permit area has historically been captured by a sump system and sent back into the mine. As alluvial waste rock has been removed throughout the valley, the alluvium around the sumps has been removed so that the sumps are now above the surrounding soil and are thereby becoming redundant. These engineering controls shall be removed once the onsite source is addressed.
    - The historical solid phase sources have largely been reclaimed with limited materials around the Site access road still in the process of being removed, and then the valley will be reclaimed by establishing native vegetation. The reclamation activities combined with the upstream diversion have essentially eliminated mass loading to Ralston Creek.
- The mine pool is seasonally pumped to a water treatment plant (WTP), treated, compliant water is discharged to Ralston Creek, and reject brine is sent back to the mine. The WTP includes a reverse osmosis (RO) and ion exchange (IX) system that removes uranium and metals from the mine pool water.
- Since CLL purchased the Site in March 2018, pumping of the mine pool has consistently maintained the mine pool elevation below the regulatory limit of 150 feet (ft) below the Steve Level (hereafter referred to as the "regulatory limit") even during consecutive months of no pumping.
    - Maintaining the mine pool below the regulatory limit has led to (i) establishing a hydraulic gradient away from Ralston Creek in the permit area, and (ii) closing the mine has resulted in reducing the exposure of wall rock to oxygen, which minimizes uranium oxidation in the workings and translates to less mobile uranium to treat.
    - The regulatory limit was established as the permit level in 2012 by the Mine Land Reclamation Board. This elevation is agreed to establish a hydraulic gradient away from Ralston Creek in the permit area.
- In-situ treatment of the mine pool with molasses and alcohol (carbon and nutrient sources for the indigenous population of sulfate reducing bacteria [SRB]), has shown promising results in reducing uranium concentrations to below 10 milligrams per liter (mg/L). These results indicate that in-situ treatment of the mine pool may be a viable feature of a long-term strategy to manage the mine pool.

The usefulness of in-situ treatment as a feature of this long term strategy is still under consideration and may be addressed in a subsequent permit revision.

E.2. INTERCEPTION AND TREATMENT OF ALLUVIAL GROUNDWATER

Although the ore sorter was removed in 1999, legacy contamination associated with the Ore Sorter Decommissioning Area and other mining-impacted areas remain in the alluvial valley at the site. Material associated with these mine disturbances is a mix of mine waste rock and naturally occurring soils, alluvial sands, and gravels. For the purposes of this discussion, these materials are collectively referred to as "alluvial fill". (The word "pad" has historically been used in reference to these disturbed alluvial fill materials.) Construction of the pad was altered over the operational history of the Mine as needed to support changes in mining facilities and operations. Because seasonally varying amounts of groundwater associated with Ralston Creek inundate portions of subsurface alluvial fill materials, and some of these materials include mineralized waste rock, water quality in the creek is subject to seasonal impacts to water quality, namely uranium concentrations that under low streamflow conditions can exceed the applicable water quality standard (0.03 mg/L, which is the U.S. Environmental Protection Agency's [USEPA] primary drinking water standard for uranium and the State of Colorado's domestic water supply limit for uranium). Probable leaching mechanisms include variable cycles of oxidation and formation of soluble uranium salts on waste rock surfaces, combined with seasonally fluctuating alluvial groundwater tables. Since operational mine dewatering and treatment was terminated in 2000, water quality monitoring data have consistently demonstrated that uranium is the primary constituent of concern. Due to geomorphic valley features in the vicinity of the Site, surface water in the creek seeps into the alluvium in upper portions of the pad to become alluvial groundwater that flows back towards the creek in the lower portions of the alluvial pad. The surface water monitoring station just below CLL's property line (SW-BPL) is situated just below a geologic constriction in the valley that forces most of the alluvial groundwater to the surface and into the creek channel to become surface water. Surface water monitoring station SW-BPL is considered a point of compliance for Ralston Creek. In 2010, the water treatment plant in the valley was refurbished with a new ion-exchange water treatment system, along with infrastructure to begin interception, pumping, and treatment of alluvial groundwater from existing sumps and monitoring wells across the alluvial pad. These systems were authorized under a Colorado wastewater treatment discharge permit (CO-0001244) with the Water Quality Control Division (WQCD) of CDPHE, along with an amendment to the Radioactive Materials License (RML CO-369-06) and technical revisions (Technical Revision-12, Technical Revision-15) to the Mine Permit (M-1997-300). All sumps and monitoring wells were individually permitted with the State Engineer's Office, Division of Water Resources.

E.3. ISOLATION OF RALSTON CREEK FROM SOURCES OF IMPACTS

While the alluvial groundwater interception and treatment system resulted in dramatic reductions in uranium concentrations in Ralston Creek (2013 Mine Plan Amendment 4), it was not sufficient to eliminate seasonal low-flow (base groundwater flow) exceedances of water quality standards at SW-BPL, and in 2012 an engineered upper cut-off wall was constructed to direct up to 8 cubic feet per second (cfs) of unimpacted upgradient alluvial groundwater and surface water flowing above historic mine facilities into an 18-inch HDPE pipeline, convey this water past the Site, and release it back into the creek below the Site.

The pipeline diversion was conceived and designed to achieve two basic objectives: 1) prevent upgradient groundwater and surface water from becoming impacted as it flows past the Site, and 2) to help dewater the alluvial fill during low-flow conditions such that other remedial measures, such as excavation of contaminated materials within the alluvial pad, can be performed. To allow for access to the contaminated soils in the alluvial valley, the water treatment plant was relocated up to the Mesa in 2018. The previous water treatment plant was demolished, and debris were returned to the underground mine in accordance with the Mine Permit (M-1977-300).

After the alluvial valley excavation is complete and the corresponding disturbed areas are reclaimed, the bypass pipeline and sump system shall be removed. CLL proposes allowing Ralston Creek to flow through the sluice gate at the cut off wall into its natural channel while the bypass pipeline infrastructure remains in place. This would allow CLL to monitor the water quality in Ralston Creek while the bypass pipeline infrastructure is still intact and determine the optimal time for removal. CLL intends to demolish the concrete wall (2 feet thick x 220 feet long x 20 feet high), footer (1 foot x 2 foot x 220 foot), and pipeline cradle foundations (ten total, 5-foot long each). Concrete and other demolition debris shall be broken into manageable pieces for offsite disposal. The bypass pipeline shall be cut into 30-foot sections, loaded on a truck and hauled offsite for disposal.

E.4. MITIGATION PLAN FOR SOLID SOURCE TERM MATERIALS AND RECLAMATION PLAN FOR THE ALLUVIAL VALLEY

Alluvial valley excavation began in 2018 and has progressed seasonally (late spring to early fall) to present day. In Technical Revision #14, the previous operator, Cotter Corporation presented the baseline scope for the excavation project. This document initially identified 33,000 to 54,0000 cubic yards (CY) cubic yards of soil for removal and onsite disposal in the Minnesota Adit. In accordance with 2013 Mine Plan Amendment 4, contaminated alluvial fill materials were excavated and placed in an underground stope known as the “Glory Hole”, which is accessed through the Minnesota Adit of the Schwartzwalder Mine on the hillside well above the elevation of Ralston Creek on the southern side of the valley. When the Glory Hole reached capacity (~56,000 CY), and in accordance with 2021 Mine Plan Amendment 5, additional contaminated materials were placed in the open adit for the Black Forest Mine, a nearby former decorative rock mine that was only partially advanced before operations were permanently terminated. Because Black Forest Mine has recently reach capacity (~15,000 CY), CLL is requesting permission to dispose of additional materials by extending the South Waste Rock Pile (SWRP) to the south / south-east in front of the Former Black Forest Mine (~12,000 CY). CLL shall extend the SWRP consistent with the previously approved construction criteria and reclaim the newly disturbed areas consistent with the MLRP. These criteria are summarized below:

- Placement Map: Appendix 4 contains a plan set that illustrates the placement of materials to extend the SWRP. Technical Revision 14 initially scoped adding materials to the top of the SWRP, however CLL is proposing to extend the pile. This approach reduces the footprint of “new disturbance” and will create a more natural looking
- Cap: Disturbed areas shall be capped with 3-feet of cover material. Cap material will be locally sourced from within the permit boundary from either the north side of Ralston Creek near the former laydown area, or from within the alluvial valley excavation area on the south side of Ralston Creek.
- Reseeding: Disturbed areas shall be reseeded using the approved seed mix (Table E-1). Additional detail on reseeding is provided in the following section.

The true spatial extent of the alluvial excavation project is not fully known. As the excavation work processes, and in accordance with Technical Revision 14, gamma radiation surveys are completed to guide excavations such that material are efficiently and effectively removed based on real time measurements. Figure E-2 illustrates the potential horizontal extent of contamination (up to 6.35 acres) from the most recent surface gamma radiation survey (Fall 2021) and shows the location of the Ore Sorter Decommissioning Area (also called RML Area #2). CLL does not anticipate excavation to extend into Ralston Creek. The vertical extent of contamination may extend to bedrock (approximately 15 feet below ground surface or less) in some areas, particularly on the south/southeastern portion of the excavation area near RML Area #2.

As indicated in Technical Revision 14, alluvial materials with Radium-226 concentrations above 7 pCi/g shall be excavated and disposed of to protect water quality in Ralston Creek. Alluvial materials with Radium-226 concentrations below 7 pCi/g are expected to meet the 17.2 mg/kg natural-uranium criterion, which in turn, should ensure that groundwater leachate from contact with alluvial fill materials will not exceed the applicable water quality standard of 0.03 mg/L.

In the course of the alluvial valley excavation project, CLL has learned that contaminated soils (concentration of radium-226 greater than 7pCi/g) occur in "pockets" adjacent to unimpacted soils (concentration of radium-225 less than or equal to 7pCi/g). This deposition is considered reflective of the historic ore-sorting practices that created the initial contamination. These unimpacted soils may be used a fill materials or growth media for reclaiming the valley or capping the expanded SWRP. Reclaiming with local soils is expected to reduce the likelihood of importing weeds or invasive species from outside fill material. Regrading is expected to occur consistent with Figure F-2 with a final slope of 3H:1V or less with positive drainage toward Ralston Creek.

Successful completion of alluvial fill excavation work (i.e. confirmation that all contaminated soils have been removed) shall be verified with soil sampling results and presented in a Final Status Survey Report, which shall be provided under separate over to DRMS and CDPHE to satisfy the following regulatory requirements:

- DRMS: Remove soil with the potential to leach uranium to surface water above the Colorado domestic water supply limit for uranium [0.03 mg/L]. The objective is to protect water quality in Ralston Creek and satisfy reclamation requirements under the Mine Permit (M-1977-300).

- CDPHE WQCD: Eliminate the discharge of uranium and other mine-related pollutants from "the Pad" to alluvial groundwater and surface water in Ralston Creek. The removal of contaminated alluvial fill materials is expected to eliminate the long-term need to operate the sump-capture system and bypass pipeline, and to eliminate the need for monthly monitoring of Ralston Creek as required by the NOV/CDO (CDPHE, 2010).

- CDPHE Radiation Control Program: Remove soil above CDPHE clean-up requirements for unrestricted release of RML Area #2 (also called the Ore Sorter Decommissioning Area in Exhibit U) from Radioactive Materials License CO-369-06.

E.4.1. Replanting and Reseeding

In 2016 the Biological Assessment [1] (IRIS Mitigation and Design Inc., 2016) was prepared in coordination with Technical Revision 23 to conservatively describe the replanting and reseeding requirements for the Schwartzwalder Mine site. Because the extent of the alluvial valley excavation was unknown, the Biological Assessment assumed a worst-case scenario in which the entire Excavation Area (up to 8-acres) would need to be excavated to bedrock and a new waste rock rile would need to be constructed across Ralston Creek. However, as shown in Figure E-2, the extent of the alluvial valley excavation is limited compared to the initial scope of the Biological Assessment. Gamma scans indicate that complete excavation to bedrock is unwarranted and CLL does not intent to create a new waste rock pile across Ralston Creek. Therefore, after the Final Status Survey report is complete, CLL shall prepare a final planting plan, describing the exact planting quantities, species, and locations. This planting plan shall be submitted to USACE, USFS, and DRMS to ensure compliance with all applicable permits.

Any surficial areas that are disturbed, shall be reclaimed consistent with the current topography (approximately 15-30% slopes, as shown in Figure F-1), reseeded (seed mix shown below in Table E-1) and re-topsoiled consistent with Technical Revision 23, Attachment B *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016). CLL estimates that up to 7.1 acres of land in the alluvial valley shall need to be reseeded with the seed mix shown in Table E-1. The extent of the disturbed area is show on Figure F-1.

TABLE E-1. SEED MIX

Species	Scientific Name	Season	% in Mix	Seed / lb	lbs PLS*/AC
Native Grasses**					
Sand dropseed	Sporobolus cryptandrus	Warm	15	5,298,000	0.1
Sideoats grama	Bouteloua curtipendula	Warm	15	191,000	3.1
Streambank wheatgrass	Elymus lanceolatus spp. Psammophilus	Cool	15	156,000	3.8
Needle and thread	Hesperostipa comate spp. Comate	Cool	15	115,000	5.2
Thickspike wheatgrass	Elymus laneolatus spp. Lanceolatus	Cool	10	154,000	2.6
Blue grama	Bouteloua gracilis	Warm	10	825,000	0.5
Canada wildrye	Elymus Canadensis	Cool	10	115,000	3.5
Native Wildflowers***					
Black-eyed susan	Rudbeckia hirta	Native	1.5	1,710,000	0.04
Sulfur flower	Eriogonum umbellatum	Native	1.5	209,000	0.3
Prairie aster	Maceranthera tanacetifolia	Native	1.5	408,000	0.2
Purple prairie clover	Dalea purpureum	Native	1.5	210,000	0.3
Western yarrow	Achillea millefolium var. occidentalis	Native	1	2,770,000	0.02
Planic coreopsis	Coreopsis tinctoria	Native	1	1,400,000	0.04

[1] Schwartzwalder Mine – Phase 2, Biological Assessment, USACE File # NOW-2011-1353-DEN (IRIS Mitigation and Design Inc., 2016).

TABLE E-1. SEED MIX					
Species	**Scientific Name**	**Season**	**% in Mix**	**Seed / lb**	**lbs PLS*/AC**
Blanket flower	Gaillardia aristata	Native	1	132,000	0.3
Purple coneflower	Echinacea purpurea	Native	1	117,000	0.3
Total			**100**	**20.3 lbs PLS*/AC**	

Source:

Technical Revision 23, Attachment B *Schwartzwalder Mine Environmental Protection Plan*, Table 7-2 (Whetstone Associates Inc., 2016).

Notes:

This upland seed mix is also included in the mitigation description portion of the USACE Section 404 Permit application and associated Biological Assessment for USFWS. Figure F-1 shows the anticipated extent of disturbed acres that will need to be replanted.

*PLS/AC = Pure Live Seed per pound, per acre. If broadcast seeding, double the rate applied.

** Colorado native grasses and wildflowers may be substituted with project ecologist approval only

*** Wildflowers may be eliminated based on availability

The soils and plant growth media used for reclamation are native soils from the alluvial valley excavation area. Section 17 of the *Schwartzwalder Mine Environmental Protection Plan* [Whetstone Associates Inc., 2016]) identifies these soils as fine-loamy to loamy-skeletal in texture. Loamy soils are well regarded as suitable plant grown medium because they are a mix of sand, clay, and silt. If additional carbon is needed to support vegetative growth, CLL shall cover the disturbed area (up to 7.1 acres, shown on Figure F-1) with 6-inches of imported topsoil.

Section 7(b)(ii) of the *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016) provides the following description of seed and topsoil placement:

> *"Topsoil Placement: Topsoil will be end-dumped on the crest of the slope and graded by dozers. Slopes will be graded to avoid concentrated water flow and subsequent erosion. Soil surfaces will be moderately roughened to allow the seeds to hold and some moisture to collect. Roughening can simply be the tracks of heavy equipment that has been used at the site for regrading.*
>
> *Seeding: Seeding will be accomplished by broadcast seeding followed by hydromulching. Hydroseeding is not recommended as it is not typically successful in an arid climate. Table E-1 presents the seed mix to be used for the waste rock piles.*
>
> *Mulching: For 2H:1V and steeper slopes, mulch is necessary to keep the seed and topsoil in place. Mulch can also provide shade to the seedlings and help the soil to retain moisture. Mulching will be accomplished by hydromulching with addition of a tackifier. Tackifier (Ecology Control MBinder) is a botanical glue made from Plantago insularis that can also be applied to the slope to prevent erosion. The hydromulch and tackifier should effectively stabilize the surface of the slope.*
>
> *Soil Amendments: Soil amendments may be required to improve the performance of the vegetation. This could include composted biosolids or manufactured amendments such as Biosol."*

The tree and shrub planting plan for the alluvial valley is based on the Biological Assessment which identified two planting phases of the remediation project:

- Phase One discussed impacts from the installation of the cut-off wall and bypass pipeline, and

- Phase Two discussed impacts from the alluvial valley excavation.

The previous operator, Cotter, completed all of the necessary planting and mitigation for Phase One impacts, except for planting 174 riparian area trees (Ponderosa Pine, Juniper, Cottonwood & Peachleaf Willow) and 615 willow stakes. Since the alluvial valley excavation project is on-going, no planting or mitigation has been completed for Phase Two impacts. The excavation area shown in Figure E-2 corresponds to the Phase Two Upland Mitigation Area (also called Impact Area#3 in the Biological Assessment). Table E-2 below summarizes the maximum tree and shrub mitigation requirements remaining at the Schwartzwalder Site. The Biological Assessment does not specify the planting rate or specific quantities of specifics that need to be planted. Therefore, for the purposes of this Amendment it is assumed that an equal distribution of each tree / shrub species shall be planted over the 7.1 acres of disturbed land shown on Figure F-1.

TABLE E-2. ESTIMATED REMAINING PLANTING QUANTITIES FOR TREES AND SHRUBS

Item	Total Mitigation Quantity (Includes Corps Ratio)	Species Description and Quantity [2]	Planting Rate (per acre)[3]
Phase One Impacts from Cut-off Wall and Temporary Bypass Pipeline Installation			
Trees, 10-gallon pots	174	Ponderosa Pine (34)	4.8
		Juniper (35)	4.9
		Cottonwood (35)	4.9
		Douglas Fir (35)	4.9
		Engelmann Spruce (35)	4.9
Shrubs	165	Willow stakes (165)	23.2
Phase Two Impacts from Alluvial Valley Excavation [1]			
Trees, 10-gallon pots	89	Ponderosa Pine (17)	2.4
		Juniper (18)	2.5
		Cottonwood (18)	2.5
		Douglas Fir (18)	2.5
		Engelmann Spruce (18)	2.5
Shrubs, 1-gallon pots	65	Mountain Mahogany (16)	2.3
		Hawthorne (16)	2.3
		Willow (16)	2.3
		Fringed Sage (17)	2.4
Shrubs, 5-gallon pots	66	Mountain Mahogany (16)	2.3
		Hawthorne (16)	2.3
		Willow (17)	2.4
		Fringed Sage (17)	2.4

Source:

Schwartzwalder Mine – Phase 2, Biological Assessment, USACE File # NOW-2011-1353-DEN (IRIS Mitigation and Design Inc., 2016).

Notes:

[1] Figure E-2 illustrates that the anticipated extent of alluvial valley excavation, which corresponds to Impact Area #3 of the Biological Assessment. The maximum planting quantities for Impact Area #3 are shown, a final planting plan shall be developed after the excavation is complete with exact quantities, species, and locations.

[2] The Biological Assessment does not specify the planting rate or specific quantities of specifics that need to be planted. Therefore, for the purposes of this Amendment CLL assumes an equal distribution of each tree / shrub species shall be planted over the 7.1 acres of disturbed land shown on Figure F-1.

[3] Figure F-1 shows the anticipated extent of disturbed acres that will need to be replanted, totalling 7.1 acres. Therefor the planting rate per acre is a calculated value of each Species Quantity divided by 7.1 acres.

E.5. MINE POOL MITIGATION

The WTP operating strategy is considered in conjunction with in-situ treatment of the mine pool to provide physical and chemical stabilization of the mine pool. During the period in which the WTP is shut down, in-situ treatment of the mine pool may at times be conducted, as necessary, to maintain chemical stabilization. A demonstration of the physical and chemical stabilization of the mine pool, including previous in-situ treatments, is discussed below.

E.5.1. Physical Stabilization of the Mine Pool Demonstration

Physical stabilization of the mine pool began when a 10-horsepower (hp) pump was installed in the #2 Shaft behind the Steve bulkhead. The pump was capable of dewatering the mine pool at 100 gallons per minute (gpm). The 10-hp pump was replaced with a 25-hp pump in February 2017 to increase the mine dewatering rate and speed up the process of achieving the regulatory limit. The pump was installed in the #2 Shaft behind the Steve bulkhead at 210 ft below the Steve Level and was capable of dewatering the mine pool at 190 gpm. The 25-hp pump dewatered the mine pool to below the regulatory limit by November 2017. The WTP has been operating approximately 50% of the time for the last four consecutive years and as shown in Figure E-3, the mine pool has been consistently below the regulatory limit, with the possible exception of one instance in the Winter of 2019 (January 27-29, 2019).

In April 2019, a 60-hp pump was installed in the Jeffrey Air Shaft at 410 ft below the Steve Level. The pump is capable of dewatering the mine pool at approximately 300 gpm.

In April 2020, there was a malfunction with the 60-hp pump and the 25-hp pump was temporarily brought into operation to dewater the mine pool. Operation of just the 25-hp pump was sufficient to keep the mine pool below the regulatory limit.

In October 2020, a team entered the mine to verify the mine pool elevation and calibrate the transducer used to measure the mine pool elevation. The team measured that the mine pool had been dewatered to 22 feet lower than the elevation recorded by the transducer, which caused inaccurate and higher measurements to be recorded. The transducer was lowered from 294 ft to 354 ft below the Steve Level and calibrated to accurately measure the mine pool elevation. The steep drop in October 2020 shown on Figure E-3 reflects when the calibration was performed. The fact that the transducer had been providing shallower mine pool elevation measurements indicates that the exceedance of the mine pool elevation above the regulatory limit in the Winter of 2019 may not have been an actual exceedance, and also it is possible that the mine achieved the 150 foot below Steve level sooner than November 2017.

Operation of the 60-hp pump and the dewatering/treatment of the mine pool will continue to physically stabilize the water elevation in the mine pool below the regulatory limit. During the time in which the WTP is not in operation, the mine pool will be allowed to naturally recover as shown in Figure E-3. Projections based on historical mine pool elevation trends and calculations of mine recharge rates show that each year the WPT can be shut down for at least a 6-month period with little risk of exceeding the regulatory limit. The basis for a shut down of at least 6-months is provided in the following section.

Maintaining the mine pool elevation below the regulatory limit (150-feet below the Steve Level) has established a hydraulic gradient inward toward the mine pool and away from Ralston Creek. A summary of the observed quarterly groundwater elevations in bedrock wells MW-13, MW-15 and MW-18 with respect to the mine pool elevation is presented in Table E-2. MW-13 is the upgradient deep groundwater well. MW-15 was installed east of the Schwartzwalder Mine, targeting the Schwartz Trend geologic transition zone, and was installed at a location that was downgradient of the mine area relative to pre-mining static water levels. MW-18 as installed in the valley floor targeting the Illinois Fault in the area near where the Illinois Fault is adjacent to Ralston Creek. These data are used to calculate the hydraulic gradient between each well and the mine pool. Negative gradients indicate an inward gradient of groundwater around the mine as measured by the transducer (which is installed within the mine pool and measured in Shaft 2). Depending on the elevation of the mine pool, which since 2018 it was below the regulatory limit, the gradient from each well ranged from 0.014 to 0.304 feet per foot. This validates that the regulatory limit is set at an appropriate depth to protect Ralston Creek and the potential for groundwater to migrate along the recognized permeable features that intersect the mine. The strongest gradient (0.304 ft/ft) was observed in MW-13 during the fourth quarter of 2021, when the mine pool was dewatered to its deepest elevation. The data also indicate an anisotropic capture zone from pumping the mine pool.

A bedrock groundwater contour map is shown on Figure E-4 that illustrates the capture zone associated with the mine pool. The lateral extent of mine pool workings is shown as the red-shaded area. Groundwater elevation data from the second quarter 2020 are shown next to wells MW-13, MW-15, and MW-18. These monitoring well data, which are conservative, are provided in Table E-2 and used on Figure E-4. In the second quarter of 2020 the mine pool elevation ranged from ~158 – 178 feet below the Steve Level (Table E-2). CLL has further dewatered the mine pool to greater than 345 feet below the Steve Level. Additional discussion of this figure and the physical stabilization of the mine pool is provided in Appendix 3.

E.5.1.1. Physical Stabilization of the Mine Pool Conclusion

The changes in mine pool elevation during the non-pumping recovery period are historically steady and consistent. On the basis of historical refill trends, once the mine pool is dewatered at the end of the operating season, the natural groundwater recharge will take at least six to and up to eight months before the mine pool approaches the regulatory limit. Historical mine pool elevations are shown in conjunction with mine pool projections in Figure E-3. The projections made for the natural refill in the spring of 2022 in Figure E-3 are based on previous recovery trends through the same elevations in the mine. The green point at 6,432 feet above mean sea level (ft amsl) represents the projected plant start-up day, when the mine pool is estimated to still be at a conservative 20 ft below the regulatory limit. On the basis of empirical data collected, the physical stabilization of the mine pool has been achieved for the last four consecutive years (i.e., since fall of 2017) by this approximately 6-month seasonal pumping. On the basis of (i) calculations developed from the empirical data, (ii) the operational periods of the WTP over the last 4 years, (iii) observed gradients in monitoring wells, and (iv) active dewatering performed for ~6 months of the year, the result is a physically stable mine pool.

E.5.2. Chemical Stabilization of the Mine Pool Demonstration

The chemical stabilization of the mine pool water has been accomplished through a number of steps taken to optimize the management of the Site, including reducing mine recharge from sumps as reclamation has progressed, closure of mine openings, as well as in-situ treatments. Functionally, keeping the mine chemistry stable enough in its overall composition to allow the RO to be used to maintain the mine pool in its target dewatered range is how achieving and maintaining chemical stabilization should be evaluated.

The mine chemistry is in a "brackish" water chemistry designation, where dissolved solids are higher than the freshwater range, but not so saline that it cannot be readily treated to make fresh water acceptable for other uses. Limiting oxidation processes has been accomplished by decreasing oxygen flux into the mine by closing/filling the open hole and stopping active ventilation, as well as by adding microbial reagents in situ into the mine workings to consume oxygen and reverse historical oxidation that occurred when the mine was open, and air was blown through the mine to decrease radon exposure. The amount of in-situ treatment is expected to decline as ventilation has been stopped, the mine openings have been closed, and the oxidized rock in the saturated workings has now been flooded with biochemically reducing water. The water in the mine has been shifted from its oxidizing form (+200 millivolts when initially flooded) to now be consistently negative millivolts (from March 2019 to the present, the raw feed into the WTP has ranged from -80 millivolts to -157.9 millivolts). When the mine water is chemically reducing, fluctuating mine pool levels cannot cause leaching of mine rock by oxidative processes.

In addition to creating a bulk mine water chemistry that is chemically reducing to minimize oxidative leaching of mine rock, the in-situ treatment regimen is also designed to create a zone of sulfate-reducing conditions for the reduction of soluble uranium species to insoluble uranium species, e.g., from the hexavalent oxidation state (U[VI]) to the tetravalent oxidation state (U[IV]), with a focus on the upper mine workings. Numerous field-based studies have documented that a sulfate-reducing environment is conducive to the reduction of U(VI) to U(IV) resulting in the decline in observed uranium concentrations (e.g., Anderson et al., 2003; Watson et al., 2013)[2], and also sulfate-reducing environments consume oxygen that otherwise could lead to uranium oxidation. The reducing environment is essential for the reduction of U(VI) to U(IV) to immobilize uranium and

---

[2] Anderson, R.T., Vrionis, H.A., Ortiz-Bernad, I., Resch, C.T., Long, P.E., Dayvault, R., Karp, K., Marutzky, S., Metzler, D.R., Peacock, A., White, D.C., Lowe, M., Lovley, D.R. (2003) Stimulating the in situ activity of Geobacter species to remove uranium from the groundwater of a uranium-contaminated aquifer, Appl. Environ. Microbiol., 69, 5884-5891.

Watson, D.B., Wu, W., Mehlhorn, T., Tang, G., Earles, J., Lowe, K., Gihring, T.M., Zhang, G., Phillips, J., Boyanov, M.I., Spalding, B.P., Schadt, C., Kemner, K.M., Criddle, C.S., Jardine, P.M., Brooks, S.C. (2013) In situ bioremediation of uranium with emulsified vegetable oil as the electron donor, Environ. Sci. Technol., 47, 6440-6448.

the precipitation of iron sulfides. In addition to the formation of insoluble uranium species, trace metals may coprecipitate with or adsorb on the surfaces of the iron sulfides.

The in-situ treatment consists of injecting carbon sources, e.g., molasses, alcohols such as ethanol and methanol, to stimulate the activity of native SRB. Oxidized sulfur compounds can be used as terminal electron acceptors for the anaerobic respiration of organic matter by SRB. SRB obtain energy by coupling the oxidation of organic compounds to the reduction of sulfate or other sulfur compounds to sulfide. Soluble sulfides are produced that react with chalcophile metals (e.g., zinc, cadmium, lead, copper) to precipitate low solubility metal sulfide phases. A phosphate source such as phosphoric acid is also added, as necessary, as a nutrient for the microbes.

Table E-3. Observed Groundwater Gradients							
Sampling Memo/Data Source	Sample Date	Daily Average Mine Pool Elevation		Monitoring Well (MW) Elevation and Gradient Data			
		(feet below Steve Adit)	(ft amsl)	Groundwater Elevation (ft btoc)	Groundwater Elevation (ft amsl)	Head in Well Compared to Mine Pool (ft)	Gradient Toward Steve Adit Transducer (ft/ft)
MW-13							
Q1 2019	No access, winter conditions						
Q2 2019	No data, transducer malfunction						
Q3 2019	No data, transducer malfunction						
Q4 2019	No access, winter conditions						
Q1 2020	No access, winter conditions						
Q2 2020	6/17/2020	178.05	6,423.95	446.37	6,956.95	533.00	-0.228
Q3 2020	No sample, equipment malfunction						
Q4 2020	No sample, equipment malfunction						
Q1 2021	No access, winter conditions						
Q2 2021	6/9/2021	227.40	6,374.31	443.55	6,959.77	585.46	-0.250
Q3 2021	7/27/2021	284.69	6,317.02	442.72	6,960.60	643.58	-0.275
Q4 2021	10/13/2021	349.07	6,252.64	440.43	6,962.89	710.25	-0.304
MW-15							
Q1 2019	No access, winter conditions						
Q2 2019	No data transducer malfunction						
Q3 2019	No data transducer malfunction						
Q4 2019	No access, winter conditions						
Q1 2020	No access, winter conditions						
Q2 2020	6/17/2020	178.05	6,423.95	373.40	6,525.93	101.98	-0.098
Q3 2020	7/29/2020	198.21	6,403.79	336.10	6,563.23	159.44	-0.153
Q4 2020	11/12/2020	326.76	6,275.24	386.90	6,512.43	237.19	-0.228
Q1 2021	Dry						

TABLE E-3. OBSERVED GROUNDWATER GRADIENTS

Sampling Memo/Data Source	Sample Date	Daily Average Mine Pool Elevation (feet below Steve Adit)	Daily Average Mine Pool Elevation (ft amsl)	Monitoring Well (MW) Elevation and Gradient Data: Groundwater Elevation (ft btoc)	Groundwater Elevation (ft amsl)	Head in Well Compared to Mine Pool (ft)	Gradient Toward Steve Adit Transducer (ft/ft)
Q2 2021	6/9/2021	227.40	6,374.31	379.40	6,519.93	145.62	-0.140
Q3 2021	7/27/2021	284.69	6,317.02	386.30	6,513.03	196.01	-0.188
Q4 2021	10/12/2021	350.05	6,251.66	422.80	6,476.53	224.87	-0.216
MW-18							
Q1 2019	Dry						
Q2 2019	Dry						
Q3 2019	9/25/2019	191.62	6,410.38	159.70	6,417.18	6.80	-0.020
Q4 2019	10/23/2019	187.84	6,414.16	153.60	6,423.28	9.12	-0.026
Q1 2020	3/4/2020	192.84	6,409.16	162.77	6,414.11	4.95	-0.014
Q2 2020	6/4/2020	158.71	6,443.29	124.70	6,452.18	8.89	-0.026
Q3 2020	7/29/2020	198.21	6,403.79	162.30	6,452.18	48.39	-0.139
Q4 2020	Dry						
Q1 2021	1/29/2021	256.61	6,345.10	215.00	6,361.88	16.78	-0.048
Q2 2021	6/8/2021	226.03	6,375.68	182.13	6,394.75	19.07	-0.055
Q3 2021	Dry						
Q4 2021	Dry						

Notes:

The following table summarizes relevant information for the Steve Adit (where the mine pool transducer is located) and monitoring wells:

Location ID	*Northing*	*Easting*	*Ground Surface Elevation*	*Well Casing Elevation*	*Total Depth of Well*	*Distance to Steve Adit*
	(feet)	*(feet)*	*(ft amsl)*	*(ft amsl)*	*(ft bgs)*	*(Linear ft)*
Steve Adit	*1,732,700.61*	*3,061,558.53*	*6,602*	*N/A*	*N/A*	*N/A*
MW-13	*1,731,272.17*	*3,059,706.76*	*7,401.87*	*7,403.32*	*500.80*	*2,338.69*
MW-15	*1,731,742.41*	*3,061,962.60*	*6,897.53*	*6,899.33*	*1,007.13*	*1,039.91*
MW-18	*1,732,989.50*	*3,061,365.66*	*6,575.34*	*6,576.88*	*239.9*	*347.36*

Coordinate values are Colorado State Plane Central Zone (NAD83) Elevations are NADV88. Survey information provided by Lambert Land Consulting, LLC and were measured on 7/23/2020.

The total depth of the well was obtained from the well construction report.

The distance between the Steve Adit and each MW was calculated using the following formula: $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

The gradient (i) toward the mine pool was calculated using the following formula: $i = \frac{dh}{dl}$ where *dh* is the difference in head between the well and the mine pool and *dl* is the distance between them.

E.5.2.1. In-Situ Treatments

Prior to the in-situ treatment of the mine pool in 2020, there were three previous in-situ treatments in 2013, 2015, and 2017. What is known about these in-situ treatments is summarized in the following paragraphs. Note: while there has been some continuity of staff between the Cotter and CLL operating periods, a significant amount of information is not available anymore as Cotter personnel from 2013-2017 are no longer available, and some records of what was done from 2013-2018 is limited. What is summarized below is what was recorded by the Alexco/Ensero staff who are still part of the program.

The initial in-situ mine pool treatment was completed in May 2013 as a pre-treatment step to the RO system in which molasses and methanol were injected into the mine pool. Molasses was injected in the #1 Shaft (~800 ft deep), the #2 Shaft (~1,160 ft deep), and the open hole behind the bulkhead. The injection location points are shown on Figure E-5a. Three subsequent monthly injections of methanol followed, and a second injection of molasses and methanol was made six months after the start of treatment.

The in-situ treatment was interrupted by a 1,000-year rainfall event in September 2013 that prevented access to the Schwartzwalder Mine for large semi-trucks from September 2013 until the summer of 2015 when the road into Schwartzwalder mine started to be rebuilt. Although truck access to the Schwartzwalder Mine was still limited in 2015 and a tanker could not make it to the Site, totes of MicroC® (a carbon source) and molasses were brought to the Schwartzwalder Mine and injected into the mine pool in the same locations as in 2013 in June and September, respectively.

In December 2017, the in-situ treatment of the mine pool consisted of an injection of phosphoric acid and molasses into the #2 Shaft. The 25-hp pump was operating and the RO concentrate effluent was reinjected into the #2 Shaft with the in-situ reagents. The operation of the pump allowed for a mixing of the mine pool to distribute the molasses and phosphoric acid. The pump was shut down on December 22, 2017, and not restarted until January 15, 2018. The injection location points are shown on Figure E-5b.

In December 2019, the 60-hp was turned off and was not restarted until April 2020. On January 28, 2020, beet molasses, phosphoric acid, and the tracer Rhodamine WT were injected in the #2 Shaft at 410 ft below the Steve Level. On January 29, 2020, alcohol and the tracer Fluorescein were injected in the #2 Shaft at 1,100 ft below the Steve Level. The injection location points are shown on Figure E-5b. The alcohol was injected into the mine pool at a lower level of the workings to mix the mine pool water as the alcohol bubbled up. The tracers were used to evaluate the mixing of the mine pool. These tracers were water soluble, low toxicity, expected to be reasonably stable in normal water environments, and highly detectable. It is expected that the use of tracers will only be required once. A discussion on the conclusion of the tracer test is provided in Section E.5.4 and a complete discussion is provided in Appendix 2.

E.5.2.2. In-Situ Treatment Results

During the in-situ treatments, the water quality of the mine pool was frequently monitored at a sample port in the WTP just before the RO units. The effectiveness of the in-situ treatments is illustrated by a decrease in the uranium and molybdenum concentrations shown on Figures E-6 and E-7, respectively. As shown on Figure E-6, dissolved uranium concentrations decreased from approximately 23 mg/L before the first in-situ treatment in

2013 to a minimum of approximately 2 mg/L, an approximate 90% reduction in concentration. There was a rebound in dissolved uranium concentrations in 2014, which subsequently decreased again after the injections of MicroC® and molasses in 2015. The dissolved uranium concentrations again rebounded to a maximum of approximately 40 mg/L before the second in-situ treatment in 2017 followed by a decrease to a minimum of approximately 4 mg/L, an approximate 90% reduction in concentration. The decreasing uranium concentrations indicate that a biochemically reducing environment is being achieved to form some insoluble uranium species that precipitate out of the mine pool.

Also shown on Figure E-6 are the TDS concentrations. Except for the noted period of suspect data, the TDS concentrations have been generally stable. This stability supports the viability of the RO technology treatment system, which is discussed in Section E.5.2.4.

As shown on Figure E-7, dissolved molybdenum concentrations indicate a consistent pattern of several quarters of decreasing concentrations with the in-situ treatments followed by an increase in concentrations. The dissolved molybdenum concentrations decreased from approximately 1.5 mg/L before the first in-situ treatment in 2013 to a minimum of approximately 0.04 mg/L, an approximate 97% reduction in concentration. There was a rebound in dissolved molybdenum concentrations in 2014, which decreased again after the injections of MicroC® and molasses in 2015. The dissolved molybdenum concentrations again rebounded to a maximum of approximately 6 mg/L before the second in-situ treatment in 2017 followed by a decrease to a minimum of approximately 0.05 mg/L, an approximate 99% reduction in concentration, after which dissolved molybdenum concentrations started increasing. The decreasing dissolved molybdenum concentrations is another indication of a reducing environment.

As shown on Figure E-7, the molybdenum concentrations increased in 2018 following the in-situ treatment in 2017, decreased after the in-situ treatment in 2020, and started to increase until the last sampling event in September 2020. The pattern of increasing and decreasing molybdenum concentrations with in-situ treatments is consistent. As shown on Figure E-6, there was not a significant decrease in uranium concentrations after the 2020 in-situ treatment as was seen in the previous in-situ treatments. There may be several factors for the absence of the significant decrease, but whatever the cause was for this limited uranium reduction is speculative at this time. What is known is that the removal of alluvial waste rock was occurring in this time period, with the open hole being filled by this rock material. It is possible that this caused a temporary increase in mine uranium concentrations as uranium containing waste rock materials that had been oxidizing on surface were placed back into the mine workings, and some of them may have fallen into the mine pool and contributed to temporary leaching of uranium. In any case, the mine pool was maintained in a reducing condition as a result of this treatment and while uranium concentrations were not reduced as a result of the in-situ treatment in 2020, the molybdenum concentrations were reduced.

A red circle is shown on Figures E-6 and E-7 for data points that had a high degree of variability in the months preceding the 2017 in-situ treatment. These data are suspect because in the nearly 10 years of other data shown on these figures, uranium concentrations have not exceeded 25 mg/L and molybdenum concentrations have not exceeded 2 mg/L, with the possible exception of one sampling event in November 2017. This is also during the period that Cotter had new staff on site, and CLL believes that a consistent labeling of samples from the mine may not have been performed. The nomenclature used for the Site included the term “mine refill” which was originally used by Cotter to refer to mine pool samples removed by operating the pump in the mine to sample the mine pool as it filled. When the permanent WTP plant RO operations started in 2017, it is plausible to think that “mine refill” was taken from the RO concentrate that was being reinjected into the mine by the new plant. The sudden increase and decrease in uranium and molybdenum concentrations during this time period does not fit with historical data and there is no plausible explanation that CLL knows other than this mislabeling and poor nomenclature to explain this variability during this time. Regardless, the few months of variable data in 2017 do not alter the conclusion that the mine pool has been chemically stable for the last four years.

E.5.2.3. Chemical Stabilization of the Mine Pool Discussion

The concentrations and linear regressions for uranium and molybdenum over the last 3.5 consecutive years are shown on Figure E-8. The uranium concentrations (dissolved and total) have maintained an average of approximately 12 mg/L since March 2018 with a positive slope. The majority of the uranium concentrations are in the 10 to 15 mg/L range with more recent data at approximately 20 mg/L. The molybdenum concentrations (dissolved and total) have maintained an average of approximately 0.6 mg/L since March 2018 with a slight negative slope. These stable average concentrations indicates that the in-situ treatments have been effective in controlling the concentrations of these two metals that are particularly elevated in concentration in this mine pool environment. The January 2020 in-situ treatment did not show the dramatic decreases in dissolved uranium concentrations as during the first two in-situ treatments, which is likely an indication that an environment favorable to U(IV) has been achieved.

A figure that combines multiple parameters (dissolved) with the mine pool elevation, in-situ treatment periods, and when the RO reject was injected back into the mine is presented on Figure E-9. Note that RO reject was injected back into the mine on a continuous basis starting in mid-2017 and the two events before that, e.g., 2013 and 2015, were only temporary periods of injection. Also note that the dates for the mine pool elevation correspond to the sampling dates and CLL does not have mine pool elevation data before December 2016. There does not appear to be any correlation between the mine pool elevation and the parameter concentrations shown on Figure E-9. The observations from Figure E-9 follows:

- The uranium and molybdenum concentrations are directly affected by the in-situ treatments, e.g., decrease during treatment and generally staying low for several quarters, with a subsequent increase toward baseline conditions.

- The arsenic and iron concentrations follow a similar pattern as the uranium and molybdenum concentrations. The arsenic and iron concentrations also increase in the 2017 period of the suspect data and coincide with a time that some of the RO concentrate was returned into the mine pool through the "open hole". The increase in concentrations appears to have occurred during the time where the continuous injection of RO concentrate began and is interpreted to be a result of leaching from broken rock in the open hole. Other than during that period (2016-2017) arsenic and iron concentrations decrease as a result of in situ treatment and have remained in line with concentrations observed after the refilling and pre-dewatering period. Iron is typically insoluble in oxidized and neutral conditions observed when the mine initially filled and transitioned to slightly soluble conditions when the mine became mildly reducing from being filled and sealed and the introduction of in-situ treatments. This should be considered a positive development that is consistent with a lack of increase in sulfate as not iron increasing due to iron sulfide oxidation, but rather from reductive solubility increase. Arsenic concentrations generally follow this same trend—low solubility in oxidized conditions with iron present, and slightly more soluble in mildly reducing conditions. However, a change from 3.6 ppb mean arsenic after mine filling to 13 ppb mean arsenic now in no way affects the effectiveness of RO at being capable of producing compliant water for discharge, as 4 years of successful dewater demonstrates.

- The chloride concentrations increased after the continuous injection of RO concentrate, which is amended with barium chloride prior to being returned to the mine pool.

Further demonstration of the chemical stabilization of the mine pool can be seen with a comparison of data collected in the past 3.5 years to historical data. A hydrologic evaluation was conducted in anticipation of mine closure, which included a table that summarized results from water quality samples collected from the mine pool from June 2000 to July 2007 (2007, Whetstone)[3]. A summary of results for water quality samples collected from the mine pool from March 2018 to July 2021 is provided in Table E-3. These data are comprised of the quarterly routine monitoring samples collected and provided to DRMS and the increased frequency of samples collected during the in-situ treatment in 2020. The mean concentrations from the historical hydrologic evaluation are provided in the last column in Table E-3. A comparison of historical mean concentrations to current mean concentrations indicates an overall decrease in concentrations with the exception of an increase in concentrations for the general parameters, which are most likely from the treatment process, and arsenic, copper, iron, and magnesium. A summary of these increases follows:

- The increase in arsenic and iron concentrations may be the result of either the in-situ treatments or natural variation in the water entering the mine. The 2007 data had 73% and 75% of non-detects for dissolved and total arsenic, respectfully, while the current data had 3% and 6%, respectfully. The 2007 data also had 80% non-detects for dissolved iron and the current data had 0%. Iron is typically insoluble in oxidized and neutral conditions observed when the mine initially filled and transitioned to slightly soluble conditions when the mine became mildly reducing from being sealed and the introduction of in situ treatment. This should be considered a positive development that is consistent with a lack of increase in sulfate as not iron increasing due to iron sulfide oxidation, but rather from reductive solubility increase. Arsenic concentrations generally follow this same trend—low solubility in oxidized conditions with iron present, and slightly more soluble in mildly reducing conditions. However, a change from 3.6 ppb mean arsenic after mine filling to 13 ppb mean arsenic now in no way affects the effectiveness of RO at being capable of producing compliant water for discharge, as 4 years of successful dewater demonstrates.

- The increase in total copper concentrations may be the result of the large percentage of non-detects (68%) used in the calculation of the mean. The 2007 calculation of the mean only included 29% of non-detects.

- The increase in magnesium concentrations may not be an increase at all. For example, the 2007 data listed magnesium under the general parameters without differentiating total or dissolved. If the 2007 mean magnesium concentration is compared to the current mean dissolved magnesium concentration

[3] Whetstone Associates, Inc. Schwartzwalder Mine Hydrologic Evaluation of Mine Closure and Reclamation. (2007) November 7.

(as shown in Table E-3) there is an increase. However, if the 2007 mean magnesium concentration is compared to the current mean total magnesium concentration there is no increase.

TABLE E-4: COMPARISON OF SCHWARTZWALDER MINE POOL CONCENTRATIONS PRE AND POST IN-SITU TREATMENT

Variable	Units	Number of Samples	Number of Non-Detects	Percent of Non-Detects	Minimum[1]	Maximum	Mean[2]	Median[2]	Standard Deviation	June 2000 to July 2007 Sample Data – Mean[3]
		March 2018 to July 2021 Mine Pool Sample Data								
General Parameters										
Bicarbonate as CaCO3	mg/L	21	0	0%	491	950	790	846	128	374
Calcium	mg/L	22	0	0%	153	352	302	321	53	299
Chloride	mg/L	35	0	0%	8	55	43	43	9.2	31
Conductivity Field	µS/cm	9	0	0%	2,680	5,131	3,510	3,351	742	3,319
Oxidation Reduction Potential	mv	6	0	0%	-158	147	-84	-121	104	193
pH Field	s.u.	10	0	0%	6.8	7.6	7.3	7.4	0.24	7.19
Phosphorus	mg/L	11	3	27%	0.15	0.40	0.19	0.20	0.09	0.15
Potassium	mg/L	22	0	0%	15	31.7	27	28	4.5	17.2
Sodium	mg/L	22	0	0%	139	297	235	231	43	197
Sulfate	mg/L	35	0	0%	408	1,790	1,362	1,420	293	1,725
TDS - Total Dissolved Solids	mg/L	24	0	0%	960	3,470	2,850	2,960	535	2,917
Temperature	Deg C	9	0	0%	7.8	22	17	18	3.8	17.2
Dissolved Metals										
Aluminum	mg/L	22	21	95%	0.17	0.17	-	-	-	0.15
Antimony	mg/L	22	21	95%	0.0012	0.0012	-	-	-	0.014
Arsenic	mg/L	35	1	3%	0.002	0.0311	0.013	0.011	0.008	0.0036
Copper	mg/L	22	20	91%	0.021	0.021	-	-	-	0.010
Iron	mg/L	35	0	0%	0.090	11	4.1	3.7	3.1	0.020
Lead	mg/L	19	19	100%	-	-	-	-	-	0.00030
Magnesium[4]	mg/L	22	0	0%	112	280	236	247	45	224

TABLE E-4: COMPARISON OF SCHWARTZWALDER MINE POOL CONCENTRATIONS PRE AND POST IN-SITU TREATMENT										
Variable	**Units**	**Number of Samples**	**Number of Non-Detects**	**Percent of Non-Detects**	**Minimum[1]**	**Maximum**	**Mean[2]**	**Median[2]**	**Standard Deviation**	**June 2000 to July 2007 Sample Data – Mean[3]**
		March 2018 to July 2021 Mine Pool Sample Data								
Manganese	mg/L	35	0	0%	0.25	1.0	0.74	0.74	0.12	2.1
Mercury	mg/L	11	11	100%	-	-	-	-	-	0.00036
Molybdenum	mg/L	35	0	0%	0.0371	1.4	0.58	0.58	0.38	1.85
Silver	mg/L	22	22	100%	-	-	-	-	-	0.0034
Thallium	mg/L	22	21	95%	0.00030	0.00030	-	-	-	0.025
Uranium	mg/L	35	0	0%	3.95	21	12	12	3.2	41.14
Zinc	mg/L	22	20	91%	0.030	0.050	0.016	0.010	0.0096	0.38
Total Metals										
Aluminum	mg/L	22	22	100%	-	-	-	-	-	0.09
Antimony	mg/L	22	19	86%	0.0016	0.0034	0.00064	0.00040	0.00081	0.020
Arsenic	mg/L	33	2	6%	0.0026	0.034	0.016	0.017	0.0077	0.0058
Copper	mg/L	22	15	68%	0.010	0.10	0.016	0.010	0.020	0.008
Iron	mg/L	35	0	0%	0.80	11	5.7	6.2	2.9	0.62
Lead	mg/L	22	9	41%	0.00010	0.0044	0.00044	0.00015	0.00091	0.018
Magnesium[4]	mg/L	11	0	0%	117	327	255	257	52	224
Manganese	mg/L	35	0	0%	0.14	1.1	0.77	0.77	0.14	2.63
Mercury	mg/L	11	11	100%	-	-	-	-	-	0.0004
Molybdenum	mg/L	32	0	0%	0.081	1.3	0.60	0.59	0.36	1.39
Silver	mg/L	22	22	100%	-	-	-	-	-	0.0023
Thallium	mg/L	22	20	91%	0.00030	0.00070	0.00012	0.00010	0.00014	0.024
Uranium	mg/L	32	0	0%	2.9	23	13	12	4.1	34.37
Zinc	mg/L	22	20	91%	0.030	0.040	0.015	0.010	0.0078	0.366
Radionuclides										
Radium 226 - Dissolved	pCi/L	22.0	0	0%	73	180	127	125	30	178

Notes:

[1] Minimum value only includes detected concentrations.

[2] Mean and median statistics calculated using one-half the detection limit as was done in Whetstone report.

[3] Mean values from Table 37 in Whetstone Associates, Inc. Schwartzwalder Mine Hydrologic Evaluation of Mine Closure and Reclamation. (2007) November 7, which were calculated from results of mine pool samples collected from June 2000 to July 2007.

[4] The Whetstone report Table 37 only had magnesium with no differentiation between dissolved or total.

Deg C - Degrees Celsius

mg/L - Milligrams per liter

mv - Millivolts

pCi/l - picoCuries per liter

s.u. - Standard unit

μS/cm - microSiemens per centimeter

The main takeaway from Table E-3 is the significant decrease in the concentrations of total and dissolved uranium and molybdenum, approximately 60% to 70%. For example, the mean concentrations of total and dissolved uranium decreased from 34.37 mg/L and 41.14 mg/L, respectively, to 13 mg/L and 12 mg/L, respectively. The mean concentrations of total and dissolved molybdenum decreased from 1.39 mg/L and 1.85 mg/L, respectively, to 0.60 mg/L and 0.58 mg/L, respectively. Therefore, the overall decrease in constituent concentrations further demonstrate that chemical stabilization of the mine pool has been achieved for the last three plus consecutive years.

E.5.2.4. Chemical Stabilization Functional Definition

Since physical stabilization of the mine was achieved and is being maintained by RO technology, it is relevant to define what is meant functionally by "chemical stabilization", not just on a constituent-by-constituent evaluation, as performed in the prior section, but also from a bulk chemistry perspective. As shown in the prior table, the mean total dissolved solids (TDS) concentrations have remained unchanged or slightly decreased in the last 4 years compared to the mine refill period (2,850 mg/L vs. 2,917 mg/L) and remains in a "brackish" water TDS range. This is important because RO technology effectiveness relies on bulk rejection of dissolved constituents, and the mine pool water chemistry as measured by this bulk parameter has not changed at all as a result of this combined seasonal RO treatment and occasional in-situ treatment. If the TDS concentrations had appreciably changed, some concern might be validated that a loss of treatment capacity of this core treatment technology, which forms the basis of the financial assurance, could be projected. However, as no increase of TDS concentrations has resulted, the RO technology appears to remain viable as long as it can be projected by this data set, and no trend of loss of use or efficiency of RO can be projected from this data.

What this indicates is that for the foreseeable future, RO technology can continue to create high quality, low dissolved solids discharge water that will continue to keep the mine pool dewatered and the Site in compliance with its discharge permit. (In fact, RO is commonly used in desalination plants to treat water with more than 10 times the concentration of TDS shown above without the loss of the treatment capacity.) When considered on this basis, the mine pool is chemically stable such that RO can be used to efficiently dewater the mine on a seasonal basis, and thus is definitionally demonstrated to be chemically stable.

E.5.2.5. Physical and Chemical Stabilization Conclusion

It is important to note that the regulatory limit of dewatering the mine pool to 150 ft below the Steve level was specifically chosen by the DRMS to (i) re-establish a hydraulic gradient away from Ralston Creek in the permit area, and (ii) reduce the exposure of wall rock to oxygen in order to minimize uranium oxidation in the workings (MLRB, 2012). The hydraulic gradient away from Ralston Creek means there is no connection between the mine workings and Ralston Creek, i.e., uranium concentrations and other analytes in the mine pool are not adversely affecting Ralston Creek. As discussed above, physical stability of the mine pool over the last three consecutive years has been demonstrated and physical stability will continue for the following reasons:

- The mine pool elevations over the past nearly 4 consecutive years shown on Figure E-3 are below the regulatory limit. The noted 'exception' on the chart during the winter of 2019 had been verified to be the results of the transducer below the mine pool and therefore not accurately measuring the depth of the mine pool.

- Actual groundwater inflow into the mine during the periods that active dewatering of the mine pool was not occurring did not raise the mine pool elevation above the regulatory limit.
- The natural recovery rate allows for more than six months before the regulatory limit is approached, based on a starting mine pool elevation of approximately 345 ft below the Steve Level.
- As shown on Figure E-4, water level measurements in bedrock wells MW-13, MW-15, and MW-18 at the Site demonstrate an inward gradient toward the mine pool and away from Ralston Creek.

Chemical stabilization of the mine pool has been demonstrated to occur as a result of CLL's management approach and reclamation at the Site and has also been benefited by in-situ treatments that have occurred since 2013. The stabilization is most notable in evaluating the bulk water chemistry parameter TDS, which remains generally unchanged since 2012, except for the noted period of suspect data. Further, a decrease in uranium and molybdenum concentrations and the overall decrease in concentrations for most of the analytes is observed, as shown in Table E-3, for the last four consecutive years as compared to the concentrations in the pre-2017 samples.

A summary of the WTP operations for the four consecutive years from 2018 through 2021 is provided in Table E-4. As shown, the mine pool has been consistently below the regulatory limit when only operating the WTP for approximately 50% of the time. The mean concentration of dissolved uranium prior to in-situ treatment (2000 – 2007) was 41.14 mg/L. (Source: Whetstone Associates. 2007) compared to the post in-situ treatment mean annual concentration range of 12.19 to 19.90 mg/L.

On the totality of evidence, the operating approach for the Schwartzwalder Mine that is being managed by CLL and is the basis for the financial assurance provided for the Site, shows that the mine pool is physically and chemically stable now, has been physically and chemically stable for the last 4 years, and with the future projections showing that operations of the Site can maintain the mine in a physically and chemically stable state for at least the next 20 years as is provided for in the financial assurance that CLL has posted.

TABLE E-5: SUMMARY OF WATER TREATMENT PLANT OPERATIONS FOR FOUR CONSECUTIVE OPERATING YEARS				
Year	**WTP Operations Summary**	**Dissolved Uranium[1] (mg/L)**	**Mine Pool Dewatering Summary [3]**	**Notes**
2018	Operated 47% of the year. Online = 171 days. Offline = 194 days.	12.19	Feet Gained = 51 feet Max. Depth = 201 fbS (6,401 ft amsl)	In-situ injection in December 2017.
2019	Operated 66% of the year. Online = 241 days. Offline = 124 days.	13.73	Feet Gained = 46 feet Max. Depth = 246 fbS (6,356 ft amsl)	Installed new 60 hp dewatering pump at ~410 fbS.
2020	Operated 47% of the year. Online = 172 days. Offline = 194 days.	12.56	Feet Gained = 99 feet Max. Depth = 345 fbS (6,257ft amsl)	In-situ injection in January 2020.
2021	Operated 37% of the year. Online = 134 days. Offline = 231 days.	19.80 [2]	Feet Gained = ~20 feet Max. Depth > 345 fbS (>6,257 ft amsl)	In-situ injection in October 2021.

Notes:

[1] Mean concentration of mine pool sample results. For comparison, the mean concentration of dissolved uranium in the mine pool from 2000 - 2007 was 41.14 mg/L. (Source: Whetstone Associates. 2007.)

[2] The mean concentration of mine pool sample results for 2021 do not include data collected during the fourth quarter because this report was prepared concurrent with the sample analysis.

[3] "Feet gained" is a measure of the storage created in the mine pool, measured as feet below the regulatory level (150-feet below the Steve Adit).

~ - Approximately
amsl - Above mean sea level
fbS - Feet below Steve Level (6,602 ft amsl)
ft amsl - Feet above mean sea level
mg/L - milligrams per liter
WTP - Water Treatment Plant

E.5.3. Tracer Test

During 2020, a two-chemical tracer test was conducted in the mine to evaluate the system hydraulics and the degree that organic carbon placed underground would disperse within the mine workings to facilitate in-situ treatment. A complete description of the tracer test is provided in Appendix 2. During the duration of the tracer test, there was no flow leaving the mine as confirmed by the mine pool elevation being consistently below the regulatory limit and the demonstrated inward gradient shown toward the mine compared to surrounding groundwater monitoring wells. Based on the absence of tracer concentrations in the WTP discharge, the tracers remained in the mine. Therefore, the mine is a hydrologic sink, e.g., mine pool water is not exiting the mine.

E.5.4. Water Treatment Plant Operating Strategy

CLL is planning to operate the WTP seasonally for approximately six months or less to manage the mine pool. As described above, shutting the WTP down for at least six months each year is based on empirical data with a conservative factor included. However, as more data are collected and the mine pool level maximized below the regulatory limit, the shut down period may be extended beyond six months. Regardless of the shut down period, the mine pool level will be monitored to ensure the regulatory limit is not exceeded. The months of operating the WTP are anticipated to be during the time of year in which access to the Schwartzwalder Mine is generally not hampered by weather. During operations, the 60-hp pump shall be used to dewater the mine workings to approximately 400 ft below the Steve level. The pump will be shut down during those months the WTP is not operating and as described above, the last three years of operating this way has demonstrated that the mine pool level has remained stable below the regulatory limit.

The WTP operating strategy is considered in conjunction with in-situ treatment of the mine pool. During the period in which the WTP is shut down, in-situ treatment of the mine pool may at times be conducted, as needed, to maintain chemical stabilization. The criteria for in-situ treatment of the mine pool shall consist of the Mann-Kendall trend test to evaluate statically significant trends in the uranium concentrations.

E.6. WATER QUALITY MONITORING PLAN

This Exhibit has not changed from the 2021 Mine Plan Amendment 5.

All of the wells/sumps in CLL's water quality monitoring network are installed in unconfined aquifers. These wells/sumps shall be abandoned in accordance with Rule 16, Standards for Plugging, Sealing and Abandoning Wells and Boreholes of the Colorado Code of Regulations which states:

> "Abandonment of Wells or Boreholes in Type II (unconfined bedrock aquifers) and Type III Aquifers (unconsolidated aquifers) - Wells completed into unconfined bedrock aquifers and unconsolidated aquifers must be plugged, sealed, and abandoned by filling the well to the static water level with clean sand or clean gravel. Between the static water level and the ground surface, the borehole must be filled with clean native clays, cement, drill cuttings, or high solid bentonite grout to the ground surface. The uppermost five (5) feet of casing must be filled with grout or a permanent watertight cover must be installed at the top of the casing. If casing is removed, the hole must be filled as described above to within five (5) feet of the ground surface." [4]

Specific means and methods shall be determined by the well abandonment subcontractor, but CLL expects that each well be filled with sand from the bottom of the well to 5-feet above the screen, and then grounded with bentonite to ground surface. Similarly, CLL expects the inverted-culvert housing around each sump and lid to be removed and taken offsite for disposal or scrap metal recycling. The sump void space will be backfilled with

[4] Rules and Regulations for Water Well Construction, Pump Installation Cistern Installation, and Monitoring and Observation Hole/Well Construction, Code of Colorado Regulations, division of Water Resources, 2 CCR 402-2.

native soils to ground surface. Any surface pads or bollards would be removed, disposed of offsite, and reclaimed consistent with the natural surroundings. All sumps and monitoring wells all be individually permitted for abandonment with the State Engineer's Office, Division of Water Resources.

FIGURE E-1: PHOTOS OF MINE OPENING CLOSURES

(A) CV / Charlie Adit, April 2022

(B) Minnesota Adit, April 2022

FIGURE E-1: PHOTOS OF MINE OPENING CLOSURES

(C) Pierce Adit, April 2022

(D) Steve Adit, April 2022

FIGURE E-1: PHOTOS OF MINE OPENING CLOSURES

(E) Sunshine Decline, April 2022

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE E-2

POTENTIAL EXTENT OF ALLUVIAL VALLEY EXCAVATION

JULY 2022

Potential Horizontal Extent of Excavation Area (6.35 Acres)

RML Area #2

Glencoe Valley Road

Ralston Creek

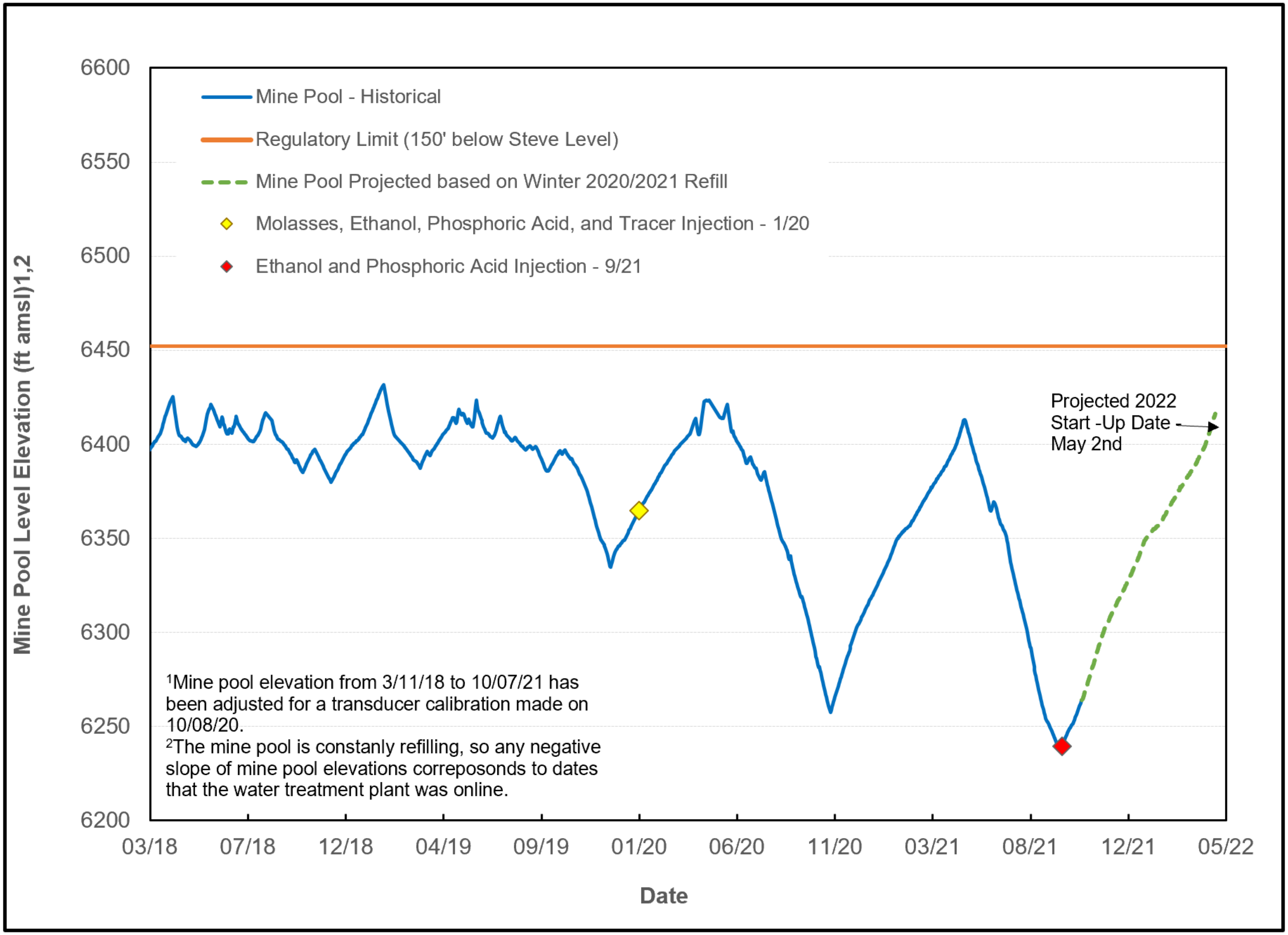
1:4,000 *when printed on 8x11 inch paper*

0 100 200 300 400 Feet

Satelite imagery obtained from ArcGIS on services.arcgisonline.com on July 2022
Fault lines are manually digitized from Whetstone Associates Schwartzwalder Mine Environmental Protection Plan, 2016

Datum: NAD 1983 (CORS96) StatePlane Colorado Central FIPS 0502 (US Feet)

D:\Project\AllProjects\Schwartzwalder\Map\01-Overview\03-Overview\RML_Area2_20220426.mxd



COLORADO LEGACY LAND

ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE E-3
SCHWARTZWALDER MINE POOL PROJECTED RECOVERY

MARCH 2021

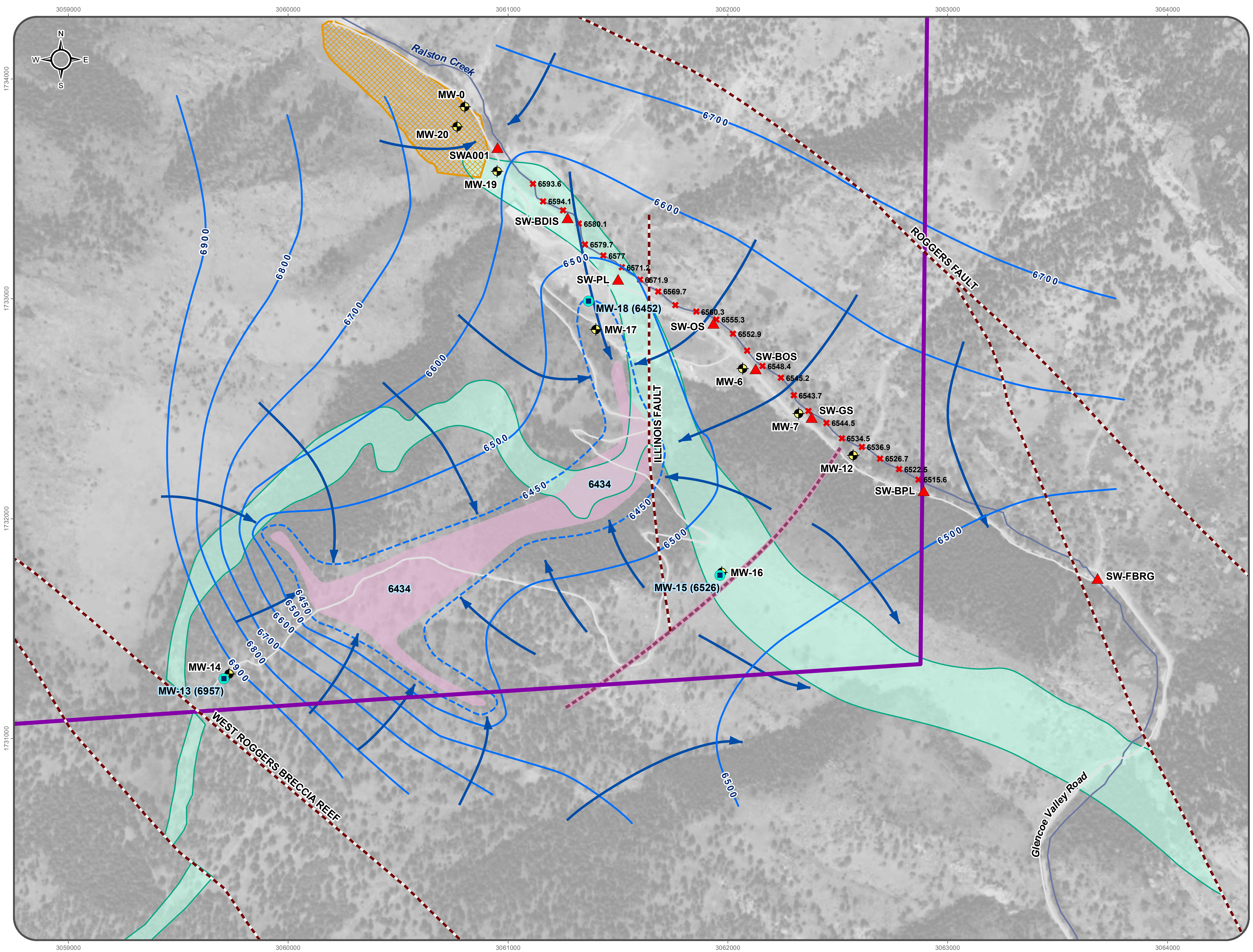
D:\Project\AllProjects\Schwartzwalder\Map\01-Overview\04-Special_Topics\Gamma_VSP

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE E-4

BEDROCK GROUNDWATER CONTOUR MAP

MAY 2022



Deep Bedrock Monitoring Well (6526) with Measured Q2-2020 Water Level (ft msl)

Alluvial or Shallow Bedrock Monitoring Well

Surface Water Quality Monitoring Station

100 foot Groundwater Contour (ft msl)

50 foot Groundwater Contour (ft msl)

Groundwater Flow Direction

Groundwater Divide

Fault

Ralston Creek Elevation Point (ft msl)

Underground Workings

Schwartz Trend

Waste Rock Dump

CLL Property Boundary

Ralston Creek

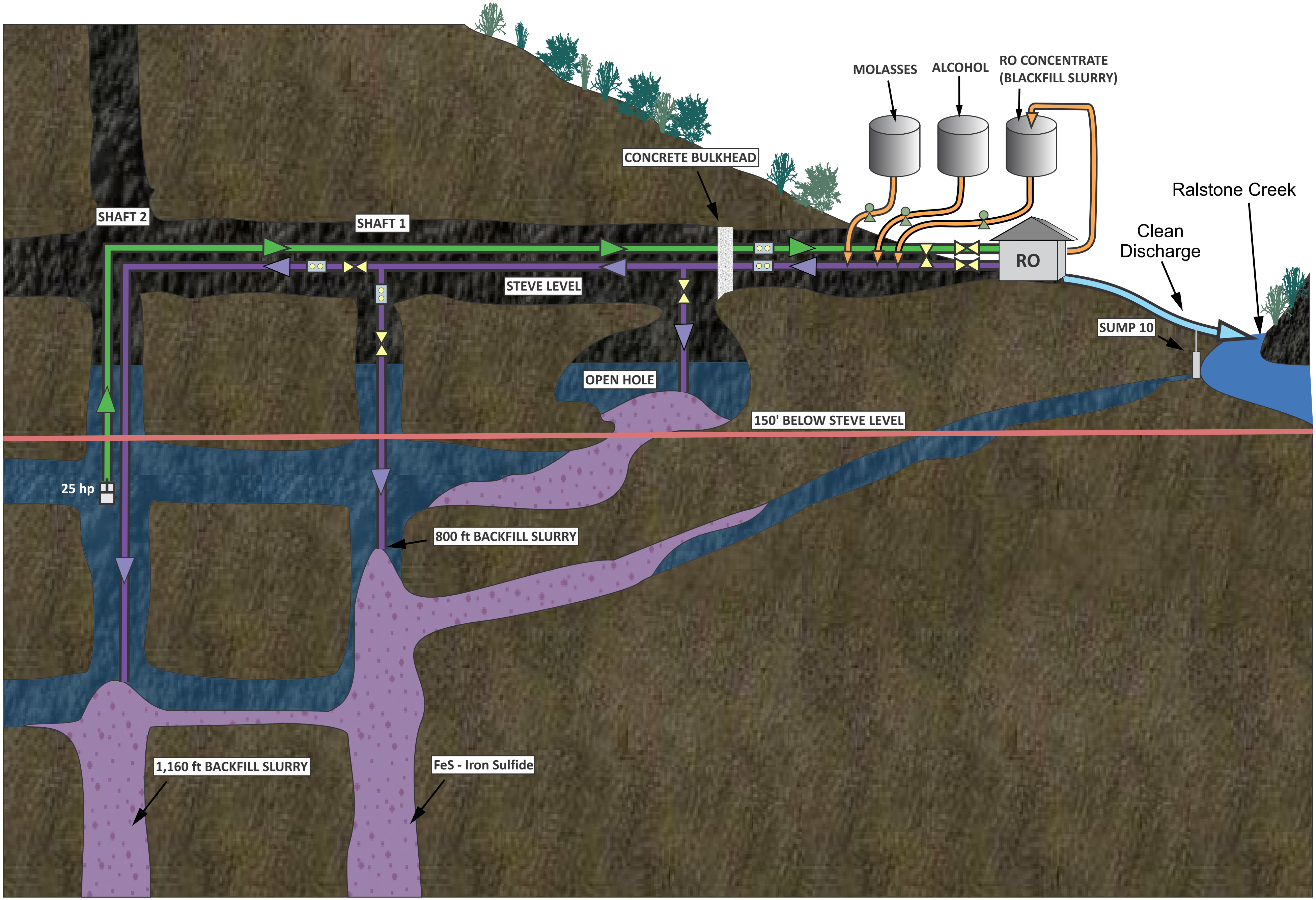
1 inch = 420 feet

0 250 500 750 ft

Satellite imagery obtained from ESRI ArcGIS map service https://services.arcgisonline.com/ArcGIS/rest/service on May 09 2022.

Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet

D:\Project\AllProjects\Schwartzwalder\Map\02-Water_Quality\02-Groundwater\GW_Contours\GW_Contours_20211208.mxd
(*Last edited by: amatlashevska;2022-05-09/11:31 AM*)



FEATURES ARE NOT TO SCALE

Injected in-situ treatment material, e.g., molasses, alcohol, etc., and RO concentrate
Mine Pool Pumping
Gate Valve
Flow Meter
Pump
Submersible Pump

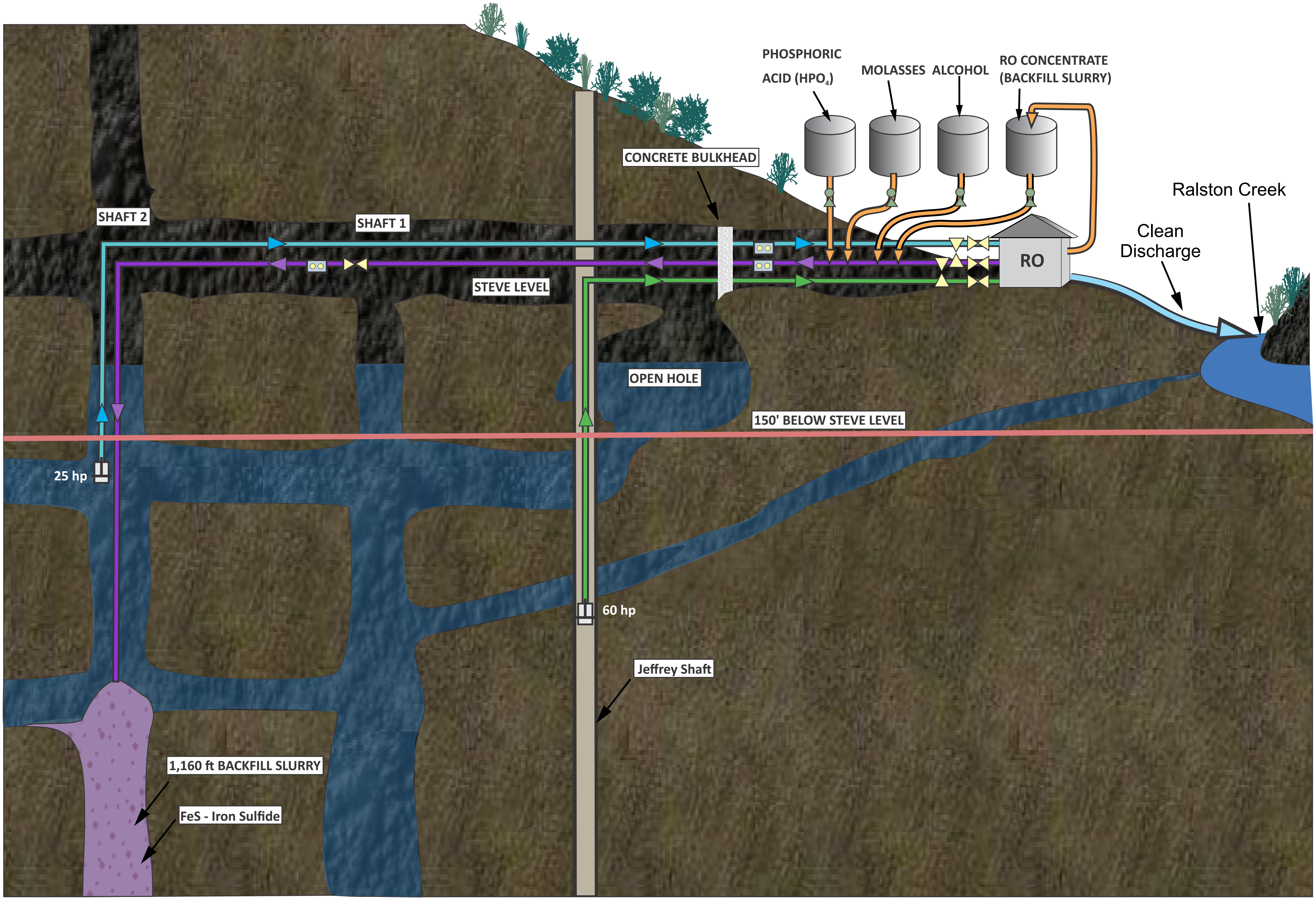
Colorado Legacy Land
ENSERO solutions

COLORADO LEGACY LAND SCHWARTZWALDER MINE

FIGURE E-5a
SCHWARTZWALDER MINE IN-SITU TREATMENT INJECTION LOCATIONS - 2013/2015

JANUARY 2022

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



FEATURES ARE NOT TO SCALE

The Jeffry Shaft is actually on a diagonal plane coming out of the figure

- Injected in-situ treatment material, e.g., molasses, alcohol, etc., and RO concentrate
- 2020 Mine Pool Pumping
- 2017 Mine Pool Pumping
- Pump
- Gate Valve
- Flow Meter
- Submersible Pump

In 2017 molasses/HPO_4 were injected at 1,160' below the Steve Level
In 2020 molasses/HPO_4/ Rhodamine WT and alcohol/ Fluorescein were injected at 410' and 1,100' below the Steve Level, respectively

COLORADO LEGACY LAND
ENSERO solutions

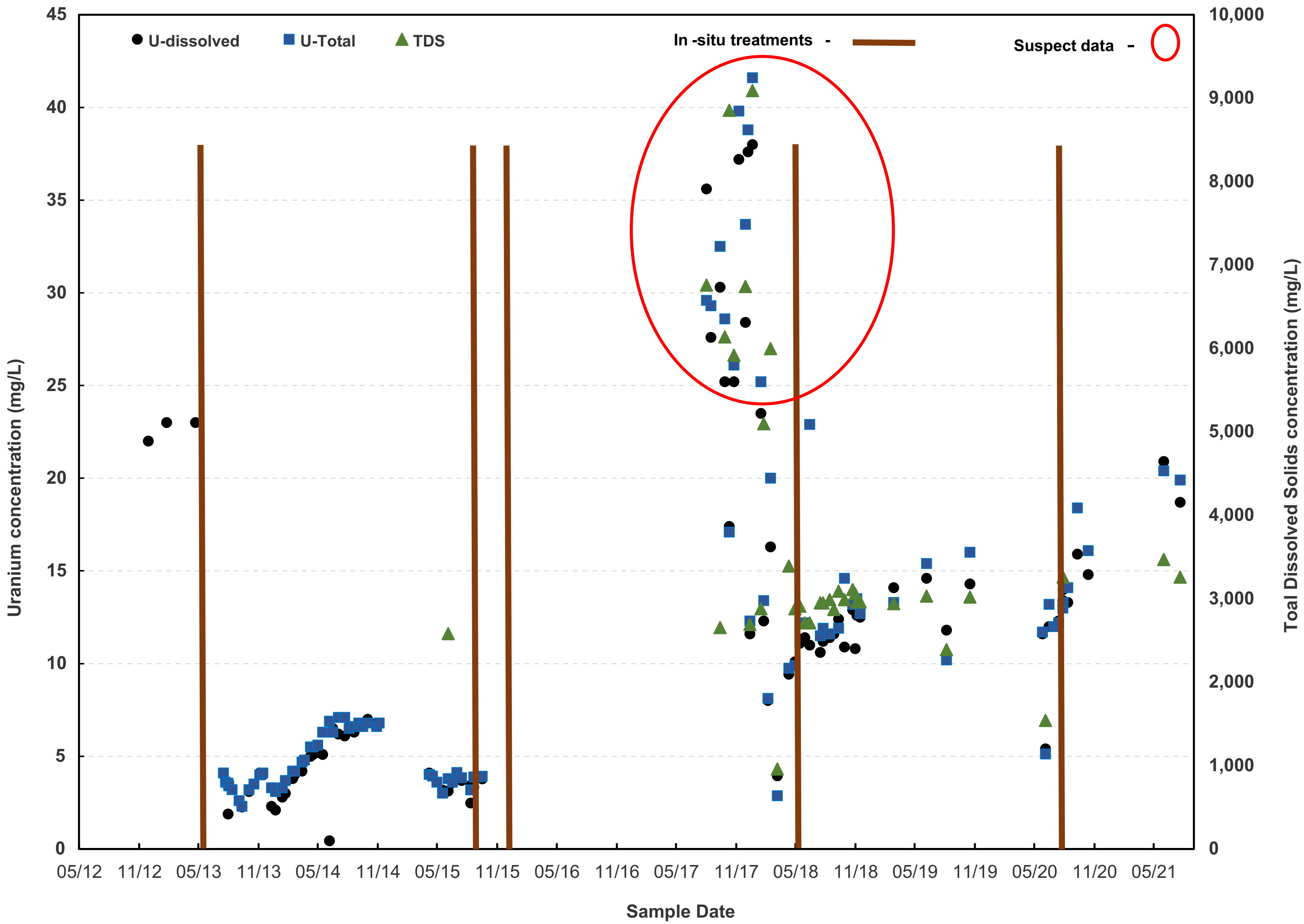
COLORADO LEGACY LAND SCHWARTZWALDER MINE

FIGURE E-5b

SCHWARTZWALDER MINE IN-SITU TREATMENT INJECTION LOCATIONS - 2017/2020

JANUARY 2022

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



Colorado Legacy Land

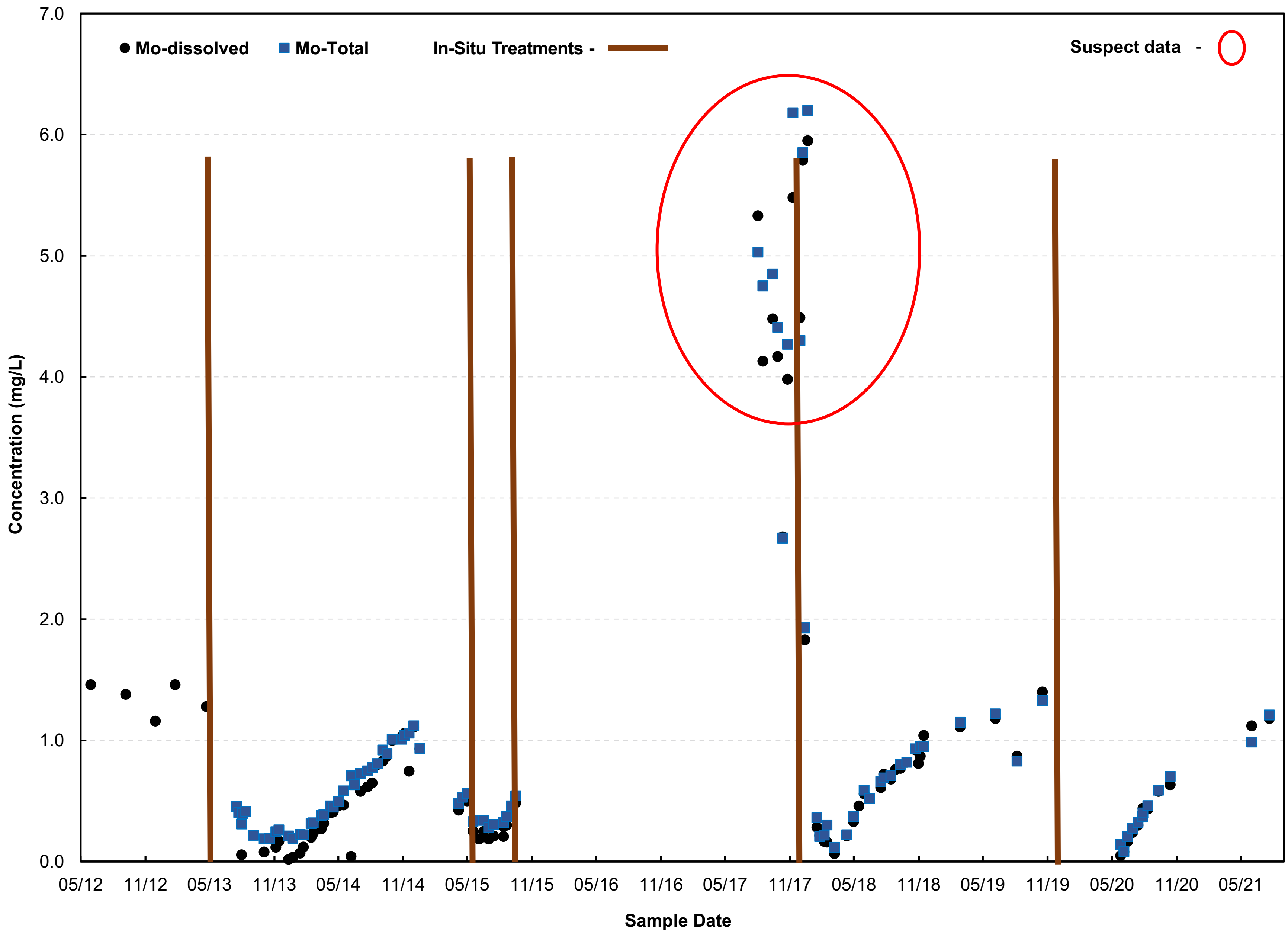
ENSERO solutions

COLORADO LEGACY LAND SCHWARTZWALDER MINE

FIGURE E-6
SCHWARTZWALDER MINE IN-SITU TREATMENT -
URANIUM CONCENTRATIONS

MAY 2022

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



COLORADO LEGACY LAND

ENSERO solutions

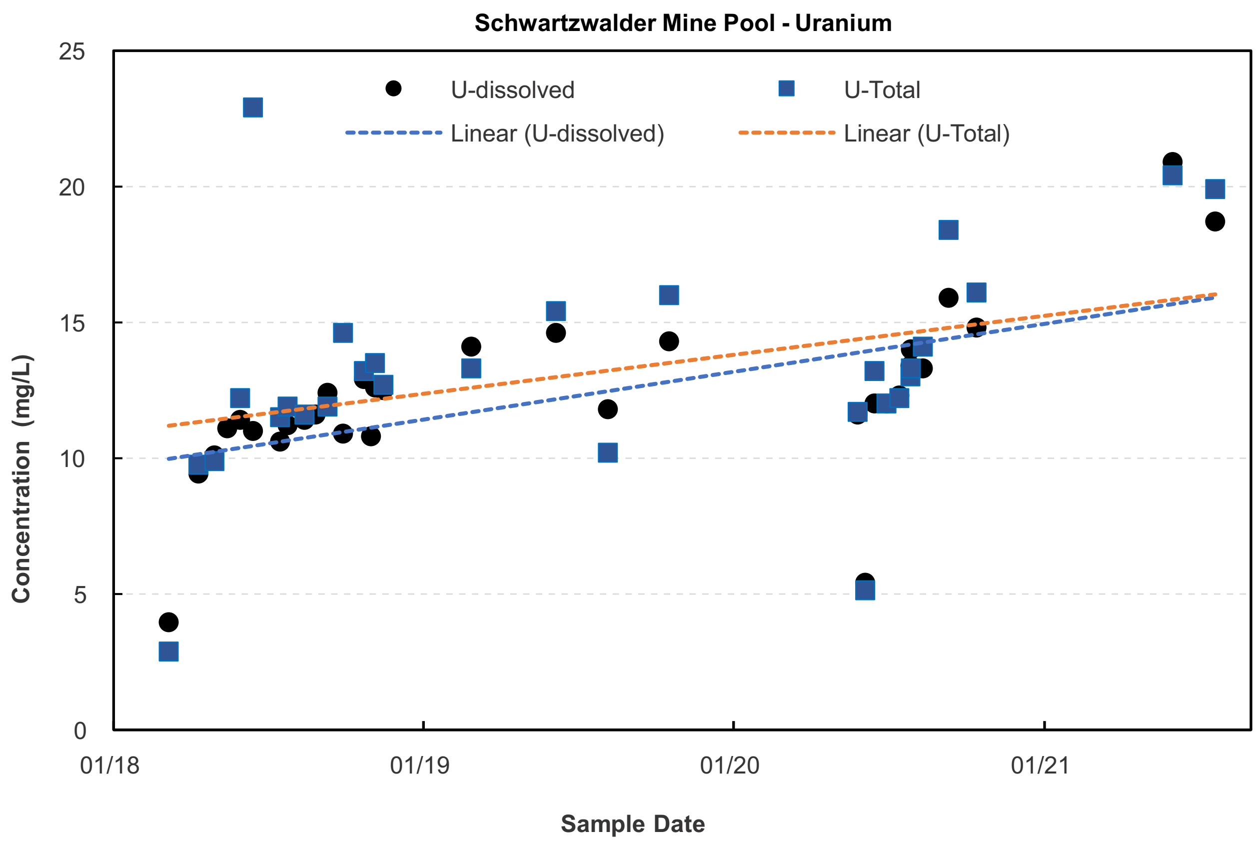
COLORADO LEGACY LAND SCHWARTZWALDER MINE

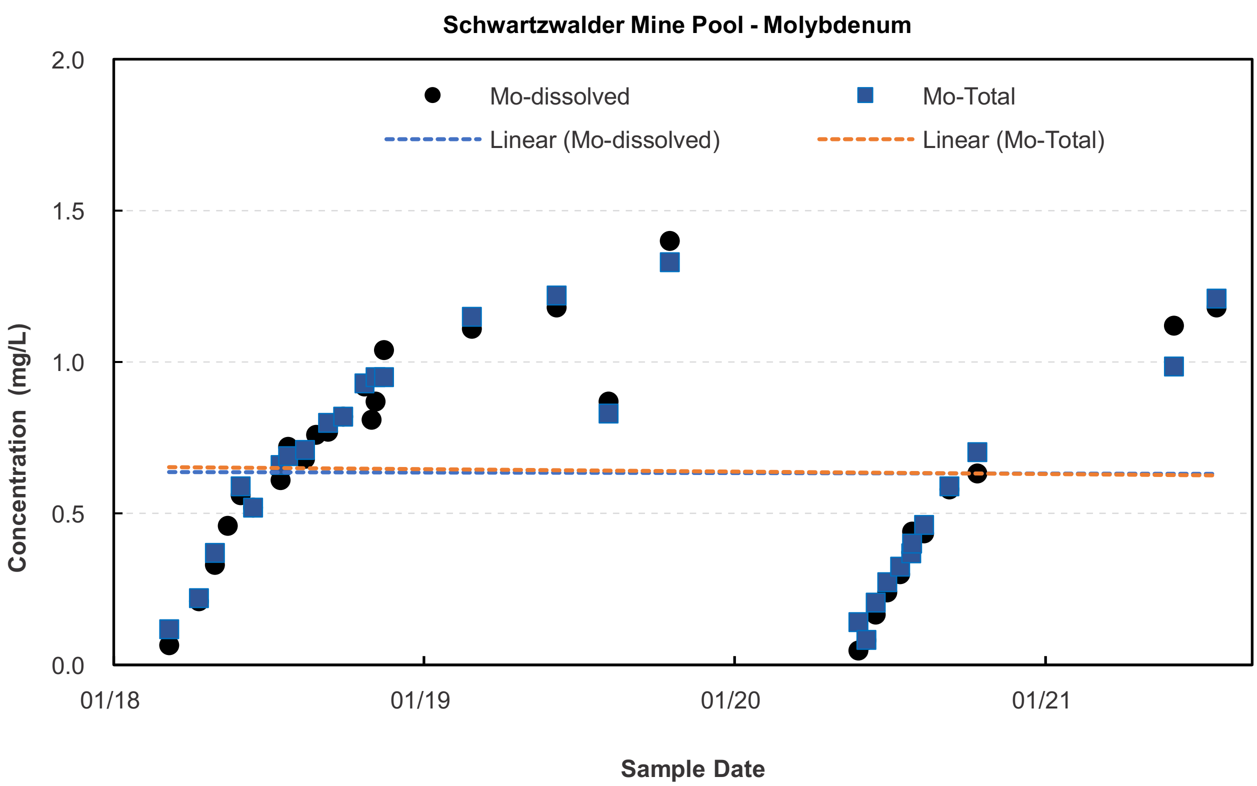
FIGURE E-7

SCHWARTZWALDER MINE IN-SITU TREATMENT - MOLYBDENUM CONCENTRATIONS

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300





COLORADO LEGACY LAND

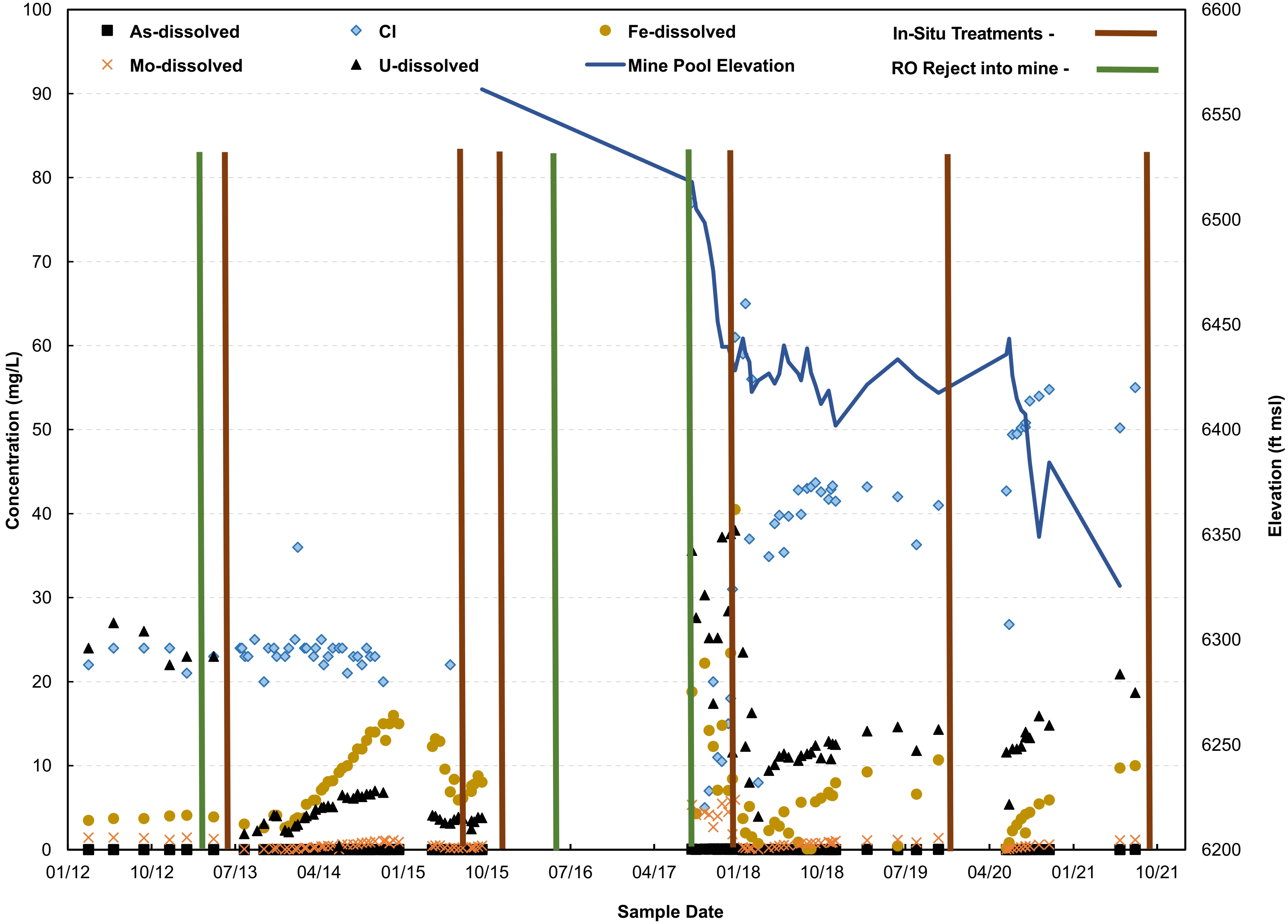
ENSERO solutions

COLORADO LEGACY LAND SCHWARTZWALDER MINE

FIGURE E-8
SCHWARTZWALDER MINE
URANIUM AND MOLYBDENUM 3-YEAR TREND

NOVEMBER 2020

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



Note: Beginning in mid-2017, the RO reject brine has been continuously injected back into the mine pool during operating periods of the treatment plant.

COLORADO LEGACY LAND

ENSERO solutions

COLORADO LEGACY LAND SCHWARTZWALDER MINE

FIGURE E-9
SCHWARTZWALDER MINE IN-SITU TREATMENT
CONSTITUENT CONCENTRATIONS

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300

EXHIBIT F. RECLAMATION PLAN MAP

A reclamation plan map showing the full extent of the MLRP boundary is shown on Figure F-1. A reclamaiton plan man for the alluvival valley is shown on Figure F-2.

(This page intentionally left blank.)

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

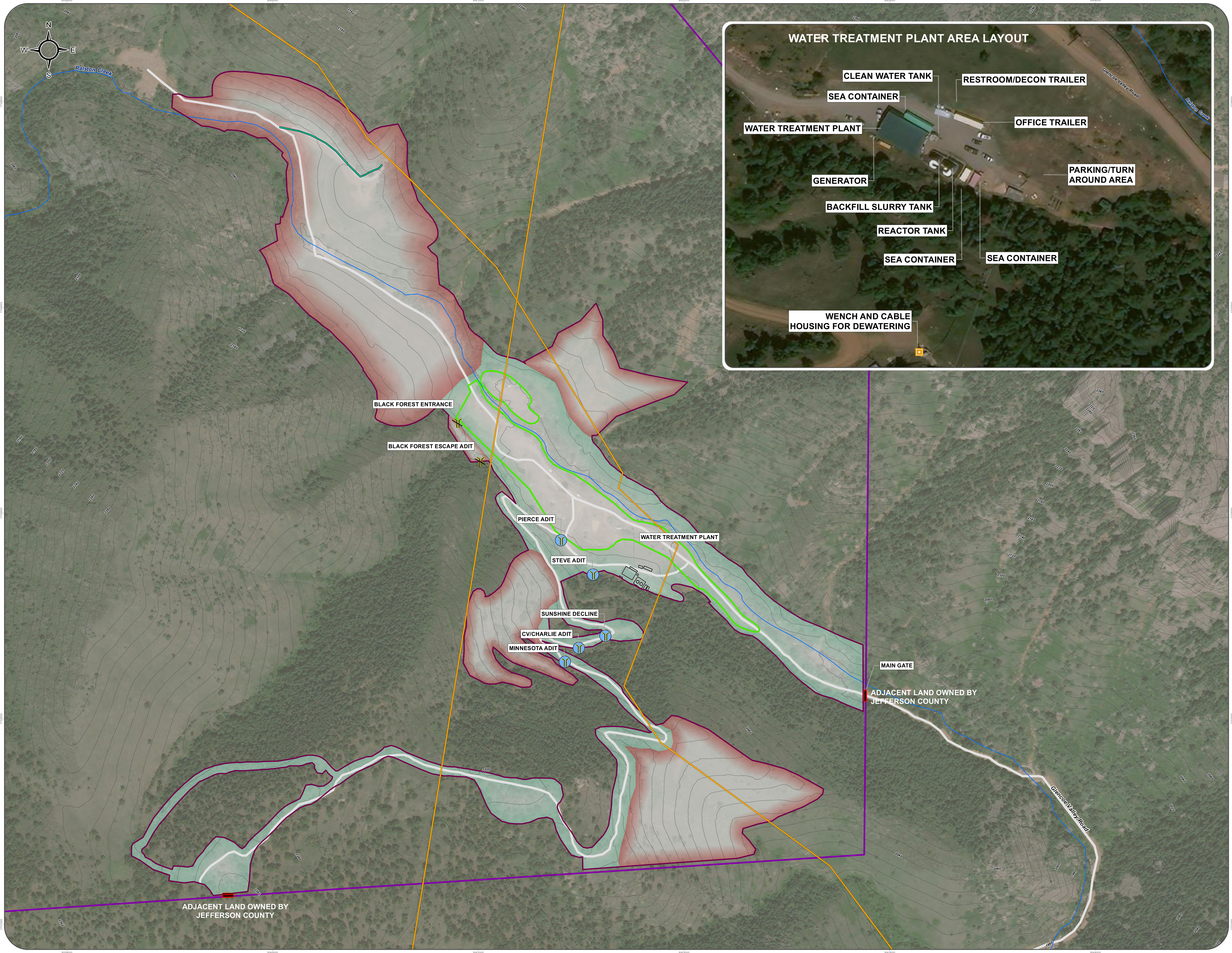


FIGURE F-1

RECLAMATION PLAN MAP

JULY 2022

COLORADO LEGACY LAND

Sloped Areas

- 3H:1V or Flatter
- 3H:1V or Steeper
- Adit - Backfilled with Rockfill
- Adit - Closed with Gate
- Gate
- CLL Property Boundary (559.2 acres)
- Riprap / Grouted Boulder Area
- Disturbed Area to be Revegetated / Replanted (7.1 acres)
- Permitted Boundary, Schwartzwalder Mine M-1977-300 (72.24 acres)
- Existing Mine Feature Footprint
- Power Line
- North Waste Rock Pile Channel
- Ralston Creek
- Glencoe Valley Road
- Elevation Contour Lines (10-foot)

All disturbed areas within the Permitted Boundary for the Schwartzwalder Mine shall be retopsoiled (as needed) and revegetated to fully reclaim the land for wildlife habitat.

Wire Fence Varies Across Property Boundary

1 inch = 200 feet

0 200 400 600 800 ft

ENSERO solutions

Aerial imagery acquired from King Surveyors on December 10th, 2018

Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet

Notes:

1. LiDAR data: U.S. Geological Survey, 20211223, USGS Lidar Point Cloud CO_DRCOG_2020_B20 w0475n4410: U.S. Geological Survey.
2. Aerial Imagery: USDA-FSA-APFO Aerial Photography Field Office, 20151110, FSA 10:1 NAIP Imagery m_3910514_ne_13_1_20150919_20151102 3.75 x 3.75 minute JPEG2000 from The National Map: USDA-FSA-APFO Aerial Photography Field Office.
3. Contour interval: 10 ft.
4. Finished grade to be to a maximum grade of 3H:1V.

Revision History

Rev.	Description	Date
A	Draft for review	2022-07-18
A	Draft for review	2022-07-18

Engineer's Seal

DRAFT
Not for
Construction

	Name	Date
Design	K. Boldt	2022-07-18
Drawn	K. Boldt	2022-07-18
Checked	E. Busby	2022-07-18
Approved	J. Harrington	2022-07-18

Project/Drawing Information

Project Name	Schwartzwalder Mine
Project Number	EUS22CO00174
Project Location	Golden, Colorado

Drawing Name

FIGURE F-2
Schwartzwalder Mine - Reclamation Grading

Drawing Number

EUS22CO00174-C-300

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

Colorado Legacy Land, LLC

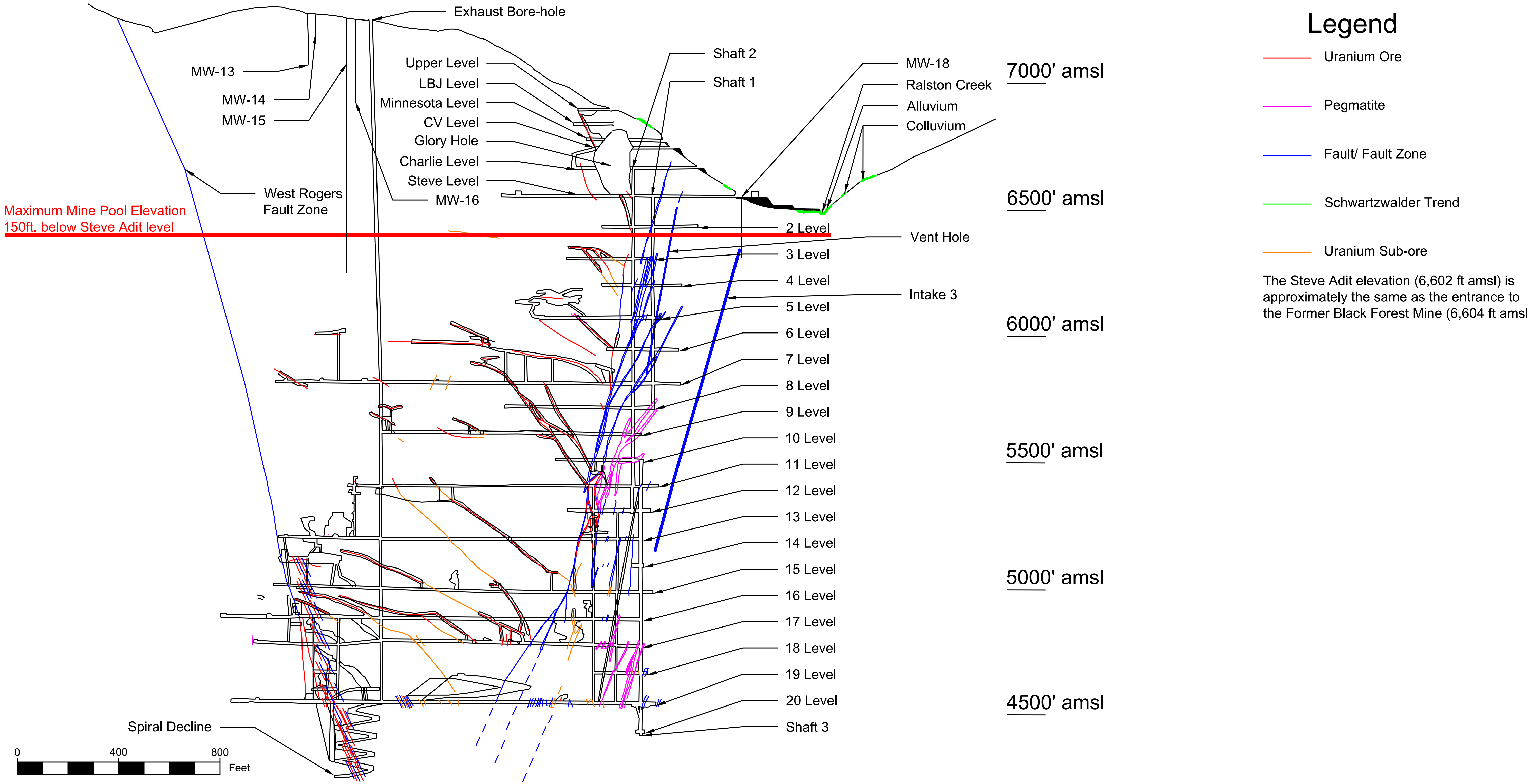
D:\Users\KBoldt\Projects\Schwartzwalder Mine\Production Drawings\EUS22CO00174-C-300.dwg (last edited by: KBoldt; 2022/08/08 - 2:12 PM)

EXHIBIT G. WATER INFORMATION

This information is presented in Technical Revision 23, Attachment B *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016) and Exhibit E of this document, which provides an updated description of the current environmental monitoring program. Additional information regarding the Black Forest Mine is discussed below:

Disposal of radionuclide impacted alluvial valley soil in the Black Forest Mine is expected to improve the water quality in shallow groundwater and Ralston Creek. This is because Ralston Creek is in direct communication with the shallow alluvial aquifer and the contaminated alluvial soil is the primary source of metals loading to both surface water and groundwater at the Site (Whetstone Associates Inc., 2016). As described in Technical Revision #14, the scope of the alluvial valley excavation project is to remove any soil with the potential to leach uranium to groundwater above 0.03 mg/L (Colorado Groundwater Quality Standard and USEPA Drinking Water Standard). The Black Forest Mine is a dry mine and therefor is not hydraulically connected to the alluvial aquifer, bedrock aquifer, or Ralston Creek. This is because underground mining in the Black Forest occurred at elevations equal to or above 6,604 feet above mean sea level. The original Construction Materials 110 Permit (M-2001-036) for the Black Forest Mine states that the natural (pre-mining) depth to groundwater in the adjacent alluvium was approximately 9 feet below ground surface (ft bgs) (6,595 ft amsl). The current static water level (March 2020) in alluvial groundwater well MW-19 (total depth of 21.6 ft bgs) is approximately 15 ft bgs (6,625 ft amsl). The current static water level (March 2020) in nearby deep bedrock groundwater well MW-18 (total depth of 239.9 ft bgs) is approximately 120 ft bgs (6,484 ft amsl). These wells are part of the quarterly groundwater sampling network discussed in Section E.6. Heads in these wells are likely depressed due to the sump capture system, Ralston creek bypass pipeline, and the inward gradient created by dewatering the mine pool (the mine pool is required to be 150 feet below the Steve Level or 6,452 ft amsl). Following the alluvial valley reclamation, the heads in the shallow groundwater wells (e.g., MW-19) are expected to return to natural elevations. The head in MW-18 is expected to remain depressed, as the deep bedrock well is more indicative of the mine pool elevation. A cross section of the Schwartzwalder Mine workings is shown on Figure G-1 and Figure G-2. The Steve Adit elevation (6,602 ft amsl) is approximately the same as the Black Forest entrance adit (6,604 ft amsl). The maximum mine pool elevation is 150 feet below the Steve Adit (6,452 ft amsl). Additional surface water and alluvial groundwater data from 1998 to 2010 are presented and summarized in Sections 11 and 9 of the *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016). Removing soil from the alluvial valley and placing them inside the Former Black Forest Mine will prevent the soil from potentially leaching uranium to the surrounding waters.

(This page intentionally left blank.)



Revision History		
B	Added wells	01/06/2022
A	Initial Draft	11/05/2020
Rev.	Description	Date

Engineer's Seal

	Name	Date
Design		
Drawn	N. Lambert	01/06/2022
Checked	E. Busby	01/06/2022
Approved		

Project/Drawing Information	
Project Name	Former Schwartzwalder Mine
Project Number	EUS20CO00004
Project Location	Golden, Colorado

Drawing Name

Cross Section of Mine Workings
Figure G-1

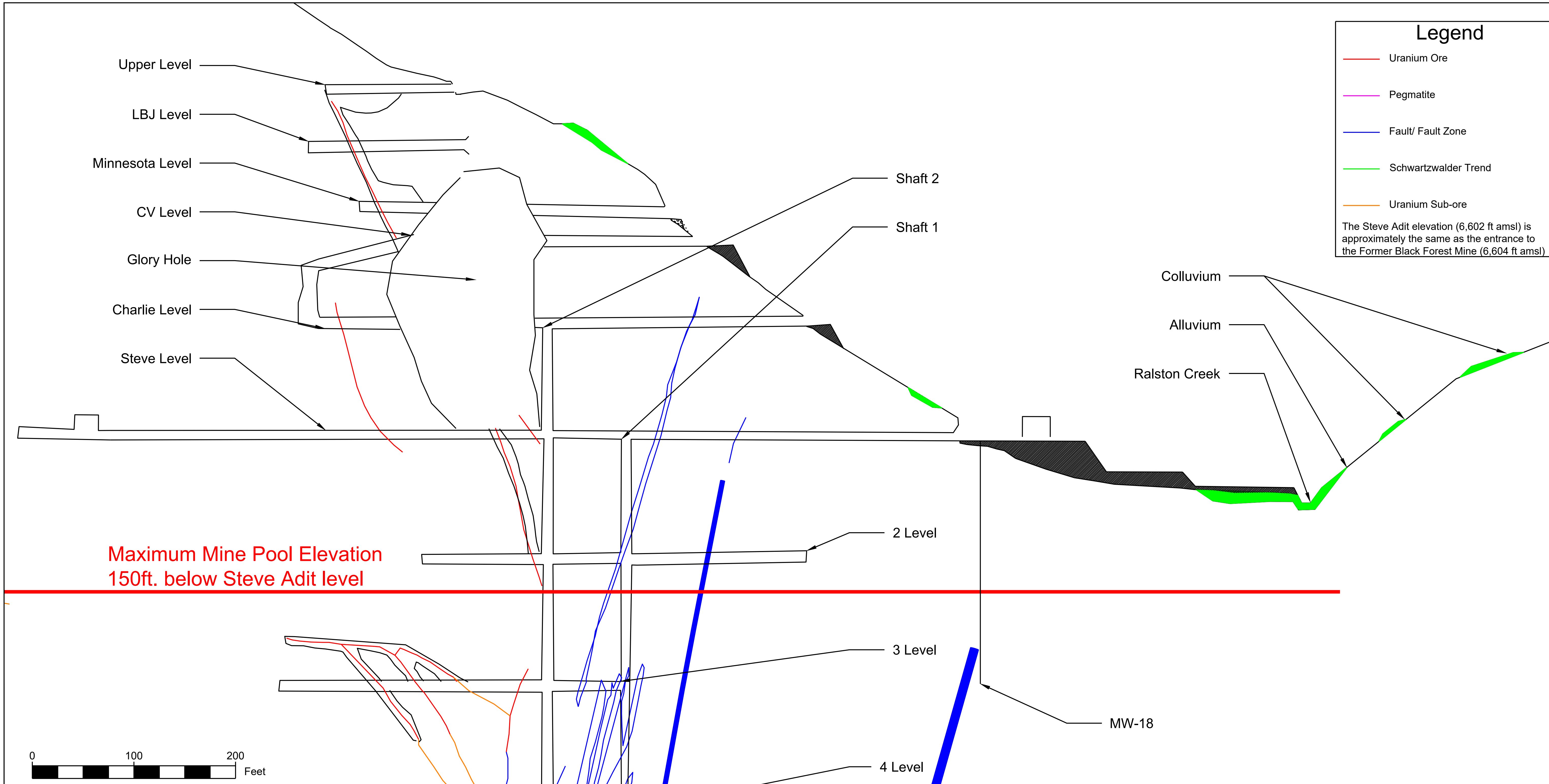
Drawing Number

EUS20CO0004-C301

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

Colorado Legacy Land, LLC

C:\Users\NateLambert\Documents\Projects\Schwartzwalder\Drawings\Mine_workings.dwg (last edited by: NateLambert; 2022/01/06 - 4:05 PM



Revision History		
B	Added wells	01/06/2022
A	Initial Draft	11/20/2020
Rev.	**Description**	**Date**

Engineer's Seal

	Name	Date
Design		
Drawn	N. Lambert	01/06/2022
Checked	E. Busby	01/06/2022
Approved		

Project/Drawing Information	
Project Name	Former Schwartzwalder Mine
Project Number	EUS20CO00004
Project Location	Golden, Colorado

Drawing Name

Detail Cross Section of Mine Workings
Figure G-2

Drawing Number

EUS20CO0004-C302

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

Colorado Legacy Land, LLC

EXHIBIT H. WILDLIFE INFORMATION

This information is presented in Technical Revision 23, Attachment B *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016). Section 18 of the *Schwartzwalder Mine Environmental Protection Plan* discusses soil.

(This page intentionally left blank.)

EXHIBIT I. SOILS INFORMATION

This information is presented in Technical Revision 23, Attachment B *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016). Section 17 of the *Schwartzwalder Mine Environmental Protection Plan* discusses soil.

(This page intentionally left blank.)

EXHIBIT J. VEGETATION INFORMATION

This exhibit has not changed from the 2012 Mine Plan Amendment 3.

(This page intentionally left blank.)

EXHIBIT K. CLIMATE INFORMATION

This information is presented in Technical Revision 23, Attachment B *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates Inc., 2016). Section 13 of the *Schwartzwalder Mine Environmental Protection Plan* discusses climate.

(This page intentionally left blank.)

EXHIBIT L. RECLAMATION COSTS

The revisions in Table L-1 reflect the reclamation plan presented in Exhibit E of this document and are consistent with the remaining scope of work at the Site.

TABLE L-1. REVISED SCHWARTZWALDER MINE RECLAMATION COSTS					
Item	**Unit Cost**	**Quantity**	**Unit**	**Total Cost**	**Notes / Basis of Estimate**
Water Treatment Plant Operations (20-year time period)					
Water Treatment Plant Operator	$ 23.93	19,200	hour	$ 459,456.00	U.S. Department of Labor, Service Contract Act hourly wage for a Water Treatment Plant Operator (20 years *6 months*4 weeks *40 hours = 19,200 hours).
Controller	$ 8,982.90	2	controller	$ 17,965.80	Replacement for WTP controllers (remote monitoring of plant). Expected to be replaced once every 10 years. Quote from Tank Equipment.
Internet	$ 59.00	240	month	$ 14,160.00	Mountain Broadband monthly internet service
Electricity	$ 4,719.72	240	month	$ 1,132,732.80	United Power. Average monthly electric bill at the site.
Potable Water	$ -	0	gallon	$ -	Potable water for bathroom facilities provided by WTP.
Columbia Sanitary	$ 325.00	20	service	$ 6,500.00	Pump septic tank onsite once per operating year.
Waste Management	$ 164.00	60	month	$ 9,840.00	Bimonthly trash service (pickup 3 times per year).
Office Trailer	$ 18,500.00	1	trailer	$ 18,500.00	Office trailer for jobsite. Quote provided by JobBox for 40-foot standard office
Caustic Soda (Sodium Hydroxide, Liquid 25%)	$ 0.30	1,334,400	lbs	$ 400,320.00	Caustic soda is used for pH stabilization and "Clean in Place, or CIP" washed of the membranes. Each chemical tote is 2,780-lbs. The WTP uses 1 tote per week during operations (6 months * 4 weeks = 24 totes / year).
Barium Chloride (55 lb bag of crystals)	$ 6.50	6,600	lbs	$ 42,900.00	Interstate Chemical Company. Crystals delivered in 55-lb bags/drums. The WTP uses 1 bag per month of operation.
Antifoulant or RO anti-scale (RO 1302 NSF)	$ 2.57	25,050	lbs	$ 64,378.50	Midsouth Chemical Company. Each chemical tote is 2,502 lbs. The WTP uses 1 tote every 2 years.
EDTA (39% solution)	$ 0.71	2,380	bs	$ 1,689.80	Interstate Chemical Company. Each drum is 595 lbs. The WTP uses 1 drum every 5 years.
RO Membranes (LG 400 Energy Saving Membranes)	$ 441.00	192	membrane	$ 84,672.00	Utilizing a 6-month or less operational period, RO membranes are expected to be replaced every 5 years. The WTP requires a total of 48 membranes (2 RO skids * 6 tubes per RO * 4 membranes per tube = 48 membranes). Unit price includes delivery fees. Costs provided by Consolidated Water Solutions.
Cannister filters (1 Micron 40")	$ 13.18	2,880	filter	$ 37,958.40	Cannister filters are replaced once every two months of operations. Unit price includes shipping. Optimum Filter.
Sustaining capital	$ 2,000.00	20	year	$ 40,000.00	Sustaining capital costs are for maintenance, repair, or replacement of WTP equipment.

Item	Unit Cost	Quantity	Unit	Total Cost	Notes / Basis of Estimate
Discharge permit sampling	$ 1,988.20	120	month	$ 238,584.00	Discharge sampling only occurs for 6 months of the year when the plant is operating (6 months * 20 years = 120 months). Unit costs for samples are provided by contract laboratories SeaCrest and ACZ.
IX Resin Disposal	$ 3,150.15	1	per exchange	$ 3,150.15	Energy Fuels White Mesa Mill recovers uranium from the IX resin and returns regenerated resin to the site in lieu of a typical disposal fee. Therefor the only costs for disposal are the transportation costs. IX resin is exchanged every once in a 20-year time period.
Demolish water treatment plant	$ 58,949.50	1	event	$ 58,949.50	Costs to demolish the Water Treatment Plant facilities on Mesa.
In-situ Treatment (10-year time period)					
Ethanol	$ 4.70	33,655	gallon	$ 158,178.50	5 additional injections (1 injection every 2 years). One tanker (6,731 gallon) per injection. Bulk chemical costs are provided by Interstate Chemical Company.
Phosphoric Acid	$ 0.80	54,285	lbs	$ 43,428.00	5 additional injections (1 injection every 2 years). Each chemical tote is 3,619-lbs. 3 totes per injection. Bulk chemical costs are provided by Interstate Chemical Company.
Alluvial Valley Excavation					
Mobilization	$ 17,000.00	1	event	$ 17,000.00	Heavy equipment already onsite. However in the event the State needs to perform the work, mobilization costs presented here are for a Dozer - John Deere 750, Haul Truck - Caterpillar D250E , Excavator -Caterpillar 320 , and Loader- Caterpillar 950G (or equivalent). These were mobilized from the nearest Wagner rental facility in Denver. Verbal quote provided by Wagner.
Demobilization	$ 17,000.00	1	event	$ 17,000.00	Demobilization of equipment expected to equal mobilization of equipment.
Demolish upstream cut-off wall	$ 9.02	8,800	SF	$ 79,388.76	2 feet thick x 220 feet long x 20 feet high. Wall, concrete, demolition only, average reinforcing - 24 inches thick
Demolish footer of upstream cutoff wall	$ 8.17	220	LF	$ 1,796.39	1 foot x 2 foot x 220 foot. Footing, concrete, average reinforcing 1 foot x 2 foot.
Demolish Pipeline cradle foundations	$ 8.17	50	LF	$ 408.27	Ten total, 5-foot long each. Footing, concrete average reinforcing is 1 foot x 2 foot.
Cut 18-inch HDPR pipeline into 30-foot lengths	$ 32.93	100	cut	$ 3,292.50	Pipeline is 3,000 feet long, 10 cuts.

TABLE L-1. REVISED SCHWARTZWALDER MINE RECLAMATION COSTS					
Item	**Unit Cost**	**Quantity**	**Unit**	**Total Cost**	**Notes / Basis of Estimate**
Load and haul concrete and pipe to landfill	$ 19.89	341	CY	$ 6,781.36	Loading and 2-mile haul, no salvage, machine loading
Landfill disposal fee for concrete and pipe	$ 107.99	341	CY	$ 36,825.95	Dump fees - Building construction materials.
Excavate and place soil onsite	$ 5.33	16,208	CY	$ 86,388.64	Volume includes 3,895 CY of cap material and 12,313 CY of radionuclide impacted soils. The expansion of the SWRP will cover the main portal and escape portal of the Black Forest Mine, therefore this line item includes costs for adit closure. This unit rate per cubic yard includes labor and equipment (Dozer - John Deere 750 or equivalent, Haul Truck - Caterpillar D250E or equivalent, Excavator -Caterpillar 320 or equivalent, and Loader- Caterpillar 950G or equivalent) costs.
Confirmation sampling, soil analysis	$ 158.80	48	sample	$ 7,622.40	A total of 12 soil samples for each of the 4 survey units are proposed (4*12 = 48). Unit costs for samples are provided by contract laboratory ACZ. Exact sample quantities shall be presented in the Final Status Survey Work Plan document.
Fill Soil	$ -	0	CY	$ -	Enough suitable soil has been identified during the alluvial valley excavation. CLL intends to regrade the alluvial valley consistent with the surrounding slopes by pushing adjacent fill materials to fill in excavated potholes.
Top Soil / Plant Growth Medium	$ 14.50	5,727	CY	$ 83,041.50	6-inches to topsoil / plant growth medium applied over 7.1 acres yields 5,727 CY. Figure F-1 identifies 7.1 acres that receive the topsoiling.
Seed Mix	$ 450.00	7.1	acre	$ 3,195.00	Seed mix shown in Table E-1 of Application Amendment #5. Figure F-1 identifies 7.1 acres that will likely be reseeded, a final planting plan shall be prepared following the alluvial valley excavation project.
Trees (Phase I)	$ 60.00	174	tree	$ 10,440.00	Transported in 10-gallon pots. Riparian Area trees (Ponderosa Pine, Juniper, Cottonwood, & Peachleaf Willow) associated with habitat restoration above the cutoff wall and 18" creek bypass pipeline. Estimated quantities shown in Table E-2. Figure F-1 identifies 7.1 acres that will likely be replanted, a final planting plan shall be prepared following the alluvial valley excavation project.

TABLE L-1. REVISED SCHWARTZWALDER MINE RECLAMATION COSTS					
Item	**Unit Cost**	**Quantity**	**Unit**	**Total Cost**	**Notes / Basis of Estimate**
Willow Stakes (Phase I)	$ 4.00	615	willow	$ 2,460.00	Transported as cuttings. Remaining habitat restoration above the cutoff wall and 18" creek bypass pipeline. Estimated quantities shown in Table E-2. Figure F-1 identifies 7.1 acres that will likely be replanted, a final planting plan shall be prepared following the alluvial valley excavation project.
Trees (Phase II)	$ 60.00	89	tree	$ 5,340.00	Transported as 10-gallon pots. Upland Area trees (Ponderosa Pine, Juniper, Cottonwood, Douglas Fir, Engelmann Spruce) associated with areas impacted by excavation below the cut off wall. Estimated quantities shown in Table E-2. Figure F-1 identifies 7.1 acres that will likely be replanted, a final planting plan shall be prepared following the alluvial valley excavation project.
Shrubs (Phase II)	$ 20.00	65	shrub	$ 1,300.00	Transported as 1-gallon pots. Upland Area shrubs (Mountain Mahogany, Hawthorne, Willow, and Fringed Sage) associated with areas impacted my excavation below the cut off wall. Estimated quantities shown in Table E-2. Figure F-1 identifies 7.1 acres that will likely be replanted, a final planting plan shall be prepared following the alluvial valley excavation project.
Shrubs (Phase II)	$ 37.00	66	shrub	$ 2,442.00	Transported as 5-gallon pots. Upland Area shrubs (Mountain Mahogany, Hawthorne, Willow, and Fringed Sage) associated with areas impacted my excavation below the cut off wall. Estimated quantities shown in Table E-2. Figure F-1 identifies 7.1 acres that will likely be replanted, a final planting plan shall be prepared following the alluvial valley excavation project.
Hydromulching	$ 25.00	2,970	CY	$ 74,250.00	Only required on 2H:1V and steeper slopes. The surface area of the SWRP expansion is estimated at 35,635 SF. Typical thickness of hydromulching is 1-inch.
Excavator	$ 120.00	0	hour	$ -	Excavator -Caterpillar 320 or equivalent, Loader- Caterpillar 950G or equivalent. Equipment costs included in unit cost ($/CY) for soils.
Dozer	$ 100.00	80	hour	$ 8,000.00	Dozer - John Deere 750 or equivalent. Regrading alluvial valley is expected to take 2 weeks (80-hours).
Labor	$ 42.00	80	hour	$ 3,360.00	Regrading the alluvial valley is expected to take one operator 2 weeks (80-hours).
Environmental Monitoring (10 year time period)					
Surface Water Monitoring	$ 722.40	520	sample	$ 375,648.00	Quarterly sampling of Ralston Creek at 13 stations.

TABLE L-1. REVISED SCHWARTZWALDER MINE RECLAMATION COSTS					
Item	**Unit Cost**	**Quantity**	**Unit**	**Total Cost**	**Notes / Basis of Estimate**
Groundwater Monitoring	$ 722.40	560	sample	$ 404,544.00	Groundwater monitoring network includes 13 wells and 2 spigots (sumps and mine pool), however 1 well is only monitored for water levels.
Monitoring Well Abandonment	$ 20.00	2,511	well	$ 50,220.00	Typical unit rate ($20/foot) provided verbally by Drilling Engineers Inc. 13 monitoring wells onsite totaling 2,511 linear feet.
Sump Removal / Abandonment	$ 2,000.00	1	sump	$ 2,000.00	Abandon /remove the master sump.
Mine Opening Closure: Black Forest Mine, Backfill Closure					
Minnesota Adit, Sunshine Decline, Steve Adit, CV/ Charline, & Peirce Adit	$ -	5	openings	$ -	Gate closure already in place.
Black Forest Mine	$ -	2	openings	$ -	Backfill closure shall be completed as part of SWRP expansion. Costs included in 'excavate and place soils onsite' line item above.
Cost Total					
				$ 4,116,108.23	Subtotal of direct costs (equipment and materials)
-				$ 174,934.60	Engineering Work &/or Contract/Bid Prep. (4.25% of direct costs)
				$ 205,805.41	Reclamation management &/or Admin. (5% of direct costs)
				$ 4,496,848.24	**Grand total**

Item	Unit Rate	Unit	Quantity	Total Amt	Notes
Mesa WTP Demolition					
Mobilization					
Subtotal				**$ -**	Eqpt already onsite.
Site Preparation and Staging					
Excavator	$ 140.00	per hour	6	$ 840.00	Caterpillar 320 or equivalent.
Haul Truck	$ 135.00	per hour	6	$ 810.00	Caterpillar D250E or equivalent.
Loader	$ 120.00	per hour	0	$ -	Caterpillar 950G or equivalent.
Track Skid	$ 105.00	per hour	3	$ 315.00	John Deere 323DT or equivalent.
John Deere Dozer	$ 115.00	per hour	3	$ 345.00	John Deere 750 or equivalent.
Subtotal				**$ 2,310.00**	
Equipment Removal and Disposal					
Excavator	$ 140.00	per hour	0	$ -	Caterpillar 320 or equivalent.
Haul Truck	$ 135.00	per hour	24	$ 3,240.00	Caterpillar D250E or equivalent.
Loader	$ 120.00	per hour	20	$ 2,400.00	Caterpillar 950G or equivalent.
Track Skid	$ 105.00	per hour	2	$ 210.00	John Deere 323DT or equivalent.
John Deere Dozer	$ 115.00	per hour	0	$ -	John Deere 750 or equivalent.
Subtotal				**$ 5,850.00**	
Building Demolition and Disposal					
Excavator	$ 140.00	per hour	6	$ 840.00	Caterpillar 320 or equivalent.
Haul Truck	$ 135.00	per hour	12	$ 1,620.00	Caterpillar D250E or equivalent.
Loader	$ 120.00	per hour	12	$ 1,440.00	Caterpillar 950G or equivalent.
Track Skid	$ 105.00	per hour	6	$ 630.00	John Deere 323DT or equivalent.
John Deere Dozer	$ 115.00	per hour	6	$ 690.00	John Deere 750 or equivalent.
Construction Debris Disposal in Landfill	$ 152.00	per metric ton	100	$ 15,200.00	Foothills Landfill, 2022 price per metric ton. 143 CY of demolition debris yields ~100 MT of debris (143CY*0.7MT/CY = ~100MT of debris).
Subtotal				**$ 20,420.00**	
Site Regrading					
Excavator	$ 140.00	per hour	8	$ 1,120.00	Caterpillar 320 or equivalent.
Haul Truck	$ 135.00	per hour	0	$ -	Caterpillar D250E or equivalent.
Loader	$ 120.00	per hour	8	$ 960.00	Caterpillar 950G or equivalent.
Track Skid	$ 105.00	per hour	4	$ 420.00	John Deere 323DT or equivalent.
John Deere Dozer	$ 115.00	per hour	2	$ 230.00	John Deere 750 or equivalent.
Subtotal				**$ 2,730.00**	
Foundation Demolition					
Excavator	$ 140.00	per hour	8	$ 1,120.00	Caterpillar 320 or equivalent.
Haul Truck	$ 135.00	per hour	4	$ 540.00	Caterpillar D250E or equivalent.
Loader	$ 120.00	per hour	2	$ 240.00	Caterpillar 950G or equivalent.
Track Skid	$ 105.00	per hour	0	$ -	John Deere 323DT or equivalent.
John Deere Dozer	$ 115.00	per hour	0	$ -	John Deere 750 or equivalent.
Subtotal				**$ 1,900.00**	
Site Cleanup					

Excavator	$ 140.00	per hour	28	$ 3,920.00	Caterpillar 320 or equivalent.
Haul Truck	$ 135.00	per hour	24	$ 3,240.00	Caterpillar D250E or equivalent.
Loader	$ 120.00	per hour	12	$ 1,440.00	Caterpillar 950G or equivalent.
Track Skid	$ 105.00	per hour	24	$ 2,520.00	John Deere 323DT or equivalent.
John Deere Dozer	$ 115.00	per hour	4	$ 460.00	John Deere 750 or equivalent.
Subtotal				**$ 11,580.00**	
Demobilization					
Subtotal				**$ -**	Eqpt already onsite
Total for Demolition				**$ 44,790.00**	
Project Management					
Project Management					
Project Management and Administration Fee				$ 2,239.50	5% of the Demolition Costs
Subtotal				**$ 2,239.50**	
Travel Costs					
Travel, Per Diem (meals & incidentals, Colorado 2022 Rate)	$ 79.00	per person per day	40	$ 3,160.00	4-man crew, 2 weeks
Travel, Lodging, (Jefferson Co., Colorado 2022 Rate)	$ 199.00	per person per day	40	$ 7,960.00	4-man crew, 2 weeks
Weekly Mobilization	$ 400.00	per week	2	$ 800.00	2 weeks
Subtotal				**$ 11,920.00**	
Total for Project Management				**$ 14,159.50**	
Project Total:				**$ 58,949.50**	

Calvin Kessler, Owner

Kessler Reclamation Company

Phone: 719-371-0476

Email: kesslerreclamation@yahoo.com

Calvin Kessler

RSB LOGISTIC

INVOICE NO: K068238

A member of COMPASS LOGISTICS INTERNATIONAL

Coding:RSB100
Period:11
Task#:6200
PO #:NA
Coding:5151-8030-363
Total:$2,763.29

BATCH0** - ENTRY**

BILL TO

ALEXCO WATER & ENVIRONMENT
12150 E. BRIARWOOD AVE
SUITE 135
CENTENNIAL CO 80112

Shipper

ALEXCO WATER & ENVIRONMENT
8330 GLENCOE VALLEY ROAD
GOLDEN CO 80403

Consignee

ENERGY FUELS RESOURCES USA, INC.
6425 SOUTH HIGHWAY 191
P.O. BOX 809
BLANDING UT 84511

Billing/Delivery	Currency	Reference #	Trailer #	Power Unit #	Bill of Lading #	PO #
11/8/2018	USD		F48217	59716	11-05-18	RESIN IN TOTES

Description		QTY	Weight	Rate	Charges
ALEXCO WATER & ENVIRONMENT GOLDEN, CO 80403	ENERGY FUELS RESOURCES USA, INC. BLANDING, UT 84511				
RADIOACTIVE PACKAGING- CLASS 7		1.00			$2,175.00
FSC ON RSB NEW SCHEDULE USD		2,175.00		0.2245	$488.29
TARPING CHARGE	TARPING	1.00		100.0000	$100.00
				Charges SubTotal:	**$2,763.29**
				GST/HST #R100629518:	**$0.00**
				Total Amount Owing:	**$2,763.29**

Notes

USE RSB'S FSC, QUOTED AT .2310%

RSB LOGISTIC

RSB LOGISTIC
219 Cardinal Crescent
Saskatoon SK
Canada S7L 7K8

PH. (306) 242-8300 **FAX (306) 652-5888** **TOLL FREE 1-800-667-3934**

SASKATOON, SK **www.rsblogistic.com** **PADUCAH, KY**

THIS BILL MUST BE PAID WITHIN 14 DAYS AFTER PRESENTATION OR A SERVICE CHARGE OF 2% PER MONTH WILL BE ASSESSED.

EXHIBIT M. OTHER PERMITS AND LICENCES

Rule 6.4.20(5) requires a list any air, water quality, solid and hazardous waste, and other federal, state permits or local licenses, or other formal authorizations which the Operator/Applicant holds or will be seeking applicable to the use, handling, storage, or disposal of designated chemicals and acid mine drainage-forming materials within the permit area.

The Schwartzwalder Mine operated under Colorado Mining Permit # M-1977-300, Colorado Discharge Permit #CO-0001244 and Radioactive Materials License CO-369-03.

- **Colorado Mining Permit #M-1977-300:** The mine permit (M-1977-300) was issued by the State of Colorado in 1977 the permit disturbance boundary covered by the permit is shown in Figure C-1.

- **Colorado Discharge Permit #CO-0001244:** Discharge Permit #CO-0001244 was issued in 1981 by the Colorado Department of Public Health and Environment, Water Quality Control Division for the Schwartzwalder water treatment plant. The monitoring requirements associated with the discharge permit and corresponding NOV/Cease and Desist Order (order #IO-100601-1) are described in Exhibit E.

- **Radioactive Materials License number CO-369-06:** A new Radioactive Materials License #CO-369-06 was issued by the CDPHE Hazardous Materials and Waste Management Division in July 2010 and renewed in June 2020. This license authorizes storage, possession and ownership of radioactive materials associated with an ion-exchange water treatment system.

- **Air Quality Permits:** There is one air permit #97JE0037F associated with the Site reclamation activities (dust suppression for grading and earthwork).

- **Storm Water Discharge Permit:** The Colorado stormwater discharge permit #COR-040046 has been in effect since March 19, 1993. The stormwater management plan (updated in May of 2010) identifies potential sources of pollution (including sediment) which may reasonably be expected to affect the quality of stormwater discharges associated with the mine and describes the best management practices (BMPs) used to reduce pollutants in stormwater discharge.

- **Well Permits Water Resource Permit Number 64684**: issued September 22, 1972, by the Office of the State Engineer for the non-industrial domestic water well. All monitoring wells have been permitted through the Colorado Division of Water Resources.

- **U.S. Army Corps of Engineers:** The U.S. Army Corps of Engineers issued a nationwide 404 permit (Corps File No. NOW-2011-013530-DEN) for performing the alluvial fill material excavation along Ralston Creek.

- **U.S. Fish and Wildlife Service:** The U.S. Fish and Wildlife Service issued a biological opinion (February 2016) as part of the aforementioned U.S. Army Corps of Engineers permit. In this biological opinion, the Colorado Ecological Services Field Office finds that the alluvial valley exaction may affect the Preble's meadows jumping mouse and it's critical habitat, but the project is not likely to jeopardize the continuing existence of the species or result in destruction of adverse modification of the Preble's critical habitat.

- **Cultural Resource Inventory:** The Colorado Cultural Resource Inventory conducted a cultural resource survey as part of the aforementioned U.S. Army Corps of Engineers permit (NOW-2011-01353-DEN, CHS #70986). No properties of historical significance were recorded.

- **USEPA Underground Injection Control:** USEPA Region 8 Underground Injection Control Program has issued a Class V Injection Well Rule Authorization (USEPA File # CO50000-09923) for mine backfilling and returning brine from the WTP back to the flooded underground mine workings.

No other air, water quality, or solid and hazardous waste permits are in effect for the reclaimed Schwartzwalder Mine. The Schwartzwalder Mine does not currently use, handle, store, or disposal of designated chemicals. No acid mine drainage-forming materials have been handled or stored within the permit area[5].

[5] All geochemical testing performed on materials from the site indicates that mine rock is classified as having a very low potential to produce acid and a high potential for neutralizing acid. Specifically, the results of the acid-base accounting (ABA) tests indicate that waste rock from the Schwartzwalder Mine is strongly neutralizing with an average net neutralizing (NNP) capacity of 149 t CaCO3/kt and an ANP/AGP ratio of 10. The mined rock has a very low potential to generate acidic drainage, and no acidic drainage has been detected from the mine or waste rock facilities to date.

Of the five seeps and drips described in Section 9(b)(iv).3, of the *Schwartzwalder Mine Environmental Protection Plan* (Whetstone Associates, 2016) two had low pH (WASH [3.8], ILLRS [2.7]) and three had near neutral to slightly basic pH (Minnesota [7.9], CO [7.9], and 146 [8.2]). The two seeps with the lowest pH values had the lowest flow rates, measured at 0.03 – 0.05 gpm for the WASH and 0.15 gpm for the ILLRS. Two of the seeps with the highest pH had the highest flow rates, measured at 0.8 gpm for the CO and 0.5 gpm for the 146. Therefore, the two low-pH drips were measured at a combined flow rate of less than 0.2 gpm compared to the 1.3 gpm measured at neutral to basic seeps and the unmeasured flow of neutral pH waters near the Minnesota Glory Hole.

Overall, the seeps and drips from the unsaturated zone above the mine represent a small quantity of flow through native, in-situ (non-handled) rock materials. Despite these small drips, the pH of the mine pool remains circum-neutral, with no indication that the mine pool will go acid. Bicarbonate alkalinity exceeds 400 mg/L (as CaCO3), which indicates significant buffering capacity within the mine pool. No trends of decreasing pH or alkalinity have been observed to date in mine pool water (Section 9(b)(iv).2 of the *Schwartzwalder Mine Environmental Protection Plan* [Whetstone Associates, 2016]). The small seeps and drips from the unsaturated workings above the Steve Level contribute significantly less than one gallon per minute annually to the 139 million gallon mine pool, and the alkalinity in the mine pool is sufficient to buffer this small contribution.

EXHIBIT N. SOURCE OF LEGAL RIGHT-TO-ENTER

This Exhibit has not changed from the 2021 Mine Plan Amendment 5.

(This page intentionally left blank.)

EXHIBIT O. OWNERS OF RECORD TO AFFECTED LAND (SURFACE AREA) AND OWNERS OF SUBSTANCE TO BE MINED

Colorado Legacy Land, LLC is the owner of record of affected land and has the following legal address:

Colorado Legacy Land, LLC
12150 E. Briarwood Ave., Suite 135
Centennial, CO 80112

(This page intentionally left blank.)

EXHIBIT P. MUNICIPALITIES WITHIN TWO MILES

No municipalities exist within two miles of the Schwartzwalder Mine.

(This page intentionally left blank.)

EXHIBIT Q. PROOF OF MAILING OF NOTICES TO COUNTY COMMISSIONERS AND CONSERVATION DISTRICT

COLORADO LEGACY LAND
12150 E. Briarwood Ave. Suite 135, Centennial, Colorado 80112
T. (303) 862-3928

June 21, 2021

Jefferson County
Board of County Commissioners
100 Jefferson County Pkwy.
Golden CO 80419

Subject: Notice of Filing an Amendment Application for Colorado Mine Land Reclamation Permit, Schwartzwalder Mine, Golden, Colorado

Colorado Legacy Land, LLC (CLL) has applied for an Amendment application to their 112d Designated Mining Reclamation Permit with the Colorado Mine Land Reclamation Board under provisions of the Colorado Mined Land Reclamation Act. This Amendment application is for the former Schwartzwalder Mine which is located at or near, Section 25, Township 2 South, Range 71 West of the 6th Prime Meridian. The entire application is on file with the Division of Reclamation, Mining and Safety (the "Division") and the Jefferson County Clerk and Recorders Office (100 Jefferson County Pkwy, Golden Colorado 80419).

The applicant/operator proposes to reclaim the affected land to Wildlife Habitat. Pursuant to Section 34-32-116(7)(j), C.R.S., the Board is required to confer with the local Board of County Commissioners before approving of the post-mining land use. Accordingly, the Board would appreciate your comments on the proposed operation. Please note that, in order to preserve your right to a hearing before the Board on this application, you must submit written comments on the application within twenty (20) days after the date of the applicant's newspaper publication.

If you would like to discuss the proposed post-mining land use, or any other issue regarding this application, please contact the Division of Reclamation, Mining and Safety, 1313 Sherman Street, Room 215, Denver, Colorado 80203, (303) 866-3567.

7020 3160 0001 2526 1600

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Golden, CO 80419

Certified Mail Fee $3.60

0197
09

Extra Services & Fees (check box, add fee as appropriate)
- ☐ Return Receipt (hardcopy) $ $0.00
- ☒ Return Receipt (electronic) $ $0.00
- ☐ Certified Mail Restricted Delivery $ $0.00
- ☐ Adult Signature Required $ $0.00
- ☐ Adult Signature Restricted Delivery $ $0.00

Postage $0.55

Total Postage and Fees $4.15

Postmark Here
COLLINS CO 80521
JUN 2 1 2021
06/21/2021
USPS

Sent To: Jefferson County Board of Commissioners
Street and Apt. No., or PO Box No.: 100 Jefferson County Pkwy.
City, State, ZIP+4®: Golden CO 80419

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

PAGE 1 OF 1

COLORADO LEGACY LAND
12150 E. Briarwood Ave. Suite 135, Centennial, Colorado 80112
T. (303) 862-3928

June 21, 2021

Jefferson Conservation District
10799 W. Alameda Ave. #261205
Lakewood, CO 80226

Subject: Notice of Filing an Amendment Application for Colorado Mine Land Reclamation Permit, Schwartzwalder Mine, Golden, Colorado

Colorado Legacy Land, LLC (CLL) has applied for an Amendment application to their 112d Designated Mining Reclamation Permit with the Colorado Mine Land Reclamation Board under provisions of the Colorado Mined Land Reclamation Act. This Amendment application is for the former Schwartzwalder Mine which is located at or near, Section 25, Township 2 South, Range 71 West of the 6th Prime Meridian. The entire application is on file with the Division of Reclamation, Mining and Safety (the "Division") and the Jefferson County Clerk and Recorders Office (100 Jefferson County Pkwy, Golden Colorado 80419).

The applicant/operator proposes to reclaim the affected land to Wildlife Habitat. Pursuant to Section 34-32-116(7)(j), C.R.S., the Board is required to confer with the local Board of County Commissioners before approving of the post-mining land use. Accordingly, the Board would appreciate your comments on the proposed operation. Please note that, in order to preserve your right to a hearing before the Board on this application, you must submit written comments on the application within twenty (20) days after the date of the applicant's newspaper publication.

If you would like to discuss the proposed post-mining land use, or any other issue regarding this application, please contact the Division of Reclamation, Mining and Safety, 1313 Sherman Street, Room 215, Denver, Colorado 80203, (303) 866-3567.

7020 3160 0001 2528 1617

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

Denver , CO 80226

OFFICIAL USE

Certified Mail Fee $3.60

Extra Services & Fees (check box, add fee as appropriate) $0.00
- ☐ Return Receipt (hardcopy) $ $0.00
- ☒ Return Receipt (electronic) $ $0.00
- ☐ Certified Mail Restricted Delivery $ $0.00
- ☐ Adult Signature Required $ $0.00
- ☐ Adult Signature Restricted Delivery $

Postage $0.55

Total Postage and Fees $4.15

0197
09

Postmark Here
JUN 21 2021
06/21/2021

Sent To: Jefferson Conservation District
Street and Apt. No., or PO Box No.: 10799 W. Alameda Ave. #261205
City, State, ZIP+4®: Lakewood CO 80226

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

PAGE 1 OF 1

EXHIBIT R. PROOF OF FILING WITH COUNTY CLERK AND RECORDER

On August 29, 2022 (date) the Jefferson County Clerk and Recorder's Office received a copy of:

Application Amendment 6, Mine Permit M-1977-300

Schwartzwalder Mine, Golden, Colorado

This document is available for public review at:

Jefferson County Clerk & Recorder

100 Jefferson County Pkwy Suite 2560

Golden, CO 80401

Kathy A. Lenger

(Signature from Clerk & Recorders Office)

8-29-2022

(Date)

(This page intentionally left blank.)

EXHIBIT S. PERMANENT MAN-MADE STRUCTURES

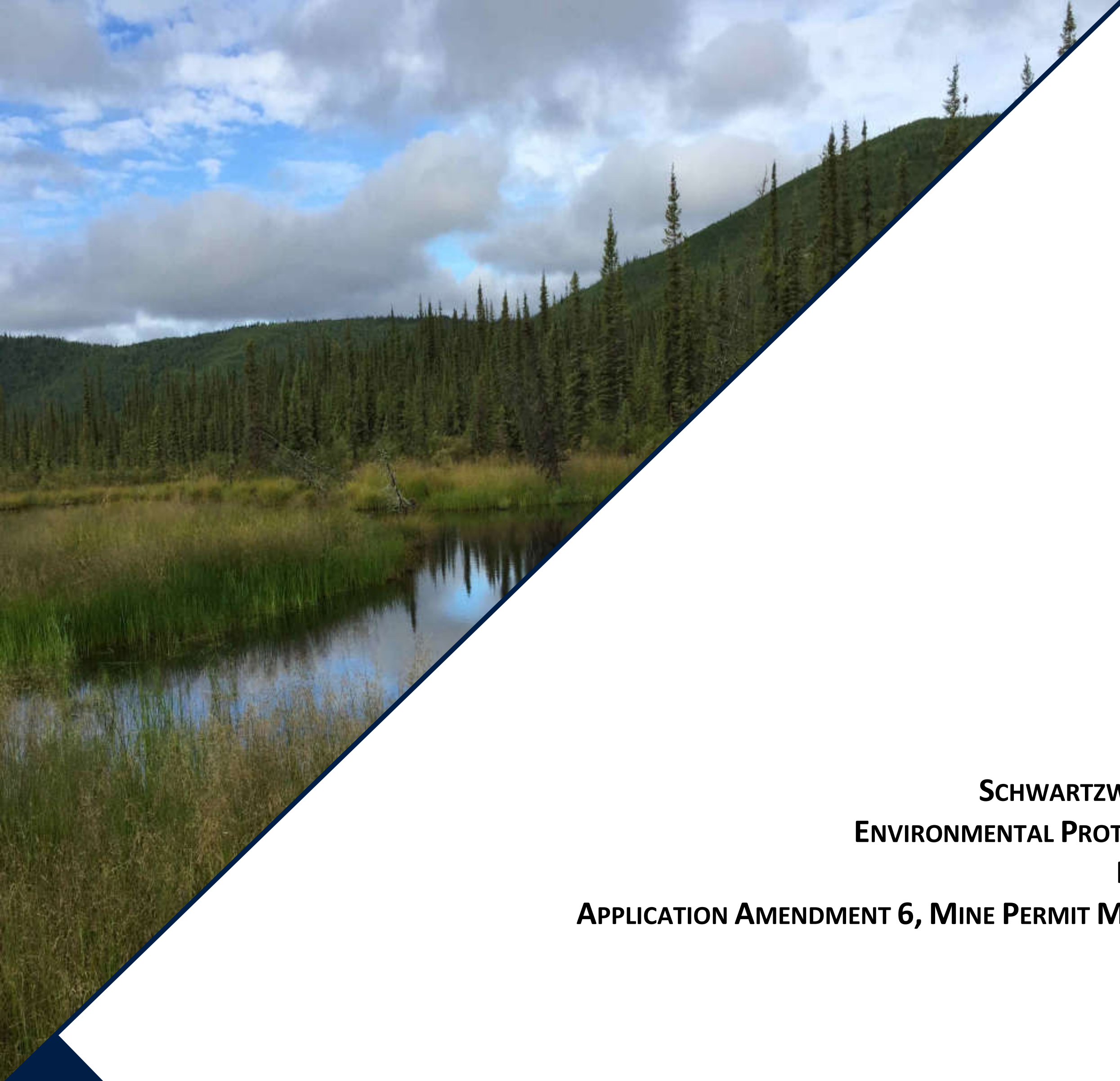
This Exhibit has not changed from the 2021 Mine Plan Amendment 5.

(This page intentionally left blank.)

EXHIBIT U. DESIGNATED MINING OPERATION ENVIRONMENTAL PROTECTION PLAN

Please see the updated Environmental Protection Plan, provided under separate cover with this submission.

(This page intentionally left blank.)



Schwartzwalder Mine
Environmental Protection Plan
Revision 2.0
Application Amendment 6, Mine Permit M-1977-300, Exhibit U

Prepared for:

Colorado Legacy Land LLC

Date:

August 2022

ENSERO
solutions

This page intentionally blank.

TABLE OF CONTENTS

1. INTRODUCTION 1

2. MAPS 1

3. OTHER ENVIRONMENTAL PROTECTION MEASURES AND MONITORING 1

4. OTHER PERMITS AND LICENSES 1

5. DESIGNATED CHEMICALS EVALUATION 1

6. DESIGNATED CHEMICALS AND MATERIALS HANDLING 1

7. FACILITIES EVALUATION 1

7.1 WATER TREATMENT PLANTS 3
7.2 WASTE ROCK PILES 7
7.2.1 Materials to be Retained 7
7.2.2 Control, Prevention, and Mitigation of Releases 7
7.2.3 Water Quality Monitoring Systems 7
7.3 ALLUVIUM AND FILL MATERIAL 7
7.4 FLOODED UNDERGROUND WORKINGS 8

8. GROUNDWATER INFORMATION 10

9. GROUNDWATER QUALITY 10

10. SURFACE WATER CONTROL & CONTAINMENT FACILITIES 10

11. SURFACE WATER QUALITY DATA 10

12. WATER QUALITY MONITORING PLAN 10

13. CLIMATE 10

14. GEOCHEMICAL DATA AND ANALYSIS 10

15. MITIGATION OPTIONS AND CONSTRUCTION SCHEDULE 10

16. QUALITY ASSURANCE AND QUALITY CONTROL 11

17. PLANT GROWTH MEDIUM (SOILS) 11

18. WILDLIFE PROTECTION 11

19. TAILINGS AND SLUDGE DISPOSAL 11

20. REFERENCES 12

LIST OF TABLES

Table 7-1: Summary of Reclamation Activities 1

Table 7-2: Schwartzwalder Mine Void Volumes 9

LIST OF FIGURES

Figure 7-1: Mesa Water Treatment Plant Building Layout 4

Figure 7-2: Water Treatment Plant Layout 5

Figure 7-3: Water Treatment Plant Process Flow Diagram 6

LIST OF ACRONYMS AND ABREVIATIONS

Acronym	Description
%	percent
CLL	Colorado Legacy Land, LLC
DMG	Division of Minerals and Geology
EDTA	Ethylenediaminetetraacetic acid
ft	feet / foot
GV	Glencoe Valley areas (offsite)
MW	Monitoring well
RML	Radioactive Materials License
RO	Reverse osmosis
SDS	Safety data sheet
SW	Surface water

1. Introduction

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

2. Maps

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]) with the exception of the location of chemicals, which is updated in Section 7 of this document. (Section 7 lists the chemicals associated with the water treatment facilities.)

3. Other Environmental Protection Measures and Monitoring

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

4. Other Permits and Licenses

This information is provided in Exhibit M of the January 2021 Application Amendment 05 (Colorado Legacy Land, LLC [CLL], 2021).

5. Designated Chemicals Evaluation

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

6. Designated Chemicals and Materials Handling

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

7. Facilities Evaluation

The Mine has been reclaimed, and all former structures (including the office/shop complex, warehouse, stormwater retention ponds, core shed, guard shack) except the water treatment plant building have been removed. Reclamation and closure activities occurred at the Mine over 15 years, with most of the facilities reclamation occurring after mining ceased in 2000. The ore sorter was dismantled and removed from site in 1999. Uranium-contaminated soils associated with a historic pond were removed in 2001. Waste rock piles were consolidated, recontoured, and revegetated. The Steve and Pierce adits were sealed in December 2007 with final contact grouting occurring in January 2008 (Technical Revision 9). A summary of reclamation activities is provided in Table 7-1.

Table 7-1: Summary of Reclamation Activities

Reclamation Area	Area Description	Completion Status
DMG 01	Exhaust Borehole	100% Complete
DMG 02	Upper/Schwartz Level	100% Complete
DMG 03	Minnesota Level	100% Complete.

Reclamation Area	Area Description	Completion Status
DMG 04	CV/Charley/Intakes	100% Complete.
DMG 05	Surface Shop/#1 Warehouse	100% Complete.
DMG 06	Core Shed/Guard Shack	100% Complete
DMG 07	Atlantic/Montana Adit	100% Complete
DMG 08	Main Office Area	100% Complete
DMG 09	Fuel Depot Schwartz Adits	100% Complete
DMG 10	East Boneyard	100% Complete
DMG 11	West Boneyard	100% Complete
DMG 12	West Waste Dump	100% Complete
DMG 13	East Waste Dump	100% Complete
DMG 14	Barrow Pit	100% Complete
DMG 15	Mine Rescue Training Area	100% Complete
DMG 16	Roadways North of EBH	100% Complete
DMG 17	Trash Trenches/Roadways	100% Complete
General GV 01	Fill Material Borrow Area	In progress
GV 02	Transfer Pad/Dozer Pad	100% Complete
GV 03	The Point and West Spur Rd.	100% Complete
GV 04	Service Entrance Rd.	100% Complete
GV 05	Lake Hill Rd.	100% Complete
GV 06	Old Road Bed Cleanup	100% Complete
RML 01	Open Space Trail/Lot#13	100% Complete.
RML 02	Ore Sorter Decommissioning Area	In progress
RML 03	Wastewater Plant Removal	100% Complete

Notes:

% = percent
DMG = Division of Minerals and Geology areas.
RML = Radioactive Materials License areas.
GV = Glencoe Valley areas (offsite).

Although the ore sorter was removed in 1999, legacy contamination associated with the ore sorter area remains in the alluvial valley at the site. Soils in the Ore Sorter Decommissioning Area (RML Area #2) contain elevated concentrations of uranium and are permitted for excavation and disposal under Technical Revision 14 and the Colorado Department of Public Health and Environment's Radiation Control Program (Radioactive Materials Licence [RML] number CO-369-06). The former ore-sorter impacted soils, and material associated with mine disturbance along the floor of the Ralston Creek valley is a mix of mine waste rock and naturally occurring soils, alluvial sands, and gravels. For the purposes of this discussion, these materials are collectively referred to as "alluvial fill". (The word "pad" has also historically been used in reference to these disturbed alluvial fill materials on the south side of Ralston Creek.)

The Fill Material Borrow Area and Ore Sorter Decommissioning Area are both in the alluvial valley at the site. In accordance with Technical Revision 14, CLL is completing the alluvial valley excavation and reclamation project, which is summarized in Exhibit E of Application Amendment 6. Soils in the alluvial valley including the Ore Sorter Decommissioning Area that contain elevated concentrations of radionuclides and shall be excavated and disposed of. Soils in the alluvial valley including the Fill Material Borrow Area that do not contain elevated concentrations of radionuclides and may be used as fill material, growth medium, or topsoil during final reclamation.

The remaining facilities or reclaimed areas of interest include the water treatment plant building, the waste rock piles, valley fill material, and the flooded mine workings.

7.1 WATER TREATMENT PLANTS

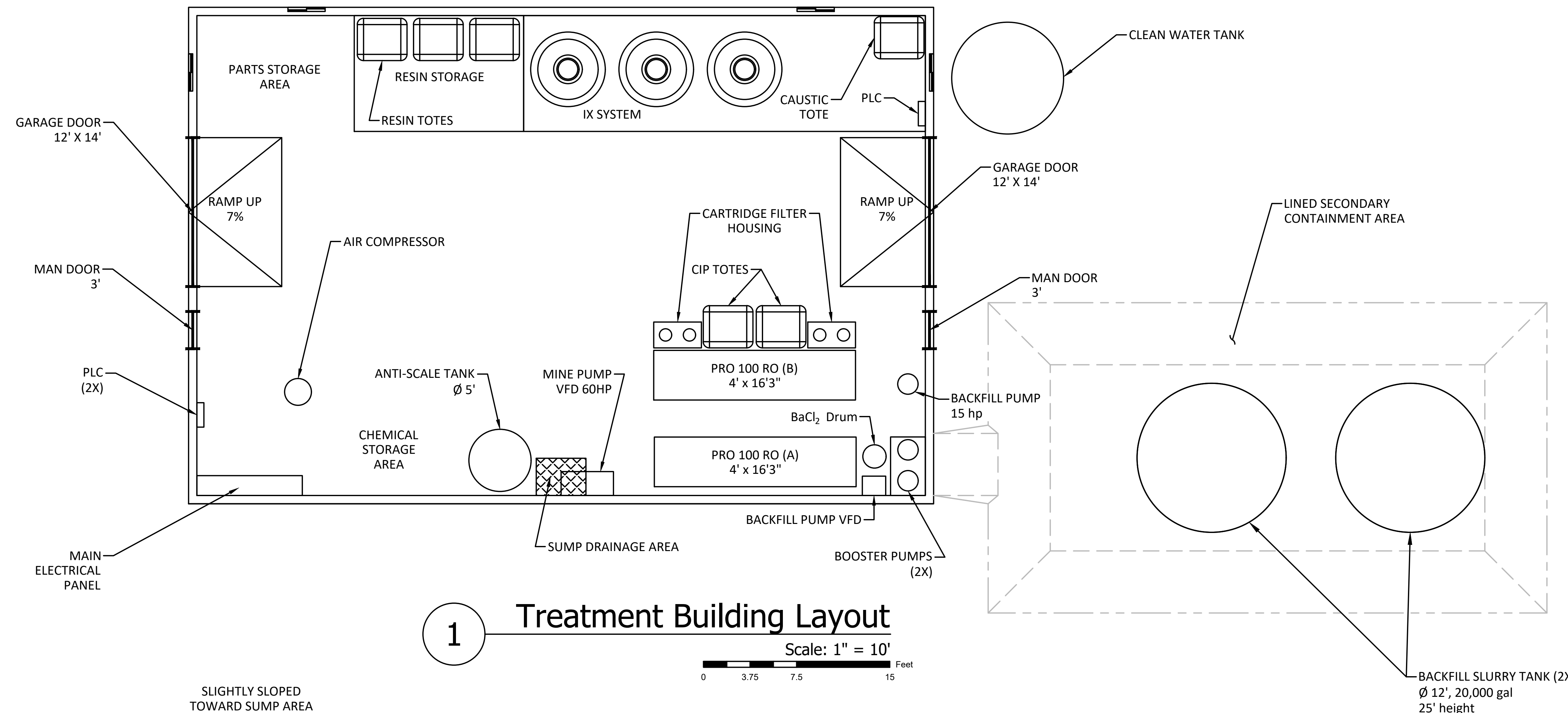
The water treatment plant in the valley was demolished in the summer of 2018, updated and relocated to the mesa near the Steve Adit. The current water treatment plant on the mesa is a designated Environmental Protection Facility. This building holds a reverse osmosis (RO) and ion exchange water treatment plant to treat mine water, which is discharged to an outfall permitted by the Water Quality Control Division. RO reject is treated with barium chloride and discharged back into the mine. This water treatment system strategically operates on a seasonal basis of 6 months on/6 months off.

Figure 7-1 is a layout of the mesa area containing the water treatment plant building and related equipment. Figure 7-2 is a detailed diagram of the water treatment plant building. The following is a list of chemicals used or stored in the water treatment plant:

- Chemicals used in the water treatment process:
  - Soda (Sodium Hydroxide, Liquid 25 percent [%]), 2,500 gallons,
  - Barium chloride, 55 gallons of solution and 2,000 lbs of dry barium flake,
  - Antifoulant or RO anti-scale (RO 1302 NSF), 55 gallons,
  - Ethylenediaminetetraacetic acid (EDTA 39% solution), 55 gallons.
- Small quantities (less than 8-ounces) of preservatives for water sampling (sodium hydroxide, nitric acid, sulfuric acid, and zinc acetate).
- Diesel and gasoline fuel for work vehicles and equipment (less than 250 gallons onsite).

The Operator maintains a master chemical inventory list and a binder with copies of all chemical safety data sheets (SDSs). This master list can be found with the SDS's in a binder in the office. The onsite SDSs are reviewed and updated annually or when a new chemical is brought on site, whichever is more frequent.

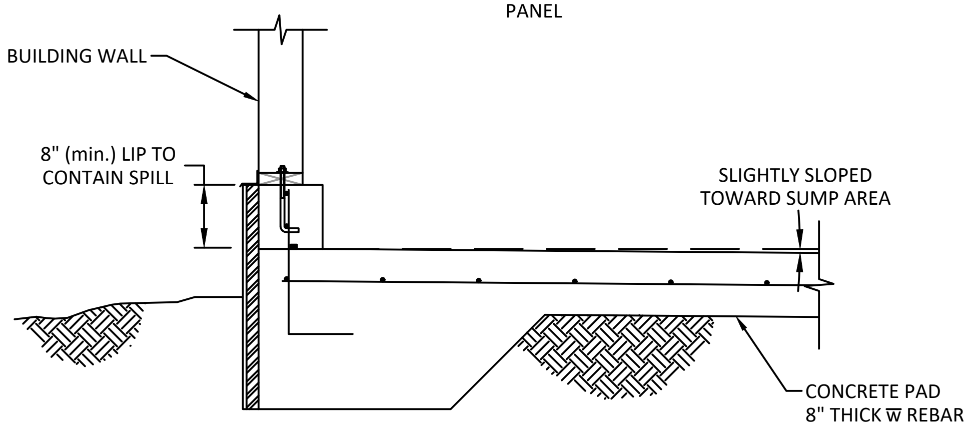
The plant floor was constructed with an 8-inch high berm to serve as secondary containment for all the structures on the building and can contain at least 110 % of the maximum storage capacity of all primary containers holding hazardous chemicals inside the building. The tanks are located within a lined, bermed excavation that serves as secondary containment, this berm can contain at least 110 % of the maximum storage capacity of the tanks with additional freeboard for precipitation. Figure 7-3 is the process flow diagram for the water treatment plant.



1 Treatment Building Layout

Scale: 1" = 10'

0 3.75 7.5 15 Feet



2 Floor Detail

Scale: 1" = 2'

0 0.75 1.5 3 Feet

Note: Scales accurate when printed on 11"x17" paper

Revision History

Rev.	Description	Date
B	Updated to current conditions	2021-12-03
A	Draft for review	2018-09-10

Engineer's Seal

DRAFT NOT FOR CONSTRUCTION

	Name	Date
Design	Ensero	2018
Drawn	K. Boldt	2018-09-10
Checked	--	--
Approved	--	--

Project/Drawing Information

Project Name	Schwartzwalder Mine Treatment System
Project Number	EUS21CO00084
Project Location	Golden, Colorado

Drawing Name

Figure 7-1
Water Treatment Plant Layout

Drawing Number

EUS21CO00084-1C102

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

Colorado Legacy Land

D:\Users\KBoldt\Projects\Schwartzwalder Mine\Production Drawings\CLL2018-1C102-ExistBuildingDetails.dwg (last edited by: KBoldt; 2021/12/03 - 11:30 AM

COLORADO LEGACY LAND SCHWARTZWALDER MINE

FIGURE 7-2

MESA WATER TREATMENT PLANT BUILDING LAYOUT

JULY 2022

COLORADO LEGACY LAND

- Wench and Cable Housing for Dewatering Pump
- Site Feature
- Pipeline
- Watercourse

1 inch = 58 feet

1:700 *when printed on 8x11 inch paper*

0 25 50 75

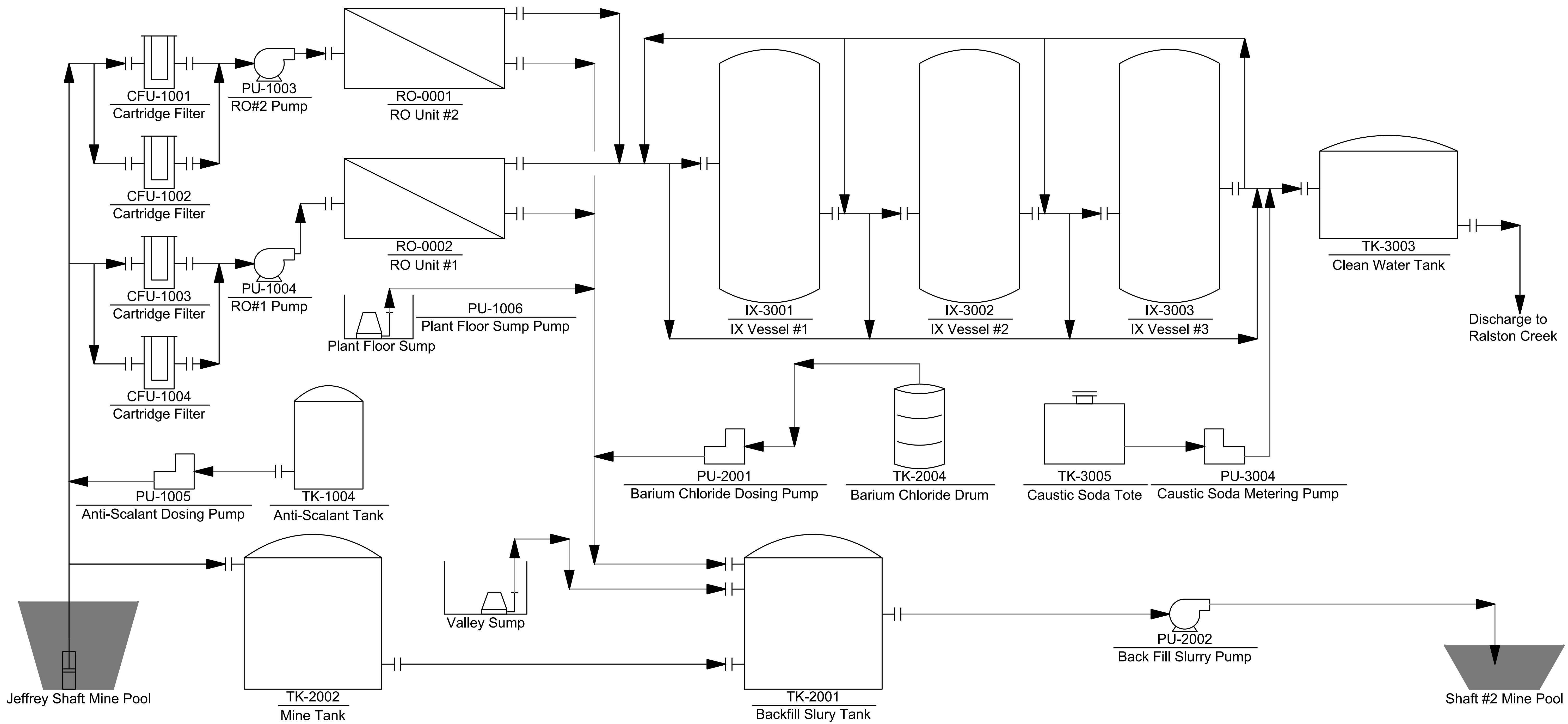
Feet

ENSERO solutions

Satelite imagery obtained from ArcGIS on services.arcgisonline.com on July 2022

Datum: NAD 1983 (CORS96) StatePlane Colorado Central FIPS 0502 (US Feet)

D:\Project\AllProjects\Schwartzwalder\Map\01-Overview\03-Overview\WTP_Layout_20211202.mxd



Revision History		
C	As Built	2021-12-07
B	As Built	2020-02-13
A	Issued for Review	2018-12-07
Rev.	**Description**	**Date**

Engineer's Seal

DRAFT
NOT FOR
CONSTRUCTION

	Name	Date
Design	Staff	2021-12-07
Drawn	N. Lambert	2021-12-07
Checked	E. Valencia	2021-12-07
Approved	K. W. Conroy	2021-12-07

Project/Drawing Information	
Project Name	Former Schwartzwalder Mine Water Treatment Plant
Project Number	EUS21CO00084
Project Location	Golden, Colorado

Drawing Name

Figure 7-3
Water Treatment Plant
Process Flow Diagram

Drawing Number

EUS21CO00084-001

ENSERO
solutions

131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

Colorado Legacy Land

C:\Users\NateLambert\Documents\Projects\Schwartzwalder_WTP\PID DWG\EUS21CO00084_P001.dwg (last edited by: NateLambert; 2021/12/07 - 12:22 PM

7.2 WASTE ROCK PILES

Two reclaimed waste rock piles are associated with the Mine both are designated Environmental Protection Facilities. The North and South Waste Rock Piles are located adjacent to Ralston Creek, upstream (west) of the Mine. Reclamation of the waste rock piles has been successfully completed, and no impacts to water quality in Ralston Creek are detectable from the waste rock piles. Reclamation included capping with 3 feet of rock cover, then topping with surface soils and revegetation using the approved seed mix (See Table E-1 of Exhibit E, Application Amendment 06).

Evaluations related to the closure of waste rock piles include stability, geochemical characterization of waste rock, and water quality in streams and groundwater adjacent to the piles. The stability of the piles was summarized in the Mine closure hydrology report (Whetstone Associates Inc., 2007). The geochemical characteristics of the waste rock piles are discussed in detail in Section 14(a). The water quality in Ralston Creek above, below, and adjacent to the piles is discussed in Section 11. The north and south waste rock piles are Environmental Protection Facilities.

The north and south waste rock piles are founded on rock within the Ralston Creek floodplain, which is competent and stable. Both waste rock piles are sloped to maintain geotechnical stability and have remained geotechnically stable since they were first constructed. Currently, these piles are covered with soil and an established vegetation cover. Occasional erosional rills form in the south pile, which have been repaired. Under Technical Revision 28, CLL installed a diversion channel on the North Waste Rock Rile to receive and divert flows around the waste rock pile and into Ralston Creek. As-builts for the channel were provided with Technical Revision-28 in November 2020.

7.2.1 MATERIALS TO BE RETAINED

CLL placed rock and soil from the alluvial area back in the mine (in the Glory Hole via the Minnesota Adit and in the Former Black Forest Mine).

7.2.2 CONTROL, PREVENTION, AND MITIGATION OF RELEASES

Both waste rock piles are inspected quarterly for stability and erosion. Erosion features, when identified, are documented and repaired. A vegetated cover is maintained on the piles.

7.2.3 WATER QUALITY MONITORING SYSTEMS

The water quality monitoring system for the waste rock piles includes surface water (SW) sample locations: SW-AWD, SW-A001, and, SW-NWRP and groundwater monitoring wells (MW): MW-0, MW-19, and MW-20. No surface water impacts, attributable to the waste rock piles have been observed.

7.3 ALLUVIUM AND FILL MATERIAL

Prior to the construction of Mine facilities, waste rock from the Mine was placed as fill material in the valley adjacent to Ralston Creek. Ralston Creek was diverted toward the north side of the canyon to make room for mine buildings and facilities. Although those facilities have been removed, the fill remains in place in the valley floor and has been reclaimed.

The composition of the fill is similar to the waste rock piles. During reclamation, additional fill was mined from the Black Forest Mine and used for cover and fill material in the valley. Rock from the Black Forest Mine is a hornblende gneiss unit, assumed to have the same chemical composition as other hornblende gneiss (LSHG) samples that have been analyzed from the site. Groundwater quality in the alluvium and fill is discussed in detail in Section 9(b)(ii). The fill material may be acting as a secondary source of uranium loading to Ralston Creek (Section 11(c)). RML Area 02 (Ore Sorter Decommissioning Area) is also located in the alluvial valley.

Starting in 2018, CLL began excavating these source area soils and disposing of them in the Glory Hole via the Minnesota Adit. This work was initially scoped and approved under Technical Revision-14. In the process of excavating the source area, CLL identified additional materials and submitted Application Amendment 05 in 2020 to incorporate the Former Black Forest Mine into the Schwartzwalder Mine Permit boundary and allow for disposal of alluvial soils in the Black Forest. Application Amendment 05 was approved in January 2021 (CLL, 2021). As of December 2021, CLL has excavated an estimated 55,000 cubic yards of materials. CLL expects to complete the exaction work in 2022, then regrade and reclaim the disturbed areas of the valley. Exhibit E of Application Amendment 06 provides additional information on the alluvial valley excavation project.

7.4 FLOODED UNDERGROUND WORKINGS

During mining operations, the underground workings were kept dry by pumping water from the lower levels of the mine. Water was collected in the 19 Level, pumped to the 7 level, and then pumped to the surface where it was sent through the water treatment plant before being discharged to Ralston Creek. Pumping rates from the underground mine were very low (140 to 310 gallons per minute) for a mine of this size and depth, indicating that the bedrock has very low permeability (Whetstone Associates Inc., 2007). Dewatering of the spiral decline ceased in September 1998, when the pumps at the 22 Level (approximately 2,200 feet below the Steve Level) were shut off and the lower workings of the mine were allowed to refill to the 19 Level. Mining operations continued until May 2000, when the pumps were shut off on the 19 and 7 Levels, and the mine was allowed to flood. Refilling rates are discussed in Section 8(b)(iii).4. The portals of the Steve and Pierce adits were bulkheaded in December 2007, followed by contact grouting in January 2008 (Mining & Environmental Services, 2008.). A 10-foot-thick, 10-foot-wide, and 10-foot-high concrete bulkhead was installed approximately 265-feet into the Steve Adit. A 12-foot-thick, 12-foot-wide, and 12-foot-high concrete bulkhead was installed approximately 304-feet into the Pierce Adit. Both bulkheads are designated Environmental Protection Facilities. This work was completed under Technical Revision-9. Table 7-2 below lists the mine void volumes by level.

Since CLL purchased the Site in March 2018, pumping of the mine pool has consistently maintained the mine pool elevation below the regulatory limit of 150 feet (ft) below the Steve Level (hereafter referred to as the “regulatory limit”) even during consecutive months of no pumping. The regulatory limit was established as the permit level in 2012 by the Mine Land Reclamation Board. This elevation is agreed to establish a hydraulic gradient away from Ralston Creek in the permit area. Maintaining the mine pool below the regulatory limit has led to (i) establishing a hydraulic gradient away from Ralston Creek in the permit area, and (ii) closing the mine has resulted in reducing the exposure of wall rock to oxygen, which minimizes uranium oxidation in the workings and translates to less mobile uranium to treat.

Water in the flooded underground workings is a strongly-buffered calcium-magnesium-sodium-sulfate water with near neutral pH (median value = 7.17), high concentrations of total dissolved solids (approximately 3,000 mg/L), and elevated concentrations of sulfate, antimony, arsenic, iron, manganese, molybdenum, thallium, uranium and radium 226. Water quality in the flooded mine is described in detail in Section 9(b)(iv) of this Environmental Protection Plan. However, because flow rates from the mine are extremely low, as described in detail in Section 8(b)(iii), total mass loading from the underground workings is small.

Table 7-2: Schwartzwalder Mine Void Volumes

Level	From (ft)	To (ft)	Volume (ft^3)	Cumulative Volume (ft^3)
Above Steve	6,602	6,949	2,568,698	21,861,745
200	6,479	6,601	609,236	19,293,047
300	6,352	6,478	669,047	18,683,811
400	6,245	6,351	498,698	18,014,764
500	6,118	6,244	756,206	17,516,066
600	5,993	6,117	985,274	16,759,860
700	5,861	5,992	2,360,088	15,774,586
800	5,764	5,860	256,162	13,414,498
900	5,660	5,763	2,284,199	13,158,336
1000	5,556	5,659	1,013,990	10,874,137
1100	5,453	5,555	784,829	9,860,147
1200	5,351	5,452	458,321	9,075,318
1300	5,246	5,350	621,218	8,616,997
1400	5,140	5,245	125,914	7,995,779
1500	5,033	5,139	1,273,234	7,869,865
1600	4,929	5,032	1,174,644	6,596,631
1700	4,823	4,928	1,061,254	5,421,987
1800	4,718	4,822	213,873	4,360,733
1900	4,598	4,717	3,438,490	4,146,860
2000	4,485	4,597	216,185	708,370
2100	4,380	4,484	492,185	492,185

Notes:

ft = feet/foot.

ft^3 = cubic feet/cubic foot

Issues related to the flooded mine workings include water chemistry in the mine, flow rates from the mine, potential interaction with water in Ralston Creek, and potential pathways in low-permeability bedrock including potential conduits or barriers to groundwater flow such as faults (including the East Rogers Fault, West Rogers Fault, and Illinois Fault) and lithologic units (including the garnet-biotite-hornblende gneiss, mica schist, and garnet-biotite gneiss and quartzite rock of the Schwartz Trend). These topics are discussed in Sections 8(e)(ii) and 14(b).

Rule 6.4.20(1) requires that the EPP describe how the Operator will protect all areas that have the potential to be affected by designated chemicals, toxic or acid-forming materials or acid mine drainage. Section 15 of the EPP describes the mitigation options proposed for the constituents of concern (uranium and molybdenum) in groundwater at the site.

8. GROUNDWATER INFORMATION

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]) with the exception of the hydraulic conceptual model, which is updated in Exhibit E of Application Amendment 06.

9. GROUNDWATER QUALITY

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

10. SURFACE WATER CONTROL & CONTAINMENT FACILITIES

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

11. SURFACE WATER QUALITY DATA

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

12. WATER QUALITY MONITORING PLAN

This section was updated in Exhibit E of the January 2021 Application Amendment 05 (CLL, 2021).

13. CLIMATE

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

14. GEOCHEMICAL DATA AND ANALYSIS

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

15. MITIGATION OPTIONS AND CONSTRUCTION SCHEDULE

Exhibit E of Application Amendment 06 describes CLL's long-term management strategy for the site. Since taking ownership of the site in 2018, CLL has operated the water treatment plant seasonally (6 months of the year or less) by maintaining the mine pool below the regulatory level of 150-feet below the Steve Adit. During the off-season operations CLL preforms in situ injections to passively treat constituents of concern (e.g. uranium) in the mine pool directly.

Since taking ownership of the site in 2018, CLL has made significant progress with the physical reclamation of the mine site:

- Demolition of Old Water Treatment Plant in the valley (2018).
- Relocate Water Treatment Plant to Mesa (2018).
- Install new intake pump for the water treatment plant in the Jeffery Air shaft (2018-2019).
- Construct north waste rock pile diversion channel (2019- 2020).
- Alluvial valley excavation to address source materials (2018 – present).
    - Excavation has removed alluvium around all sumps, except for Sump 1, eliminating their usefulness. Sumps were removed (2020-2021).
- Mine opening closure of Black Forest (2022).
    - All other mine openings are closed with a gate or bulkhead.

The remaining mine reclamation tasks (alluvial valley excavation, regrading, and reseeding / planting) are expected to be completed in 2022.

16. QUALITY ASSURANCE AND QUALITY CONTROL

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

17. PLANT GROWTH MEDIUM (SOILS)

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

18. WILDLIFE PROTECTION

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

19. TAILINGS AND SLUDGE DISPOSAL

This has not changed from Revision 1.0 of the Environmental Protection Plan (Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan [Whetstone Associates Inc., 2016]).

20. REFERENCES

Colorado Legacy Land, LLC. 2021. Application Amendment 05, Mine Permit M-1977-300, Schwartzwalder Mine, Golden, Colorado. January.

Mining & Environmental Services, 2008. Steve Level Adit Bulkheads, As-Built Documentation Package, prepared for Cotter Corporation, March.

Whetstone Associates Inc. 2007. Schwartzwalder Mine Hydrologic Evaluation of Mine Closure and Reclamation. November.

Whetstone Associates Inc. 2016. Technical Revision 23, Attachment B Schwartzwalder Mine Environmental Protection Plan. September.

RULE 6.5. GEOTECHNICAL STABILITY EXHIBIT

This exhibit has not changed from 2012 Mine Plan Amendment 3.

(This page intentionally left blank.)

RULE 8. EMERGENCY RESPONSE PLAN

Rule 8 requires CLL to notify DRMS, as soon as reasonably practicable, but no later than 24 hours, after CLL has knowledge of a failure or imminent failure of

- the waste rock piles,
- the water treatment plant (including the pump/treat regime that keeps the mine pool level below the regulatory limit or a loss of containment situation), or

the bulkheads installed inside the Steve and Pierce adits. If a failure or imminent failure situation arises, onsite personnel should contact the Project Manager, Elizabeth Busby, Ensero Solutions US Inc., Project Manager, 970-632-2240, as soon as it is safe to do so.

The Ensero Project Manager is responsible for notifying DRMS within 24-hours.

EMERGENCY RESPONSE PLAN SCOPE AND OBJECTIVES

The primary objectives of the emergency response plan at the Site are:

- Detail the procedures for use during any response to an emergency situation at the Site surface facilities. An emergency situation can include but is not limited to: Spills of hazardous materials, fires, accidents involving personnel and/or material transport, or any combination of the above. The emergency response procedures in text form are detailed in the following sections. A copy of the initial Site emergency response procedures is included in the Initial Response Guide. These procedures are not to be used for responding to alarms associated with routine operational problems that occur within the Site systems. Examples of routine problems include, but are not limited to, equipment breakdowns and water treatment system process alarms.
- List available equipment for response operations.
- Detail the training program for personnel who may be involved in an emergency situation at the Schwartzwalder Mine.

SURFACE FACILITY EMERGENCY RESPONSE PROCEDURES

These procedures have been developed for use by Colorado Legacy Land (CLL) personnel during any response to an emergency situation at the Site surface facilities. An emergency situation can include, but is not limited to, spills of hazardous materials (HazMat), fires, accidents involving personnel and/or material transport, or any combination of the above. Note that all CLL personnel located on the surface during an emergency situation are required to respond to the emergency. These procedures are not to be used for responding to alarms associated with routine operational problems that occur within the Site process and monitoring systems, unless those problems could result in an emergency situation. Examples of routine operational problems include routine process alarms at the water treatment facilities. Any emergency situation will be successfully resolved by a phased response consisting of notification, operations, and remediation. These three phases will be implemented in concert or sequentially depending upon the specific situation and available personnel.

- Phase One: Notification
- Phase Two: Operations
- Phase Three: Remediation

Phase One: Notification

The first person to arrive at the location of an emergency situation becomes the First Responder to the incident and assumes responsibility for the subsequent emergency response until they are relieved by an Incident Coordinator, or voluntarily relinquish their authority to a more qualified person. The First Responder can be any CLL employee or a contractor's employee (e.g., truck driver).

The primary responsibility of the First Responder in an emergency situation is the prompt notification of other Site personnel. The First Responder shall immediately relay an incident evaluation to at least one other person prior to initiating the operations phase during an emergency response. The incident evaluation must include the following information, at a minimum.

a) The location of the incident.
b) The nature of the incident.
c) The extent of injury, if applicable.
d) The type of material spilled, if known.
e) The physical extent of the spill area.
f) The First Responder=s intended course of action.
g) Available communication devices, if communication must be maintained.

Internal Notification

The first person contacted by a First Responder notes the information provided in the incident evaluation and is then responsible for notifying the Environmental Coordinator/ Radiation Safety Officer (EC/RSO). Notification procedures for work hours and off shift are detailed below.

Work Hours

During normal work hours internal notification by the First Responder shall be made verbally, or by utilizing the telephone in the job trailer. The first person contacted by the First Responder shall notify the EC/RSO and then notify all other personnel on the surface that an emergency situation exists.

Off Work Hours

Off-hours notification of response personnel is initiated by the First Responder, who notifies the Emergency Coordinator and any other available response personnel. Currently, the Site Environmental Coordinator/RSO carries a pager and is on call for responding to abnormal system conditions, A current list of on-call personnel is provided in the Access Numbers for Surface Facility Emergency Response List .

Incident Command

The first Incident Coordinator contacted shall assume the responsibility of Incident Command until officially relieved by someone of higher authority. The Incident Commander shall ensure that the Emergency Alarm Horn is sounded to alert all Site surface personnel that an emergency situation exists. The Incident Commander shall then proceed to the designated response assembly point to coordinate field operations.

Note: Once a response operation is underway, a change in Incident Command should only occur if the change would significantly improve the response to the emergency situation. Incident Coordinators must evaluate the situation on an ongoing basis to determine the best course of action to take during a response.

Emergency Coordinator

In coordination with the Radiation Safety Officer, the First Responder should act as the Emergency Coordinator during an emergency situation at the Schwartzwalder Mine surface facilities.

1. The Emergency Coordinator will perform the following duties:
2. Maintain contact with and coordinate Site operations and personnel with the incident response operation.
3. Evaluate the incident on an ongoing basis and coordinate the Site incident response operation with Corporate Management and any outside emergency response organizations, such as medical and fire services, responding to the Site.
4. Designate a suitable alternate during their absence.

Notification and Coordination with External Entities

Notification and coordination with external emergency response organizations, potentially affected off-site entities, and regulator/ agencies may be necessary during an emergency situation at the Schwartzwalder Mine.

External Emergency Response Organizations

The Emergency Coordinator will evaluate the need for assistance from external emergency response organizations, such as medical and fire services, at the earliest possible moment during an incident response. Notification of external response organizations must be done promptly, when necessary.

The current external medical and fire service organizations available for assistance during an emergency situation at the Schwartzwalder Mine are listed in the section below title, Access Numbers for Surface Facility Emergency Response List.Off-site Entities and Regulatory Agencies

The Emergency Coordinator will evaluate the emergency situation on an ongoing basis to determine whether the notification of off-site entities or regulatory agencies is necessary.

The Emergency Coordinator will be responsible for the notification of off-site entities or regulatory agencies, when necessary.

A list of off-site entities and regulatory agencies that may require notification during an emergency situation at the Schwartzwalder Mine is included below. Those agencies that must be notified within 24-Hours of the occurrence are noted as such.

For Reportable Quantity (RQ) spills:

- The State of Colorado Emergency Management Unit (24-our)
- The USEPA National Response Center (24-hour)
- The CDPHE Hazardous Materials and Waste Management Division Radiation Management Unit

For RQ spills involving Ralston Creek:

- The State of Colorado Emergency Management Unit (24-hour)
- The CDPHE Water Quality Control Division
- The Denver Water Board
- The North Table Mountain Water & Sanitation District

For a radioactive material spill outside of the restricted area:

- The State of Colorado Emergency Management Unit (24-hour)
- The CDPHE Hazardous Materials and Waste Management Division Radiation Management Unit (should notify within 24-Hour)

For any fire at the surface facilities:

- The Federal Mine Safety & Health Administration. (Within 2 Hours)

For any fire in the radioactive materials licensed facilities:

- The CDPHE Hazardous Materials and Waste Management Division

Radiation Management Unit

  - Note: The North Table Mountain Water and Sanitation District and the Denver Water Board must be notified immediately if any spill in Ralston Creek is a potential health risk.

Phase Two: Operations

The limiting factors of terrain and distance dictate that many emergency situations that occur at the surface facilities of the Schwartzwalder Mine will have to be successfully resolved or controlled by on-site personnel before external agencies or organizations will be able to mobilize and arrive on-site.

On-site personnel involved in responding to an emergency scene must carefully evaluate the situation prior to committing themselves and others to action. The severity of any injury, the quantity and concentration of any hazardous material released, the presence or absence of fire and/or energized electrical circuits, and the location of the incident are some of the primary factors used in determining an operations strategy both before and during an incident response. Responders should always perform a thorough initial and ongoing incident evaluation that accounts for these factors and adjust their actions accordingly. A thorough incident evaluation should include the following aspects:

1. The presence of physical and electrical hazards, or hazardous materials.
2. The physical layout of the incident area.
3. The extent of injury, if applicable.
4. The type and quantity of materials spilled, if any.
5. Any actions already taken.
6. The number and skills of available personnel.
7. The type and quantity of available equipment and supplies.
8. The type and availability of both internal and external support.
9. Alternate courses of action.

Response operations will usually occur in two distinct, but often overlapping, stages once the incident evaluation and subsequent notification is complete. The first stage consists of those actions taken by the First Responder immediately after the notification phase. The second stage of operations consists of coordinated site-wide actions taken to successfully resolve a situation by multiple response personnel or external support services. Actions taken by the First Responder may, or may not, successfully resolve the emergency at the Stage 1 level of operations. If the First Responder can successfully resolve the situation, then the second stage of operations will terminate with the mobilization of Site personnel during the notification phase. If the First Responder cannot successfully resolve the situation, or if the situation is beyond the First Respondents capabilities to resolve, then the second stage of response operations will continue through field response actions until a successful resolution of the emergency situation has occurred.

General guidelines for First Responder and multiple responder operations are provided below. Operational guidelines for specific types of incidents are attached as appendices to this section with HazMat response guidelines organized according to the respective USDOT hazard class of the material. The hazardous materials in use and stored on-site are listed in the Safety Data Sheets (SDSs) which are kept onsite in a binder the office trailer.

Responders should always attempt to de-energize electrical equipment and eliminate ongoing leak or spill sources (re. closing valves, etc.), both prior to and during operations, if the responder(s) will not be exposed to an unwarranted level of risk while doing so.

The prompt containment of spilled materials, or the containment of fires to a limited area, is a primary goal of any field response action during these types of emergency situations. Limiting the area impacted by a spill or a fire will significantly reduce the level of cleanup required after the response is over.

The use of proper personal protection equipment (PPE) is mandatory during response operations. The type of PPE used will depend on the type of HazMat involved and the potential for contact with a hazardous material.Stage 1 Operations- First Responder

The first person to arrive at the location of an emergency situation becomes the First Responder to the incident and assumes responsibility for the subsequent emergency response until they are relieved by a more qualified person. The First Responder can be any CLL employee or a contractor's employee (eg. truck driver).

Stage 1 response operations are coordinated individual operations undertaken by a single person upon encountering an emergency situation. The First Responder will proceed through the two distinct activity phases of Notification and Field Response Action when responding to an emergency situation.

Stage 1 Notification

The primary responsibility of the First Responder in an emergency situation is the prompt notification of other Site personnel. The First Responder shall immediately relay an incident evaluation to one additional person prior to taking any other action during an emergency response.

Stage 1 Field Action

After notification the First Responder will proceed to the Field Action Phase of response. The type of action taken by the First Responder during an emergency situation will depend on an ongoing evaluation of the incident and the First Responder's capability to respond.

First Responders should always make an initial response to incidents that are within the capabilities of a single person to correct, or control, until help arrives. Generally, a single person can successfully correct or control small fires, HazMat spills, and minor accidents that do not represent an unwarranted health hazard to a single responder. The First Responder must always be prepared to retreat and monitor the situation from a safe distance until help arrives if the initial incident evaluation, or the responders ongoing evaluation, indicate that an unwarranted hazard exists or may develop.

Stage 2 Operations – Multiple Responder

Stage 2 response operations are coordinated site-wide operations involving multiple personnel. Stage 2 response operations are initiated during the notification phase of any emergency response and proceed through the three distinct Stage 2 activity phases of Alert, Mobilization, and Field Actions.

Stage 2 Alert

Using radio communication to alert onsite workers to an emergency constitutes the Alert phase of a Stage 2 response operation and signals the beginning of a Stage 2 site response. All CLL and non-CLL personnel on the surface are to immediately proceed to a designated assembly point when the Emergency Alarm Horn (Fire Alarm) is sounded.

Stage 2 Mobilization

All emergency responses to an emergency situation at the Schwartzwalder Mine will progress through Stage 2 Mobilization. Mobilization for Stage 2 response operations consists of the assembly and organization of Site surface personnel for coordinated response operations. Stage 2 response activities will terminate at the end of mobilization if the emergency situation is successfully resolved at the First Responder level. The Site will demobilize and the Remediation Phase of the Emergency Response Plan will be executed if the situation is resolved at the First Responder level.

Mobilization: Assembly

All surface personnel are required to report to a designated assembly point when the alert signal is sounded. The primary assembly point for CLL personnel during a surface emergency situation is the Fire Alarm Control Panel located at the northeast corner of the Maintenance Building. The primary assembly point for non-CLL personnel is the Main Office Trailer. The Main Office Trailer is the alternative assembly area if the primary assembly points are inaccessible.

Mobilization: Basic PPE Requirements

All personnel reporting for Stage 2 response operations will first don hard hats, safety glasses, and steel-toed safety shoes. This is the minimum personnel protective equipment (PPE) required during response operations. CLL personnel who are not wearing the minimum PPE listed above will be restricted to support functions only during Stage 2 operations.

Mobilization: Specific Personnel Duties

The Radiation Safety Officer will:

- Provide an initial situation report to all response personnel at the primary assembly point.
- Review the incident evaluation, determine a preliminary course of action, and delegate specific duties to response personnel.
- Establish an incident command post at a secure location near the incident location.
- Establish a Site command post with secure communication links to off-site entities at a location unaffected by the incident. A mobile telephone and two hand-held radios are available to augment the telephone and mine-page phone communication systems.
- Ensure that communications with the incident command post and off-site entities are functional.
- Organize response personnel for deployment based upon the initial situation report and the projected course of action. Response organization will include the delineation of responsibilities or duties; the provision of proper PPE, including SCBA; the collection of specialized equipment; and the establishment of a support base, including communications
- Establish a preliminary field response plan based upon the initial situation report and the projected course of action.

Stage 2 Field Action

A Stage 2 Field Action is a coordinated field response to an emergency situation by multiple personnel. A Stage 2 Field Action occurs when an emergency situation cannot be successfully resolved at the First Responder level. Stage 2 field actions consist of operations undertaken in the field by multiple personnel that are designed and implemented in order to control or abate an emergency situation. A coordinated Stage 2 field response operation will continue until the situation has been successfully resolved.

Field Action: Operations

General guidelines for responding to incidents that involve specific hazardous materials classes or accident scenarios are provided under the Initial Response Guide to this procedure. The specific course of action taken during a Stage 2 Field Response Action will be determined by the ongoing incident evaluation. Rescue is the primary duty of any field response.

Field Action: Specific Personnel Duties

The Radiation Safety Officer (RSO), or RSO Designated Representative when the RSO is not present, shall:

- Act first and foremost to prevent unwarranted occupational and environmental exposures from occurring during emergency incidents involving radioactive materials.
- Monitor response activities and suspend any response activity that creates, or may create, an unwarranted exposure risk.
- Oversee and coordinate all field response actions until the emergency situation is successfully resolved.
- Perform an ongoing incident evaluation and determine an appropriate course of action for the response activity, in coordination with other relevant personnel.
- Coordinate incident response activities with external emergency responders when they are deployed in the field.
- Ensure that communications with the incident command post and off-site entities are maintained.
- Ensure that the incident response action is provided with resources that are adequate to sustain the response activity.
- Coordinate on-site response actions with off-site response activities.
- Ensure that Site response personnel are in a condition suitable for field operations, including the provision of proper PPE, sufficient quality and quantities of equipment, and adequate numbers of personnel for both operations and back-up.

Phase Three: Remediation

A successful resolution to the operations phase of an emergency situation at the surface facilities of the Schwartzwalder Mine will be followed by remediation actions designed to both mitigate the adverse effects of the emergency and reduce the potential for a recurrence of a similar situation. Remediation actions consist of clean-up activities at fire and spill locations, and formal and informal reviews of the emergency and the emergency response plan implementation.

Clean Up

General guidelines for clean-up activities at spill and fire locations are listed below. Specific clean-up guidelines for each material or incident type are included with the field response operational guidelines detailed in the Initial Response Guide.

Clean-Up: General

An evaluation for cleanup requirements at any fire or spill site will be performed by the Environmental Coordinator immediately upon the successful conclusion of field response operations. This evaluation will include the following considerations, at a minimum.

1) Type of material spilled.
2) Type of material(s) or structures affected by the incident.
3) Affected area (physical extent of contamination).
4) Physical configuration of the spill or fire area.
5) Personnel requirements and availability.
6) Equipment requirements and availability.
7) Disposal requirements.

Note: Radioactive materials will be promptly retrieved from unrestricted areas as soon as field response operations are terminated. The Environmental Coordinator will be responsible for coordinating cleanup activities in accordance with the post-field operations evaluation.

Review

The final stage in any emergency response activity is a complete review of the circumstances leading to the emergency, all response actions taken during the emergency, and post-response remediation activities.

The Environmental Coordinator will coordinate the requisite review and issue a report to corporate management summarizing the findings, including any necessary corrective actions. The Site Environmental Coordinator shall be responsible for preparing any requisite reports to the Federal Mine Safety and Health Administration. The Environmental Coordinator will prepare any necessary five or thirty day post-incident reviews for all relevant government agencies.

EMERGENCY RESPONSE EQUIPMENT

This list contains the equipment on site that may be used in responding to an emergency situation at the surface facilities of the Schwartzwalder Mine.

Emergency Response Equipment	Location
Chemical Handling Equipment	
Respirators {Half & Full-face)	Office Trailer Lockers
Rubber Gloves	Water Treatment Plant, Office Trailer and Work Truck
Eye Wash	Water Treatment Plant

Emergency Response Equipment	Location
Fire-fighting Equipment	
Fire Extinguishers	All Buildings, All Stationary and Work Truck
Earthmoving Equipment	
Ford 3550 Backhoe	Water Treatment Plant Mesa Area/Valley
Hand Tools	Water Treatment Plant
Other Equipment	
Link Belt YC-28 Crane (f 2'/2Ton)	Water Treatment Plant
Hyster P80-A Fork Lift (7300 lb)	Water Treatment Plant

EMERGENCY RESPONSE TRAINING

Response personnel have the following training:

- Forty (40) hour OSHA HAZWOPER with eight (8) hour annual refresher training
- Annual Radiation Safety Officer and radioactive materials user training for relevant personnel.
- Safety meetings as appropriate with discussion of work activities, hazardous material handling and safety.

EMERGENCY RESPONSE PLAN ~ INITIAL RESPONSE GUIDE

The initial Emergency Response Plan for the surface facilities at the Schwartzwalder Mine consists of two phases:

- Phase One: Notification
- Phase Two: Operations

Your primary responsibility as a First Responder in an emergency situation is the prompt notification of the Site Emergency Coordinator or 911, if the Emergency Coordinator cannot be contacted.

Phase One: Notification

- First Responder reports the following information to one other person immediately prior to starting any direct operations for an accident, spill, or fire,
  - The location of the incident.
  - The nature of the incident.
  - The extent of injury, if applicable.
  - The type of material spilled, if known,
  - The physical extent of the spill area.
  - The First Responder=s intended course of action.
  - Method of maintaining communication.

- The first person contacted by the First Responder notifies the Emergency Coordinator. The

Emergency Coordinator for the Schwartzwalder Mine is:

- Randy Whicker, Radiation Safety Officer Cell Phone: (970) 556-1174

Following initial notification Site personnel are mobilized for operations.

Phase Two: Operations

- The Emergency Coordinator becomes the Incident Commander and activates the Site Emergency Alarm Horn to mobilize the Site personnel.
- All surface personnel assemble at their designated assembly point.
- Onsite Personnel:
  - Primary Assembly Point: Water Treatment Plant
  - Back-up Assembly Points: Main Office Trailer
- Contractor and Visitor Personnel:
  - Assembly Point: Main Office Trailer

- The Incident Commander
  - Briefs the assembled response personnel.
  - Establishes a Site command post and communications links on-site and off-site (911, Corporate notification).
  - Reviews the situation and develops a plan of action for response operations.
  - Delegates support functions to other response personnel.

The Response Operations Plan is implemented.

Guidelines for Surface Emergency Response Operations

After notification the Responder will proceed to the Operations Phase of response. The type of action taken in the operations phase will depend on the incident and the Responder's capability. All other Site personnel have response training and should immediately begin Stage 2 operations when notification is complete. The quantity and concentration of hazardous material released, and the presence or absence of fire will be the primary factor in determining operations strategy. Proper personal protection equipment (PPE) is mandatory during response operations. Choice of PPE will depend on the type of material involved and the potential for contact with the material. A listing of available response equipment and its location is listed in the following section.

General operational strategies and PPE requirements are listed below for potential HazMat incidents involving Flammable materials. Every effort should be made, that does not involve an unwarranted risk to responders, to eliminate ongoing leak or spill sources (re. closing valves, etc.) prior to beginning operations.

Flammables

This category includes both flammable materials and some of the more volatile combustible materials such as diesel fuel. Flammable/Combustible materials stored onsite include small quantities contained in small appropriate containers as needed to fuel and maintain onsite equipment for immediate work activities only (no long-term storage of flammables is allowed):

- Gasoline (Site equipment, temporary containers)
- Various Lubricants (Site equipment, temporary containers)
- Diesel (Site equipment, temporary containers)

Spill - No Fire

PPE:

- Work clothes; rubber gloves; and rubber boots (chemical cartridge air-purifying respirator if available).

Response:

- Evaluate situation.
- Secure area.
- Rescue & First Aid, if necessary & possible.
- Remove ignition sources
- Locate fire extinguisher and keep near at hand,
- Dam or dike to contain material.
- Watch for flammable or explosive vapors.
- Coat surface of spilled liquid with dry chemical extinguishing agent, if enough is available. Save enough extinguishing agent for fire fighting.
- Do not add water.

Remediation:

- Evaluate situation.
- Do not add water.
- Pick up liquids if proper equipment is available, or absorb spilled materials with compatible material if liquid retrieval is not possible.
- Transport contaminated soil to the west waste Dump storage area for temporary storage until a permanent disposal site is determined.

Spill - Fire

PPE:

- Work clothes; self-contained breathing apparatus (alternatively, no respirator or full-face respirator for small fires that can be quickly knocked down); eye protection; gloves; and boots (rubber is best).

Response:

- Evaluate situation.
- Secure area.
- De-energize electrical equipment.
- Rescue & First Aid, if necessary & possible.
- For small fire use available dry-chemical and Halon fire extinguishers to knock down the fire as quickly as possible. Avoid water for small fires, if possible.
- Keep area well ventilated.
- For a large fire, protect adjacent structures, use water from a safe distance.
- Remember water can be used as a barrier.
- Direct extinguishing agent in a manner to avoid splashing spilled material.
- Dam and dike at a safe distance to control runoff.
- Contain collected runoff locally, when possible.
- Perform overhaul.

Remediation:

- Evaluate situation.
- Certify fire as extinguished.
- Absorb spilled materials, if possible, with earth or other suitable material.
- Transport contaminated soil to the West Waste Dump storage area for temporary storage until a permanent disposal site is determined

Radioactive Materials

This category includes all radioactive materials stored on-site. The radioactive materials stored at the Schwartzwalder Mine are low-toxicity alpha emitters. The responder must be aware that the radioactive materials may be contained within another hazardous material, such as sulfuric acid. The response should first address the material that is the more immediate health hazard.

Radioactive Materials stored on-site include:

- Large Quantities – (Storage Tanks, Emergency Pond, Building Sumps)
- Water Treatment Residues - (Surface Sumps)
- Water Treatment Plant - (Ion-Exchange Vessels, RO Membranes, and Filters)

Small Quantities:

- Radioactive Sources (Office Trailer)

Spill - No Fire

PPE:

- Protective clothing & respiratory protection appropriate to the most immediate health hazard; eye- protection; rubber gloves and boots.Note: Focus response on the most hazardous situation and material first.

Radioactive Materials Response:

- Evaluate situation.
- Secure area.
- Dam or dike to contain material.
- Do not add water.

Radioactive Materials Remediation:

- Evaluate situation.
- Do not add water.
- Pick up liquids if proper equipment is available, or absorb spilled materials with compatible material if liquid retrieval is not possible.
- Transport contaminated soil to the West Waste Dump storage area for temporary storage until a permanent disposal site is determined.

Spill - Fire

PPE:

- Protective clothing appropriate to the most immediate health hazard; self-contained breathing apparatus (alternately air-purifying respirator with at least HEPA cartridges for very small fires that can be quickly knocked down); eye-protection; rubber gloves and boots.
    - Note: Focus response on the most hazardous situation and material first.

Radioactive Materials Response:

- Evaluate situation.
- Secure area.
- Respond to fire and most immediately hazardous material present (see other *Guidelines).*
- Direct extinguishing agent in a manner to avoid splashing spilled material.
- Keep area well ventilated. Watch for airborne radioactive materials in smoke.
- Contain materials and runoff. Dam and dike at a safe distance to control runoff.
- Route collected runoff to the Emergency Storage Pond, if possible.
- Perform overhaul.

Radioactive Materials Remediation:

- Evaluate situation.
- Certify fire as extinguished.
- Absorb spilled materials, if possible, with earth or other suitable material.
- Transport contaminated soil to approved onsite storage location.

Main Access Road and Location Transport Responses

This category includes response operations to hazardous material transportation incidents on the Main Access Road (Glencoe Valley Road) and during transport on-site. In the event that Glencoe Valley Road is not accessible, there is another access point through White Ranch Open space. Materials transported at these locations include:

- Radioactive
- Flammable
- Combustible
    - Note that any radioactive materials transported are expected to be relatively low-activity alpha and gamma emitters.

The responder must be aware that the hazardous materials transported may fall under several different hazard classes with different reactions to extinguishing agents for fires or absorbent materials. The transporting vehicle may also constitute an additional hazard for responders. The response should first address the material that is the greatest immediate health hazard. Transported Materials May Include:

Radioactive

- Contaminated soil
- Loaded water treatment resin
- Small environmental samples

Flammable:

- Gasoline

Combustible

- Diesel fuel
- Oil/Lubricants

Spill - No Fire

PPE:

- Protective clothing & respiratory protection appropriate to the most immediate health hazard; eye-protection; rubber gloves and boots.
    - Note: Focus response on the most hazardous situation and material first. Radioactive material responses must be coordinated by authorized personnel only.

Response:

- Evaluate situation.
- Secure area.
- Rescue & First Aid, if necessary & possible.

- Remove ignition sources.
- Locate fire extinguisher and keep near at hand.
- Dam or dike to contain material. Prevent material from entering Ralston Creek.
- Watch for flammable or explosive vapors.

Remediation:
- Evaluate situation.
- Do not add water.
- Pick up liquids if proper equipment is available, or absorb spilled materials with compatible material if liquid retrieval is not possible.
- Recover as much material as is possible from Ralston Creek, if material was spilled into the creek.
- Transport contaminated soil to the storage area across the creek from the water treatment building for temporary (lined) storage until a permanent disposal site is determined.

Spill - Fire

PPE:

- Protective clothing appropriate to the most immediate health hazard; self-contained breathing apparatus (alternately air-purifying respirator with at least HEPA cartridges for very small fires that can be quickly knocked down); eye-protection; rubber gloves and boots.
    - Note: Focus response on the most hazardous situation and material first. Radioactive material responses must be coordinated by authorized personnel only. Generally, fire responses will involve monitoring the fire from a safe distance.

Response:
- Evaluate situation.
- Secure area.
- Rescue & First Aid, if necessary & possible.
- For small fire use available dry-chemical and Halon fire extinguishers to knock down the fire as quickly as possible. Avoid water for small fires, if possible.
- Remember water can be used as a barrier.
- Direct extinguishing agent in a manner to avoid splashing spilled material.
- Dam and dike at a safe distance to control runoff. Prevent material from entering Ralston Creek.
- Perform overhaul.

Remediation:
- Evaluate situation.
- Certify fire as extinguished.
- Absorb spilled materials, if possible, with earth or other suitable material.
- Transport contaminated soil to the storage area across the creek from the water treatment building for temporary (lined) storage until a permanent disposal site is determined.

ACCESS NUMBERS FOR SURFACE ACTIVITY EMERGENCY RESPONSE

Off-site Emergency Services Available to the Schwartzwalder Mine include:

Service	Organization	Phone
Fire and Rescue	Jefferson County Sheriff's Department	911 or 303-277-0211
	Coal Creek Canyon Fire Department	911 or 303-642-3121
Ambulance Services	Coal Creek Canyon Fire Department	911 or 303-642-3121
	Flight for Life Helicopter Landing Zone at Schwartzwalder: 39 50' 49"N 105 16'56"W	911 or 800-332-3123
Injuries (no ambulance required)	UCHealth Emergency Room 15240 W 64th Ave Arvada, CO 80007 Hours: Monday to Friday, 8am to 8pm Saturday and Sunday, 8 am to 6pm	303- 467-7185

Incident Coordinators for Surface Emergency Response

The following personnel are authorized to act as coordinators for emergency situations that occur at the surface facilities of the Schwartzwalder Mine. An emergency incident is defined as a spill of hazardous materials, a fire, an accident involving surface personnel. These personnel must be contacted during any emergency situation at the surface facilities of the Schwartzwalder Mine.

Name and Title	Telephone
Emergency Coordinator – Hazardous Materials, Fire, Radiation Protection	
Randy Whicker, Radiation Safety Officer Note: The RSO is authorized by the CDPHE to supervise the use of radioactive materials and must be notified.	970-556-1174 (cell) 505-298-4224 (office)
Corporate Management	
Jim Harrington, Colorado Legacy Land, Site Owner and Managing Partner	303-808-9101 (cell) 970-632-2239 (office)
Billy Ray, Sr Operations Manager	832-506-4433 (cell) 303-862-3928 (office)
Holli Merchant, Corporate Health and Safety Officer	303-668-0589 (cell) 303-986-1067 (office
State Agency Emergency Contacts	
Randy Whicker, Radiation Safety Officer, to notify CDPHE, Emergency Management Unit	Telephone: 1-877-756-4455 Telefax (303) 692-3683

ADDENDUM 1. NOTICE REQUIREMENTS [RULE 1.6.2(1)(B)]

NOTICE

This site is the location of a proposed mining operation. Colorado Legacy Land LLC, whose address and phone number is 12150 E. Briarwood Ave., Suite 135 Centennial, CO 80112, ph (303) 862-3938 has applied for an Amendment to their Reclamation Permit with the Colorado Mined Land Reclamation Board. Anyone wishing to comment on the application may view the application at the Jefferson County Clerk and Recorder's Office, 100 Jefferson County Parkway, Suite 2560 Golden, Colorado 80418, and should send comments prior to the end of the public comment period to the Division of Reclamation, Mining and Safety, 1313 Sherman St, Room 215, Denver, Colorado 80203.

CERTIFICATION

I Elizabeth Busby, hereby certify that I posed a sign containing the above notice for the proposed permit area known as the Schwartzwalder Mine. on June 22, 2021.

Signature: [signature]

Date: June 22, 2021

(This page intentionally left blank.)

APPENDIX 1. CONCEPTUAL SITE MODEL

(This page intentionally left blank.)

CONCEPTUAL SITE MODEL

SCHWARTZWALDER MINE SITE
MAY 2022

ENSERO solutions

WHAT IS A CONCEPTUAL SITE MODEL?
SCHWARTZWALDER MINE SITE

- Conceptual Site Model (CSM) is the current Site narrative that explains:
  - Where does contamination exist and why?
  - How does contamination move and/or change in the environment?
  - What risks do the various forms of contamination pose?
- What does a good CSM do?
  - Unifies all of the available data and information into a single narrative that makes sense and can be used to support a consensus path forward.
  - Points to gaps or weaknesses in understanding, helps to determine their significance.

- A CSM is:
  - The best available explanation of site conditions that considers all available information and data.
  - A living narrative that is updated as new data and information become available.
- A CSM is not:
  - Perfect– rather it is an informed interpretation that temporarily bridges data and information gaps. It identifies if there are key that affect making good site remedial decisions.
  - A comprehensive model – models may prove to be valuable pieces of a CSM but this site is too complex for any a single numerical model.

<u>Guidance documents used to develop this CSM:</u>

ASTM Standard E1689, 1995 (2014), "Standard Guide for Developing Conceptual Site Models for Contaminated Sites," ASTM International, West Conshohocken, PA, 2014, DOI: 10.1520/E1689-95R14 , www.astm.org.;

United States Environmental Protection Agency, 2011. "Effective Use of the Project Life Cycle Conceptual Site Model," Office of Solid Waste and Emergency Response. EPA 542-F-11-011, July.

WHAT IS A CONCEPTUAL SITE MODEL?
SCHWARTZWALDER MINE

- All CSMs have data gaps.
  - Data Gaps: information, details, data, facts, results, regulation, firsthand knowledge, interviews, etc.
- What is a data gap?
  - Something we don't fully understand that may be relevant to site remedial decision-making.
- Not all data gaps are created equal.
- When is a data gap important?
  - When it prevents us from making good decisions about the site.

ENSERO solutions

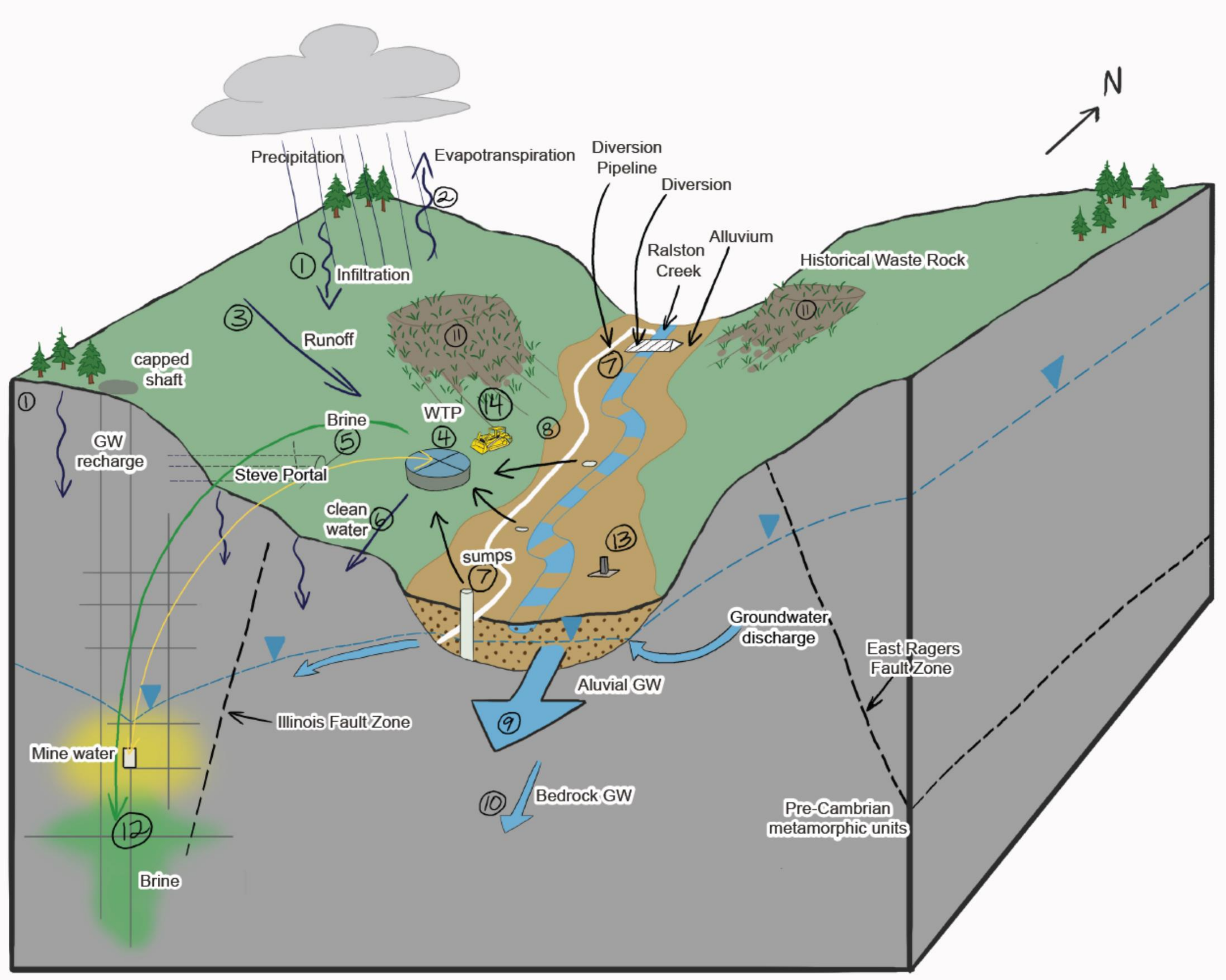
CONCEPTUAL SITE MODEL: KEY UPDATES
SCHWARTZWALDER MINE SITE

- CSM: updated from 2018 Hydrogeologica version.
- New analytical data added from 2018 through 2021.
  - Recent surface water sampling.
  - Recent groundwater sampling.
  - Mine pool data.
  - In-situ injection data: 2020 & 2021
- Mine Reclamation
  - Water Treatment: Relocation of water treatment plant, new intake pump, updated operational strategy (4-6 month pump & treat, 6-8 months monitor mine pool's recovery).
  - North Waste Rock Pile Diversion Channel was constructed in 2020.
  - Alluvial valley reclamation progress updates.
  - Reclamation timeline added to slides (year and technical revision number).

Fall 2020: Water Treatment Plant

CONCEPTUAL SITE MODEL OBJECTIVES
SCHWARTZWALDER MINE SITE

- Overview of site history and mining operations that contributed to current setting.
- Define and describe the key hydrologic and geochemical mechanisms that are expected to influence/control the flow and chemistry of water in and around the Schwartzwalder Mine.
- Illustrate these mechanisms through a series of conceptual drawings and simple calculations.



ENSERO solutions

OPERATIONAL SITE HISTORY
SCHWARTZWALDER MINE SITE

Enhanced mineralization and erosion expose uranium ore at the surface

1953
Schwartzwalder Mine opens

Figure 9. Schwartzwalder Mine, 1993. (Photograph courtesy of Jim Paschis)

1998
Dewatering of sub-19 level ceases

2018
CLL acquires Schwartzwalder Mine; alluvial valley reclamation begins

Mine Operations

Pre-discovery | 1940s | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s | 2010s

X Avg Crustal Abundance

U	70,700
Mo	4,800
Sb	2,200
W	1,150
Pb	600
Tl	400

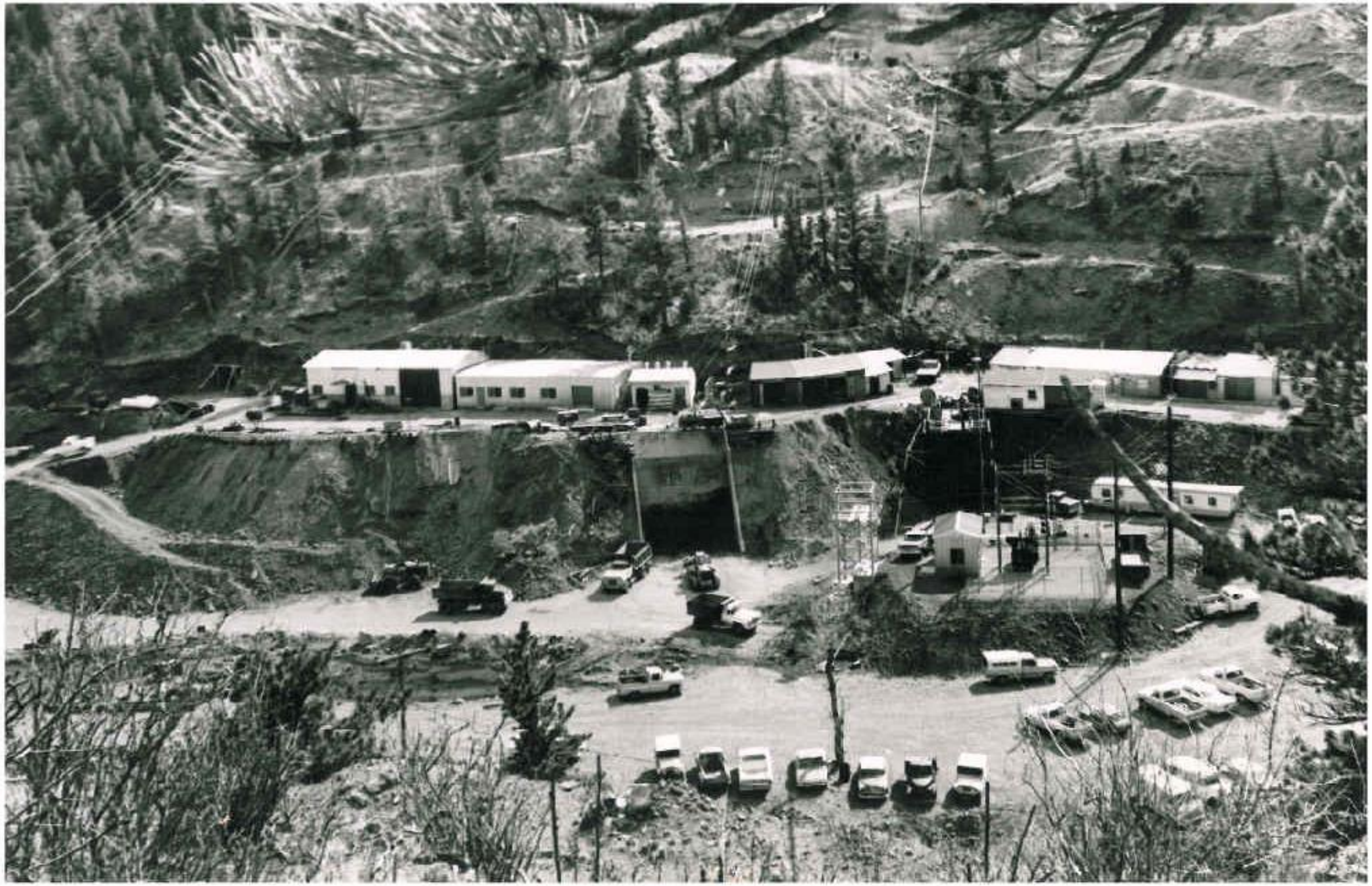
1949
Ore deposit discovered by Fred Schwartzwalder by surface sampling

1966
Property sold to Cotter Corporation

2000
Mining ceases and upper mine begins to flood

2007
Mine pool elevation reaches Ralston Creek level

MINING OPERATIONS (1978)
SCHWARTZWALDER MINE SITE

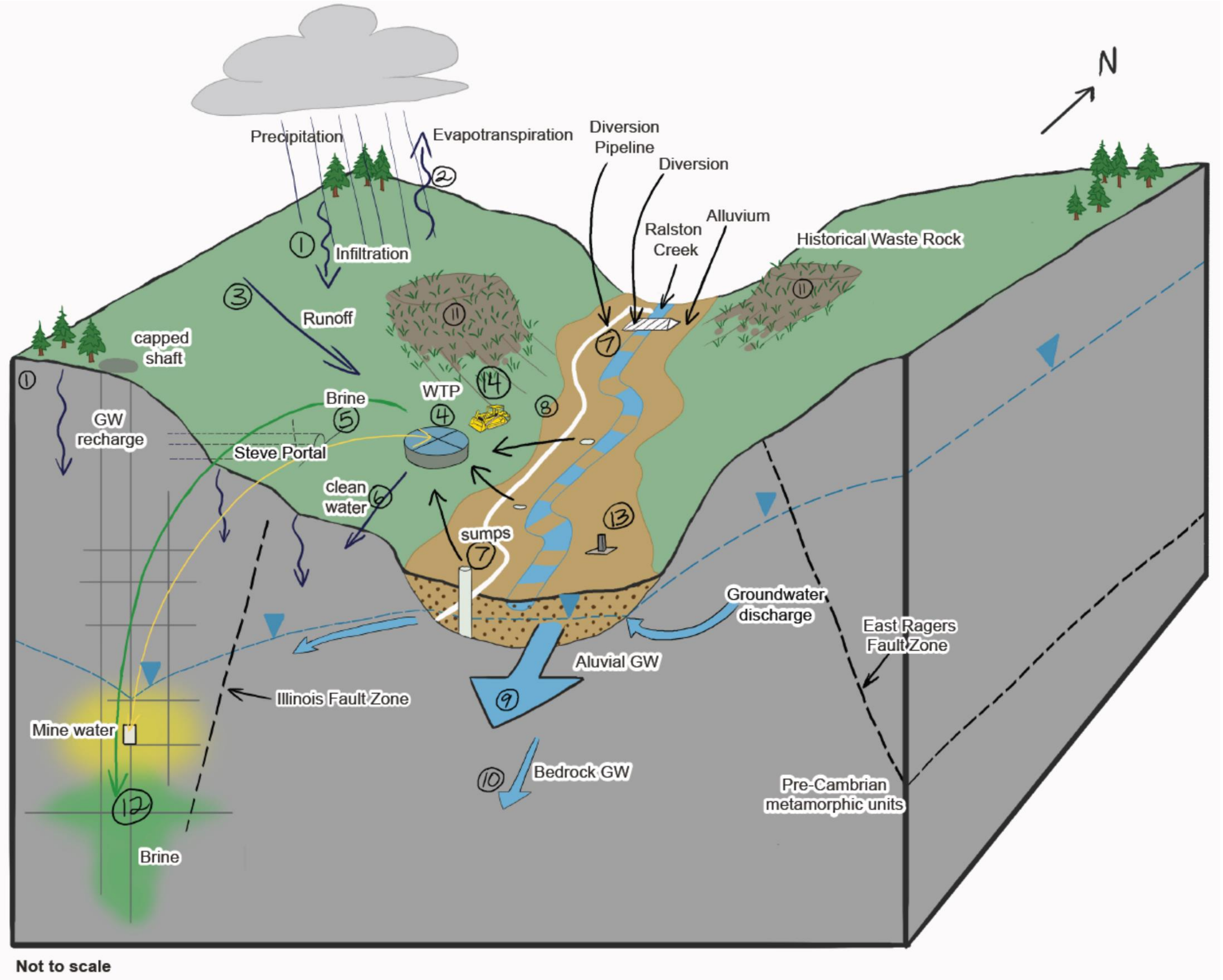


ENSERO solutions

CONCEPTUAL SITE MODEL
SCHWARTZWALDER MINE SITE

2021 Current Conditions

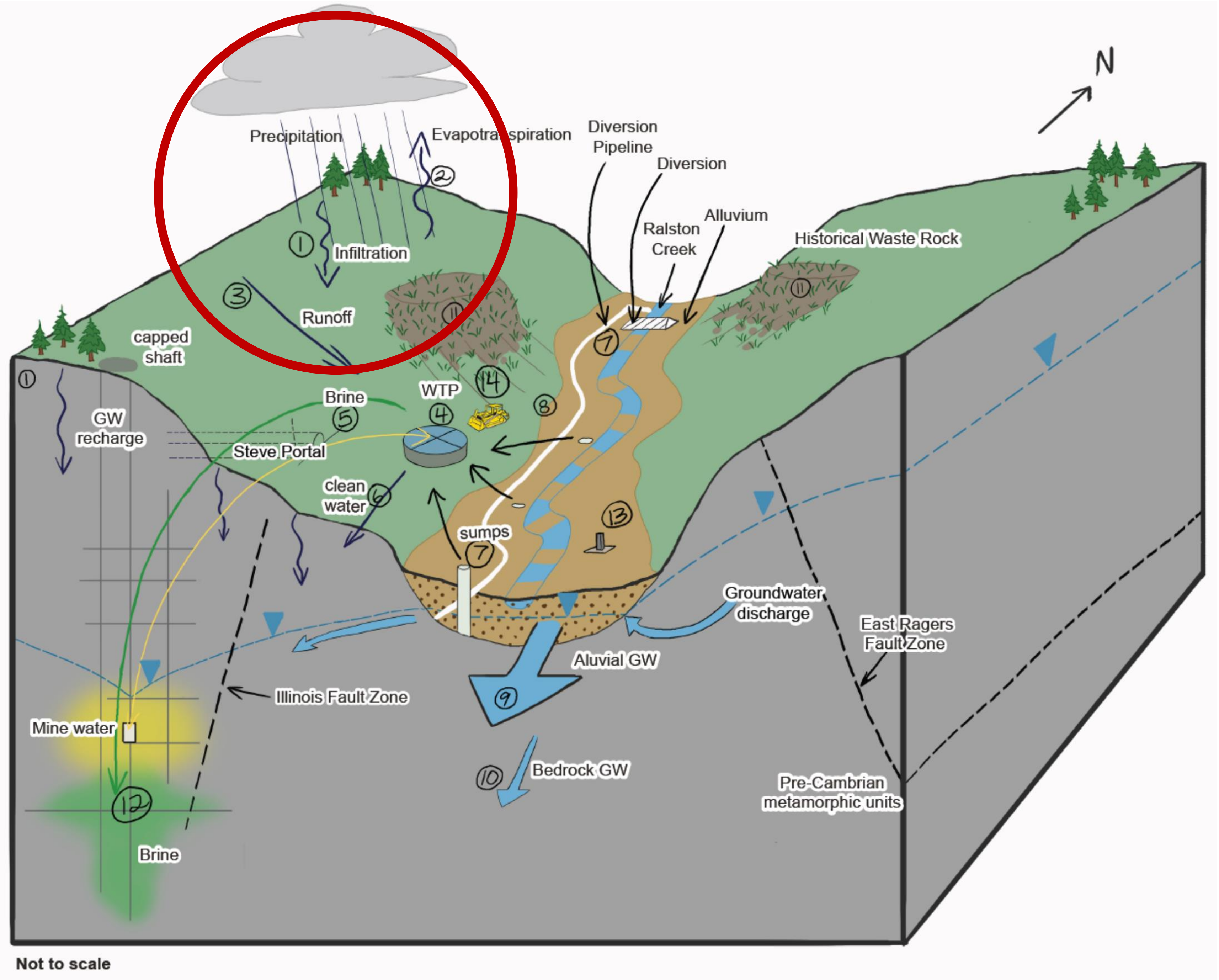
- Ralston Creek diverted in bypass pipeline.
- Mine workings dewatered to below regulatory limit (6452 ft amsl = 150 feet below the Steve adit which is at 6602 ft amsl) annual range between >400 feet to 180 feet below Steve level.
- Seasonal operation of Water Treatment Plant 4.5 months active treatment season.
- Site reclamation in progress.



ENSERO solutions

CLIMATE AND HYDROLOGY
SCHWARTZWALDER MINE SITE

- #1 - Infiltration
- #2 - Evapotranspiration
- #3 - Surface Runoff



ENSERO solutions

INFILTRATION
SCHWARTZWALDER MINE SITE

- Average annual precipitation at the site is 18.66 inches (WRCC, 1978 – 2005).
- Precipitation evaporates, transpires, and runs off. The remaining small percentage infiltrates through undisturbed, disturbed (e.g., roads and cleared areas), and reclaimed areas (e.g., waste rock facilities).
- Infiltration percolates to the water table and flows downgradient to Ralston Creek, mine workings, or flows along deeper flow paths to the west toward the Denver Basin.
- Infiltration through waste rock and impacted soils can transport metals and other mobile constituents.

ENSERO solutions

EVAPORATION AND EVAPOTRANSPIRATION
SCHWARTZWALDER MINE SITE

- Average evaporation at the site is 35 - 40 inches (CO DNR).
- Evaporation and transpiration limit the amount of precipitation that runs off or infiltrates, thereby limiting the long-term potential for dissolution and migration of metals and metalloids off site.
- Potential Climate Change Impacts:
  - There is less agreement among the models about future precipitation change for Colorado, which is shown in the second row of images. The models are split on whether the future will bring increasing, decreasing, or similar-to-current precipitation in Colorado. They show a range of possible outcomes from a 5 percent decrease to a 6 percent increase by mid-century (2050). The risk of decreasing precipitation appears to be higher for the southern parts of the state." - Kennedy, Caitlyn. Future Temperature and Precipitation Change in Colorado. NOAA. Published August 9, 2014, Updated July 3, 2021. https://www.climate.gov/news-features/featured-images/future-temperature-and-precipitation-change-colorado Accessed May 2, 2022.

SURFACE RUNOFF
SCHWARTZWALDER MINE SITE

- Precipitation that does not evaporate, transpire, or infiltrate, flows by surface (or near-surface) flow toward Ralston Creek.
- Ralston Creek flows vary from less than 1 cfs to 80 cfs (May runoff) from the Schwartzwalder Mine site down to just upstream of the Ralston Reservoir.
- RC cannot be gaining in the mine area.
  - Ralston Creek currently diverted in pipeline – prevents conclusive assessment if RC is losing in mine area.
  - Mine level below 150 ft prevents mine water recharge to creek.

Fall 2020: NWRP channel during construction

ENSERO solutions

SURFACE RUNOFF
SCHWARTZWALDER MINE SITE

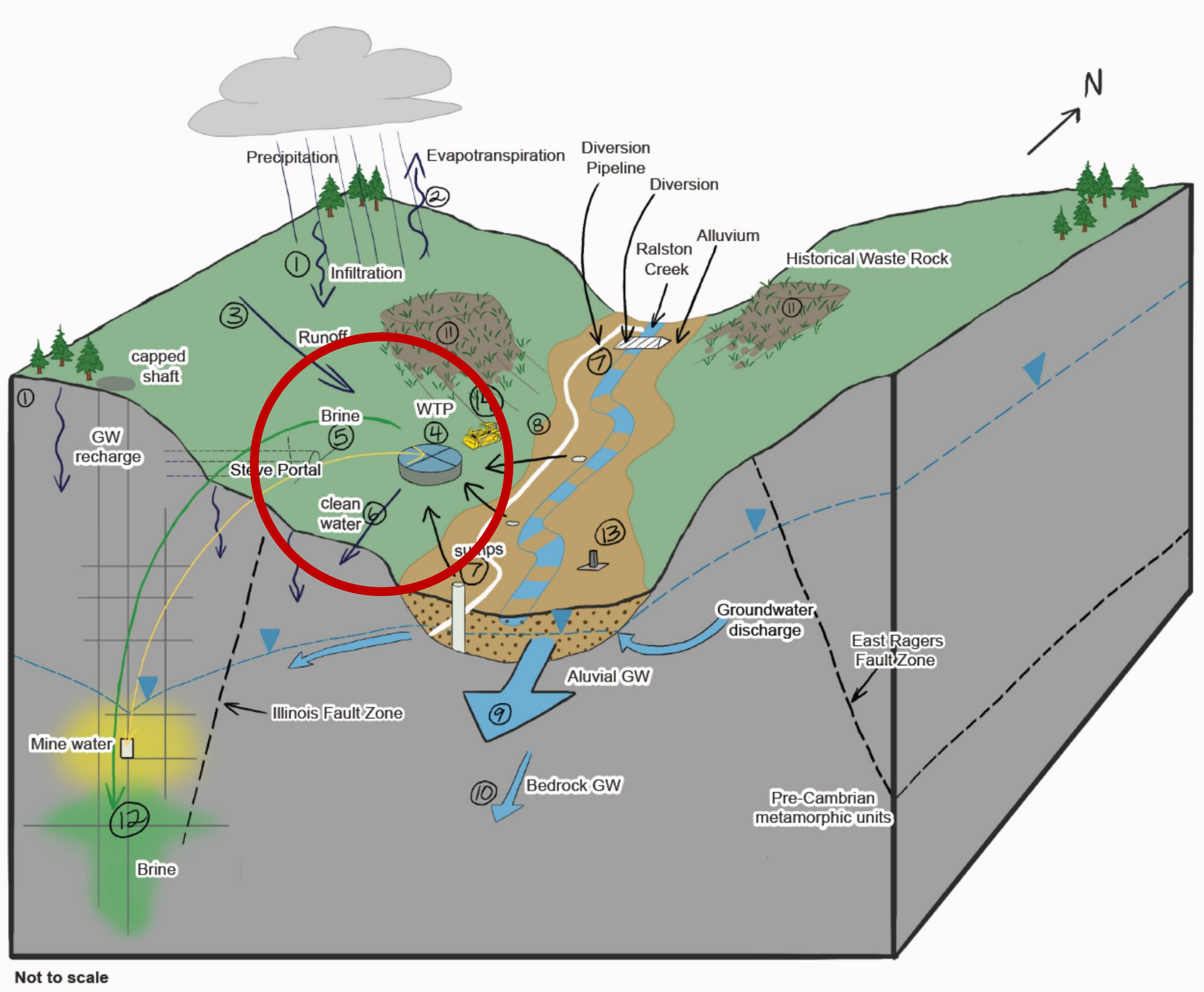
- North Waste Rock Pile Construction Project was completed in 2020 (Technical Revision #28).
- Objective: Intercept and divert storm water around the North waste rock pile, prevent infiltration of runoff through the North waste rock pile, and avoid leaching of waste rock into Ralston Creek.
- Liner Materials: 4-inch thick Geoweb liner filled with concrete, underlain with impermeable geosynthetic liner (DuraSkrim), & non-woven geotextile.

Fall 2020: NWRP channel during construction

ENSERO solutions

CONCEPTUAL SITE MODEL
SCHWARTZWALDER MINE SITE

- #4 - Water Treatment Plant (WTP)
- #5 - RO Concentrate Injection
- #6 - Clean Water Discharge



ENSERO solutions

WATER TREATMENT PLANT
SCHWARTZWALDER MINE SITE

- Site water requiring treatment (e.g., groundwater recharge and alluvial water pulled from the mine workings during pump-down) is directed to the WTP. Treated water is discharged to Ralston Creek.
- RO concentrate from the R.O. treatment process is amended with barium chloride and injected into the deep mine workings for in-situ treatment and long-term storage.

Year	Operations Summary	Mean Influent Concentration, Dissolved Uranium [1]	Mine Pool Dewatering Summary	Notes
2018	Operated 47% of the year.	12.19 mg/L	Feet Gained[3] = 51 feet Max. Depth = 201 fbS (6,401 ft amsl)	In situ injection in December 2017.
2019	Operated 66% of the year.	13.73 mg/L	Feet Gained = 46 feet Max. Depth = 246 fbS (6,356 ft amsl)	Installed new 60hp pump at ~400 fbS.
2020	Operated 47% of the year.	12.56 mg/L	Feet Gained = 99 feet Max. Depth = 345 fbS (6,257 ft amsl)	In situ injection January 2020.
2021	Operated 37% of the year.	19.80 mg/L [2]	Feet Gained = ~20 feet Max. Depth > 345 fbS (>6,257 ft amsl)	In situ injection September 2021.

[1] Mean concentration of mine pool sample results. For comparison, the mean concentration of dissolved uranium in the mine pool from 2000 - 2007 was 41.14 mg/L. (Source: Whetstone Associates. 2007.)

[2] The mean concentration of mine pool sample results for 2021 do not include data collected during the fourth quarter because this report was prepared concurrent with the sample analysis.

[3] Feet gained is defined as compared to prior year end water level

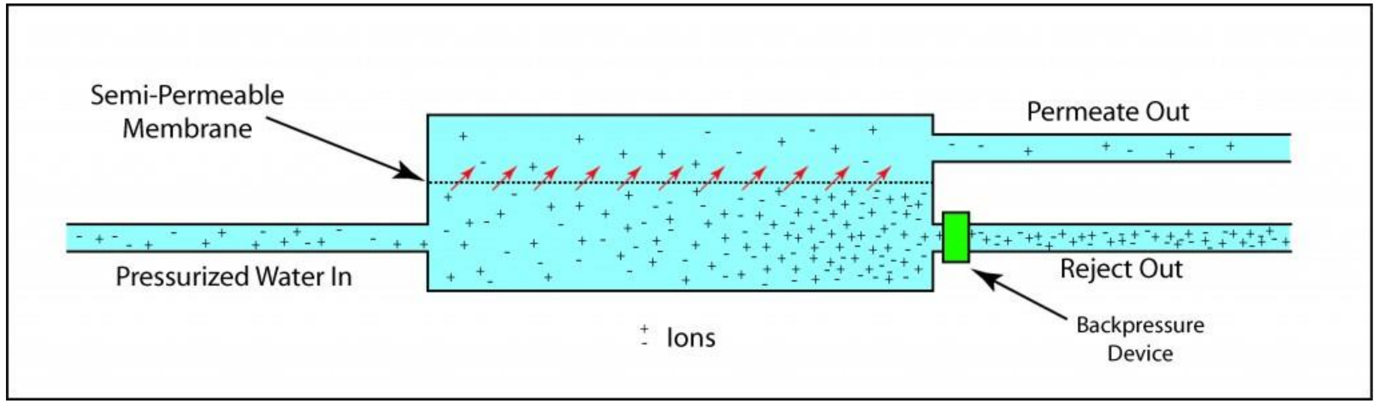
ENSERO solutions

REVERSE OSMOSIS AND RO CONCENTRATE RE-INJECTION

- RO concentrate is a higher-TDS solution generated in relatively low volumes (~30%) resulting from the reverse-osmosis treatment process.

Year	Discharge Total (MG)	RO Concentrate Total (MG)	Precent Recovery (Permeate)
2018	40.1	18.6	68%
2019	44.7	19.4	70%
2020	37.5	23.6	61%
2021	37.1	12.6	75%

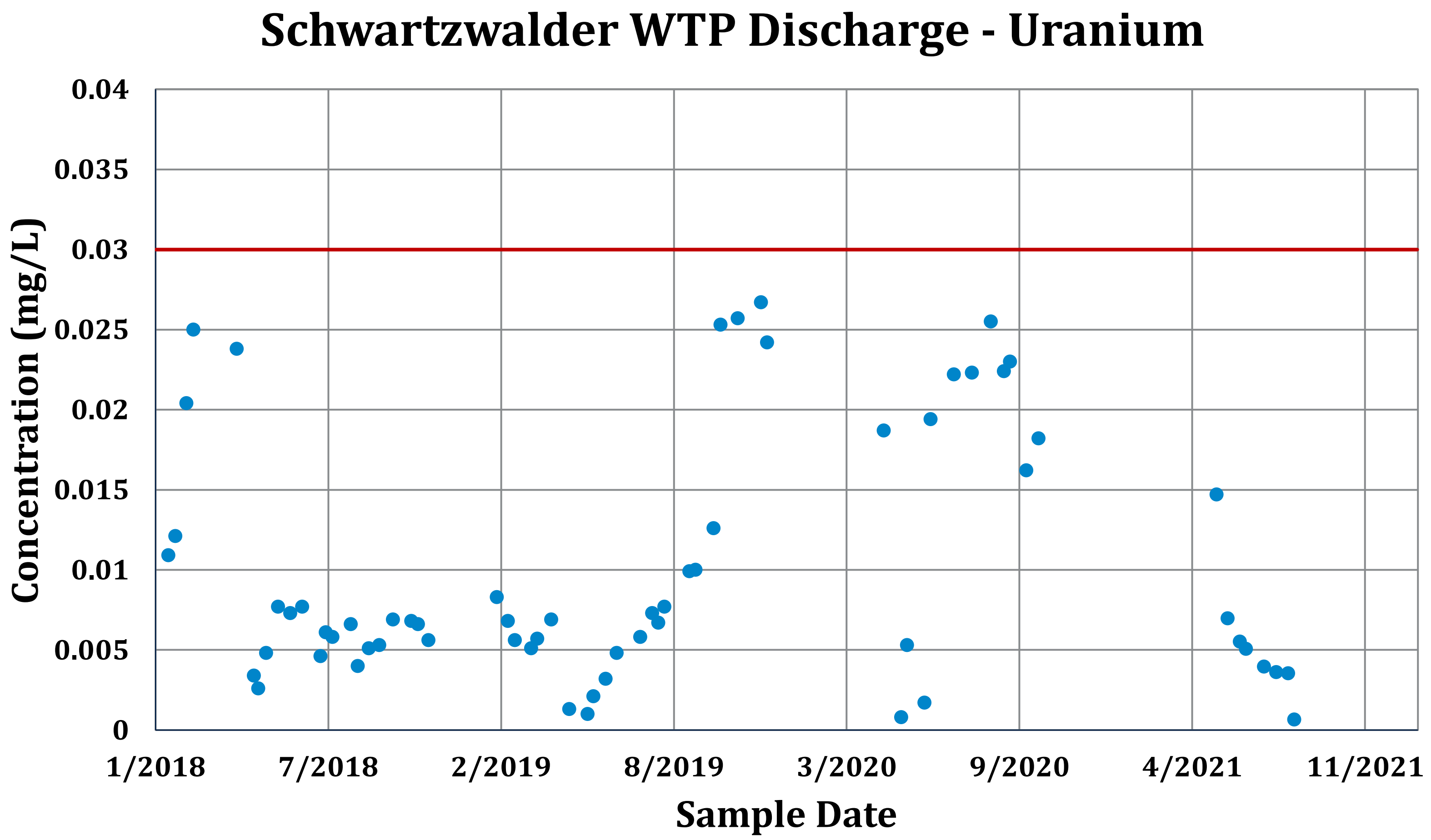
- The RO concentrate is injected into the deep mine workings through the Steve bulkhead into pipeline that discharges at the 1,100 level.
- The RO concentrate remains isolated in the deep workings because of inward hydraulic gradients.



Piping through Steve bulkhead

CLEAN WATER DISCHARGE
SCHWARTZWALDER MINE SITE

- Discharge to Ralston Creek at the property boundary is consistently below the USEPA MCL (0.03 mg/L).
  - Surface water sampling station: SW-BPL

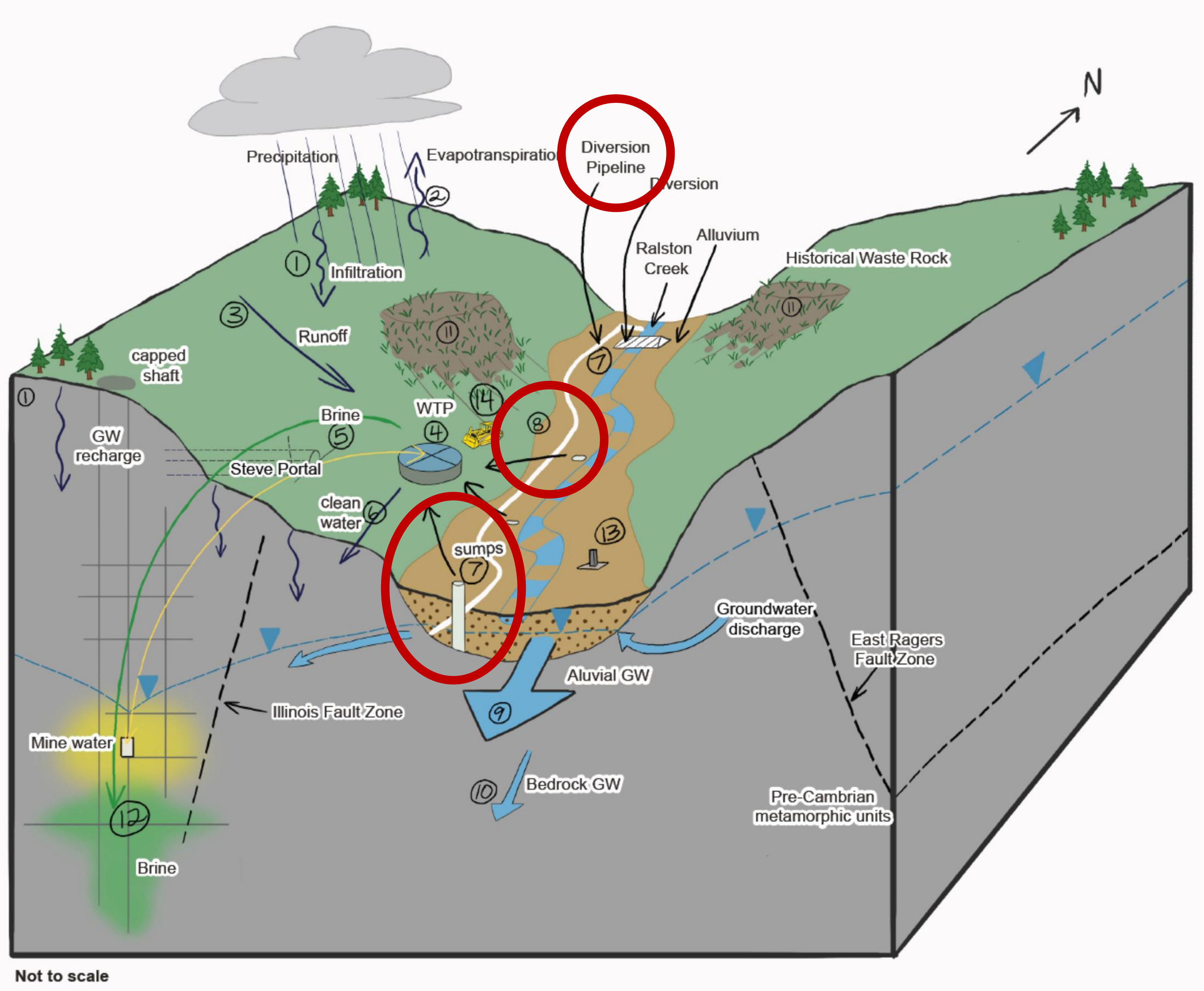


Spring 2018: Surface Water Sampling Station (SW-BPL).

ENSERO solutions

CONCEPTUAL SITE MODEL
SCHWARTZWALDER MINE SITE

- #7 – Sumps & Diversion (Bypass) Pipeline
- #8 - Mass Loading from Alluvium



DIVERSION PIPELINE FOR RALSTON CREEK

SCHWARTZWALDER MINE SITE

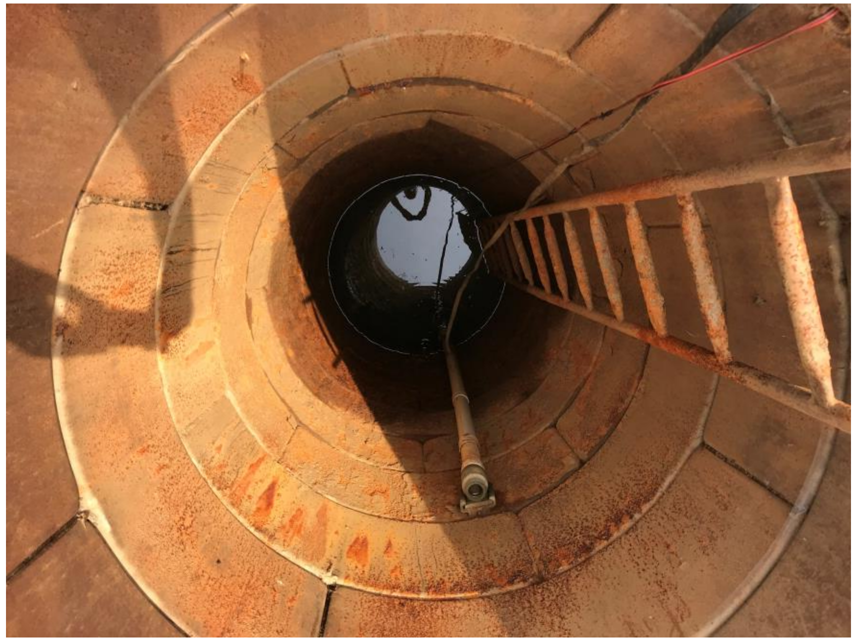
- Upstream diversion (tied into bedrock) captures and directs Ralston Creek and alluvial water around the site. Piped and discharged downstream.
- Spring melt/large storms are not fully captured; ~2 week of flow per year water flows both in stream and pipeline.
- Diversion pipeline installed in 2011 (Technical Revision #18) to prevent unimpacted, upstream waters, from contacting recognized contamination in alluvium and minimize recharge into the mine pool.
  - Contaminated alluvium current being excavated. Earthwork is expected to be complete in 2022.
  - Mine pool currently dewatered below regulatory limit.

Spring 2018: Intake for Ralston Creek diversion across CLL property. Bypass pipeline and cutoff wall

ENSERO solutions

SUMPS
SCHWARTZWALDER MINE SITE

- Sumps were installed in 2011-2012 (Technical Revision #15) to prevent shallow alluvial water (from recognized contamination in alluvium and flooded mine pool) from leaving site.
- Sumps are large-diameter extraction wells installed in the alluvium and upper fractured bedrock.
  - CLL identified contaminated alluvium surrounding each sump and expects to remove all sumps to directly address source area contamination.
- 2021 Conditions: With the current dewatered mine pool, and bypass pipeline in place, sumps are typically dry. They only collect precipitation immediately following storm events.



Nov. 2021: Sump 1 near excavation area

Spring 2018: Sumps on grade and seasonally dry

ENSERO solutions

MASS LOADING TO RALSTON CREEK FROM ALLUVIUM
SCHWARTZWALDER MINE SITE

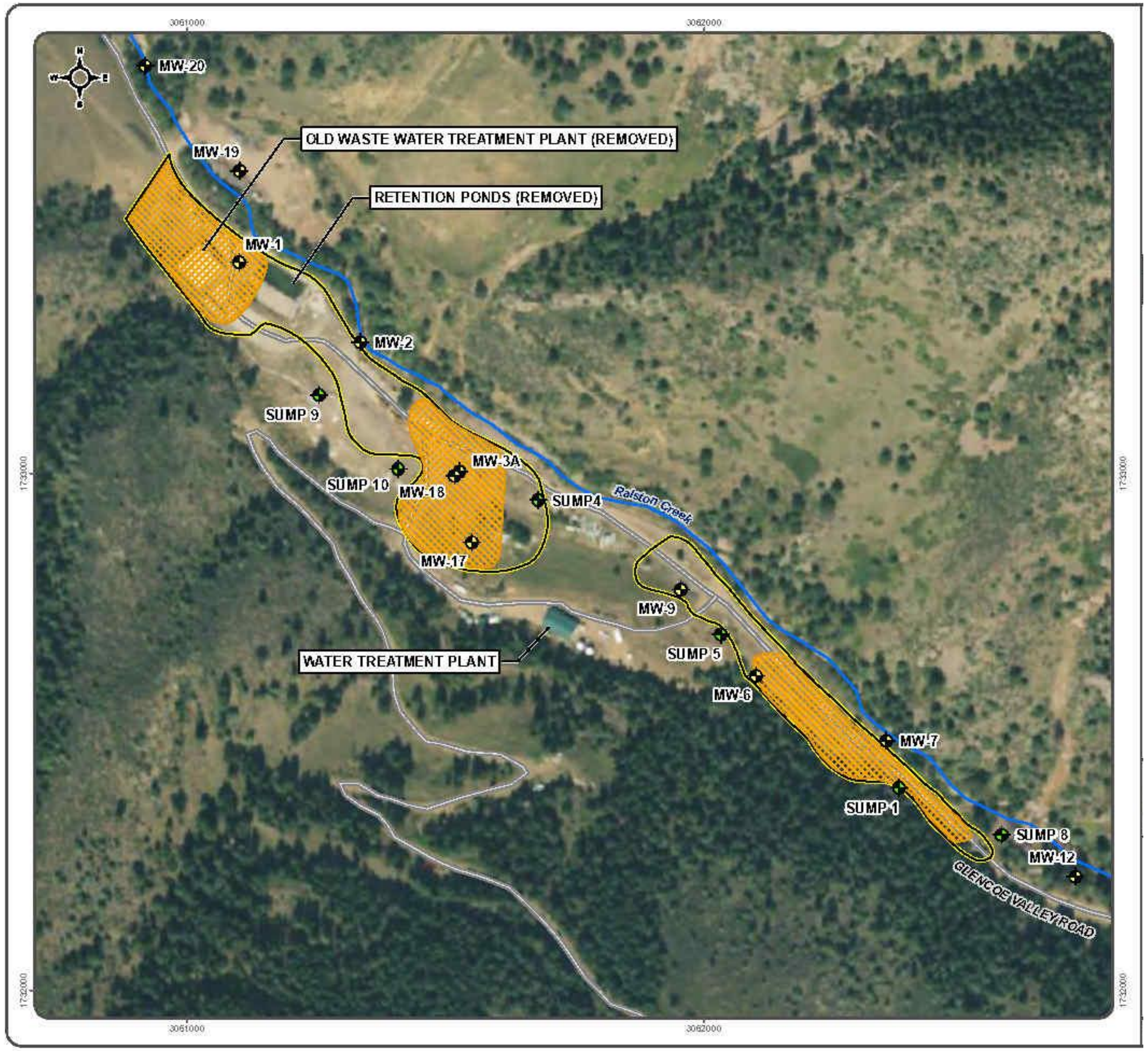
- Surface water and groundwater interact with natural and disturbed mineralized rock/soil and can result in transport of contaminant mass to the Ralston Creek system
- Likely sources include: former mining activities in alluvial valley, impacted soils/materials, and weathering of mineralized rock/soils.
- Mass loading has been ongoing since long before mining began but certainly increased as a result of mining.

Fall 2021: Alluvial valley excavation.

ENSERO solutions

MASS LOADING TO RALSTON CREEK FROM ALLUVIUM
SCHWARTZWALDER MINE SITE

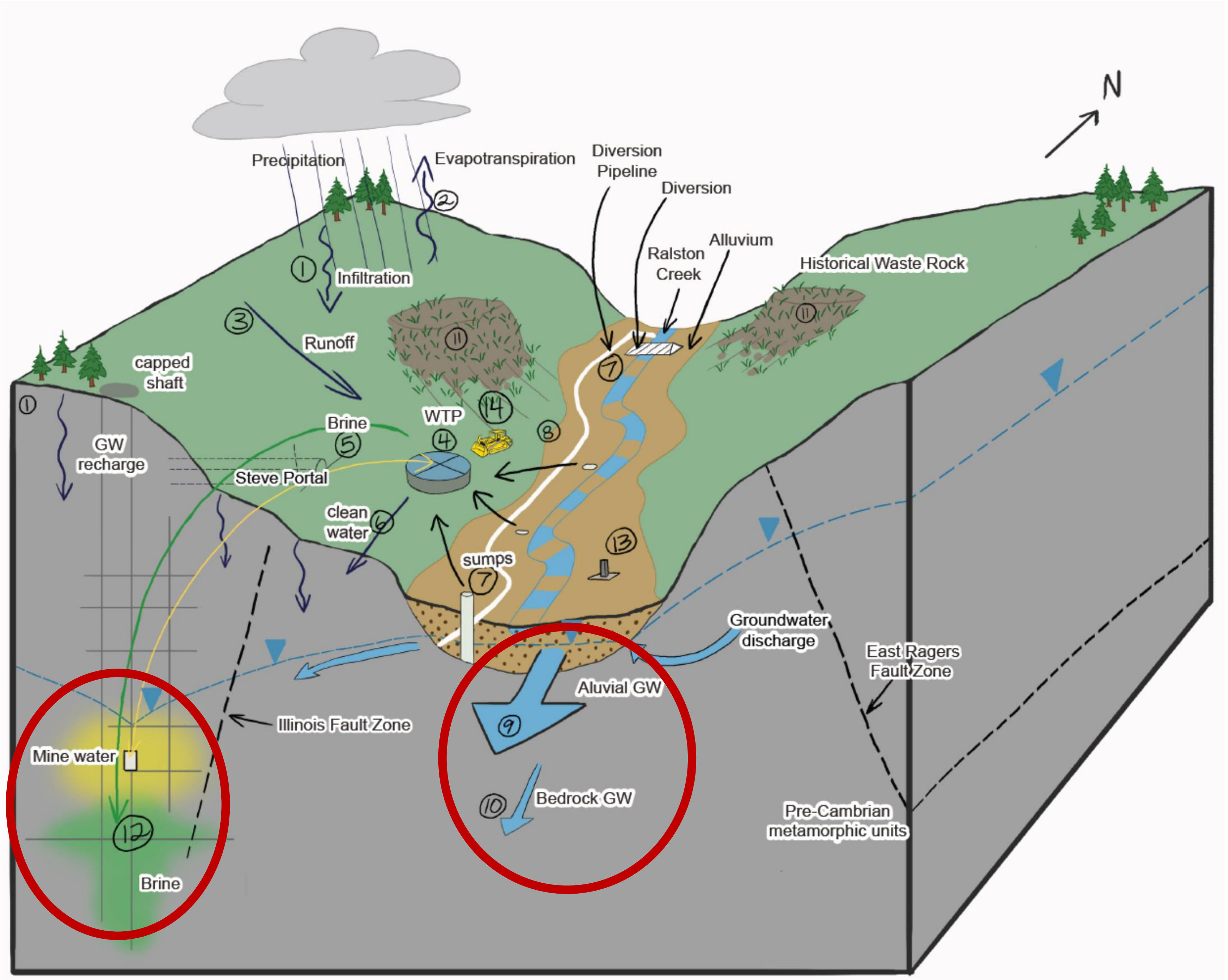
- Alluvial valley excavation began in 2018 and is expected to finish in 2022. This work was originally scoped in 2011 (Technical Revision #14.)
- Objective: Remove any materials with the potential to leach uranium to groundwater above 0.03 mg/L.
  - Sumps and bypass pipeline have helped to dry out the alluvium for excavation work.
- Current excavation extents:
  - Yellow line = horizontal extent of contamination
  - Orange hatched area = vertical extent of excavation to bedrock.



ENSERO solutions

GROUNDWATER
SCHWARTZWALDER MINE SITE

- #9 - Alluvial groundwater.
- #10 - Bedrock groundwater.
- #12 - Mine water.



ENSERO solutions

ALLUVIAL GROUNDWATER
SCHWARTZWALDER MINE SITE

- Porous flow with relatively high hydraulic conductivity values; 10^{-4} cm/s – 10^{-2} cm/s
- Recharged by direct infiltration, runoff, and shallow groundwater discharge.
- All flows are diverted upstream of the site (except for highest flow conditions), into a pipe, or captured by the sump system, to limit interaction with site materials.
- Additional alluvial water is intercepted by the sumps and sent back to WTP/mine pool.
  - Sumps are typically dry expect following precipitation events.
  - As excavation progress has advanced less sump water is recovered.

Spring 2018: Dry Ralston Creek as it runs across site

ENSERO solutions

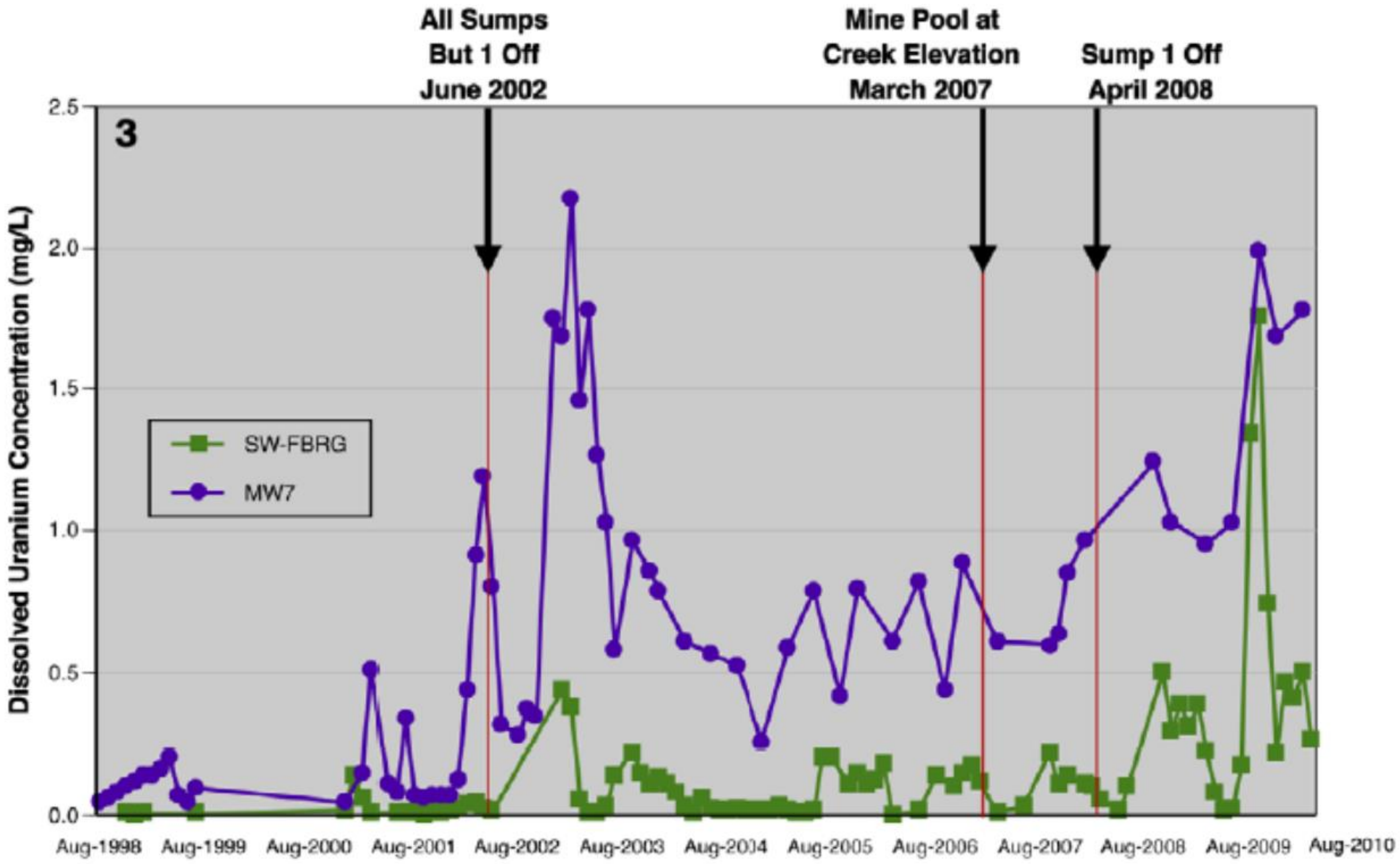
BEDROCK GROUNDWATER FLOW
SCHWARTZWALDER MINE SITE

- Dominated by fracture flow (Illinois Fault System) in Precambrian gneiss, schist, and pegmatite with potential connections to Ralston Creek via joints/fractures.
- Low hydraulic conductivity (10^{-8} – 10^{-5} cm/s).
- Low permeability of the bedrock limits flow from Ralston Creek into the mine. However, when mine pool was flooded (2000's), local/shallow interflow toward Ralston Creek was present.
- Regional (deeper) flow toward the Denver Basin.

ENSERO solutions

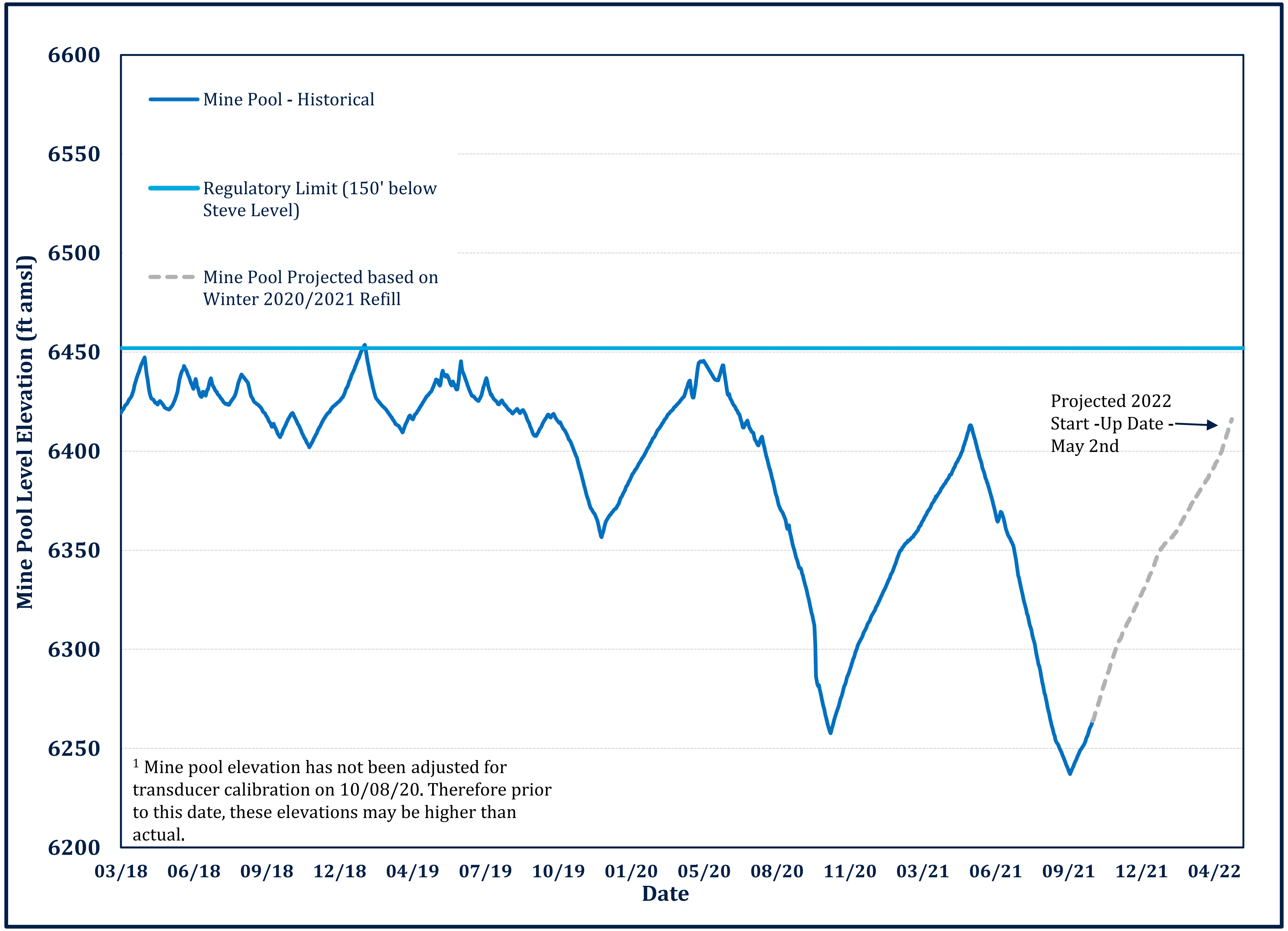
BEDROCK GROUNDWATER FLOW
SCHWARTZWALDER MINE SITE

- Ralston Creek does not appear to be in strong or direct hydraulic connection with the Schwartzwalder Mine based on stream flow rates / mine pool pumping rates, and isotopic comparison of mine water and surface water (performed by Cotter).
- Historical observed uranium concentrations suggest some hydraulic connection from the mine pool to Ralston Creek, when the mine pool was flooded (2000's) to creek elevation.
  - Flows from the creek to the mine are small and controlled by the inherent low permeability of the rock mass and the dry creek in the mine area.



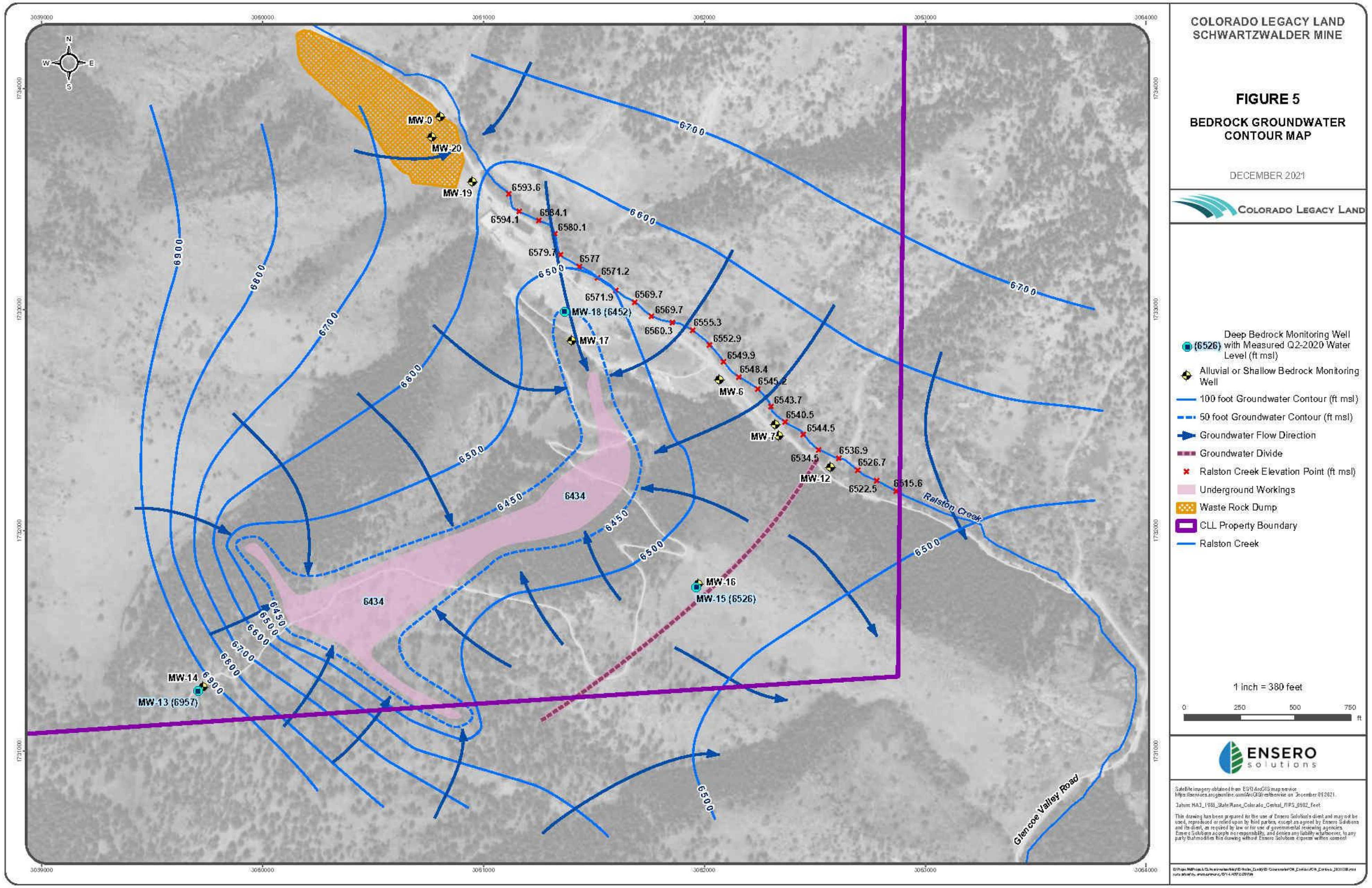
BEDROCK GROUNDWATER FLOW
SCHWARTZWALDER MINE SITE

- AM-06, Figure E-1. Mine Pool Projected Recovery.
  - Mine pool was first decreased to greater than regulatory limit November 2017.
  - CLL acquired the site from Cotter in March 2018.
  - Deep intake pump (60 HP pump) installed in January 2019.
  - Negative Slope = WTP in operation, actively dewatering the mine pool.
  - Positive Slope = WTP offline, mine pool refilling.



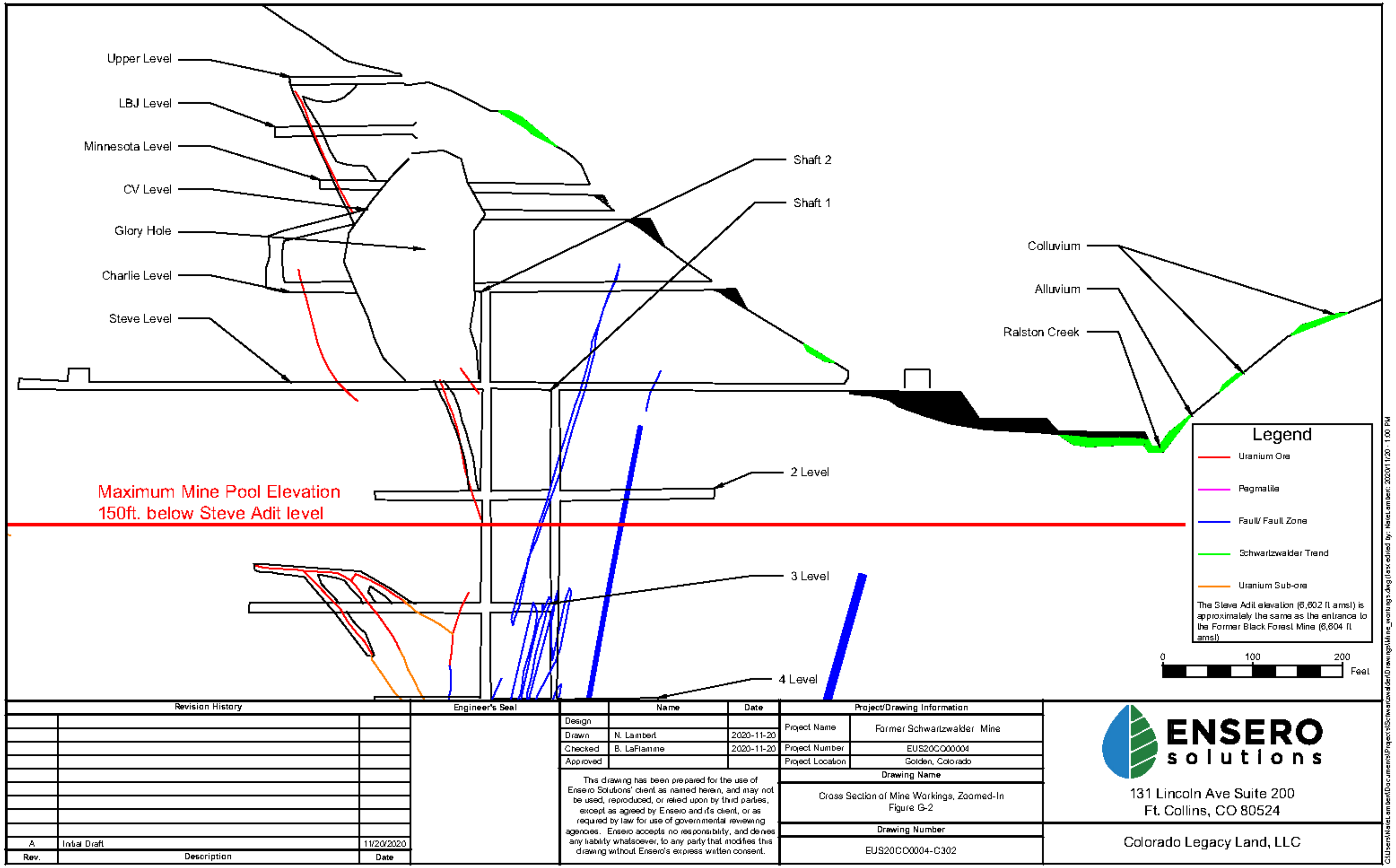
BEDROCK GROUNDWATER FLOW
SCHWARTZWALDER MINE SITE

- Maintaining a dewatered mine pool (150-feet or greater below the Steve level adit) has created an inward gradient in the bedrock groundwater.
- Groundwater in the permit area flows back toward the mine workings (shown with red-shaded area).



ENSERO solutions

MINE WORKINGS AND GEOLOGICAL FEATURES
SCHWARTZWALDER MINE SITE



MINE WATER – IN-SITU TREATMENT
SCHWARTZWALDER MINE SITE

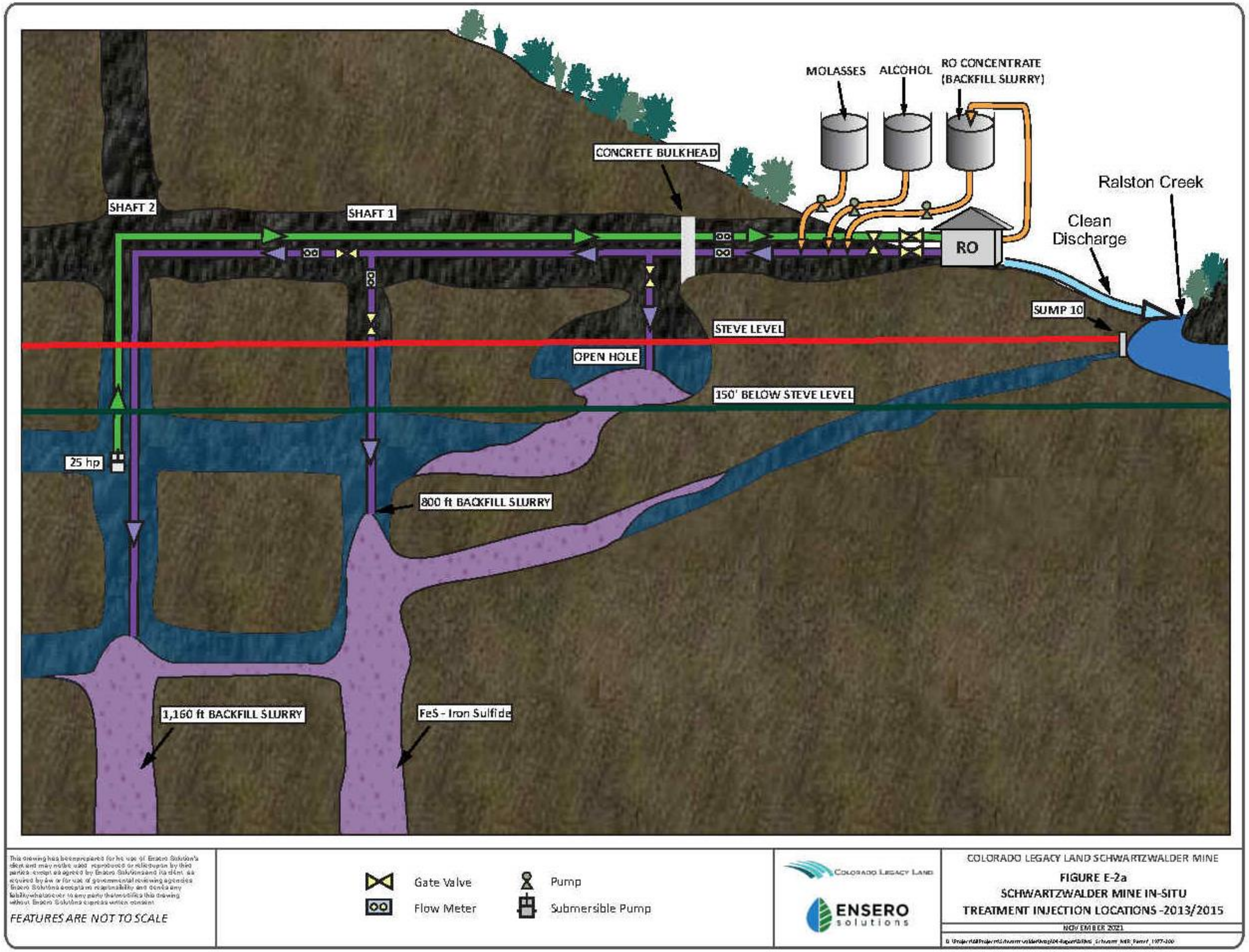
- Currently pumped down between 160 to >354 ft below the Steve-adit level.
  - Regulatory Level is 150 feet below the Steve-adit
- Contains water with elevated concentrations of uranium, molybdenum, and selenium.
- WTP returned constituents as RO concentrate to mine pool for long-term storage.
- In-situ treatment conducted during winter months when WTP is offline.

September 29, 2021. In-situ Injection Delivery

MINE WATER – IN-SITU TREATMENT

SCHWARTZWALDER MINE SITE

- In-situ treatments: 2013, 2015, 2017, 2020, and 2021.
- The January 2020 in-situ treatment did not result in dramatic decreases in dissolved uranium concentrations as during the first two in-situ treatments.
  - May be an indication of a change in underground hydraulics during in-situ treatment.

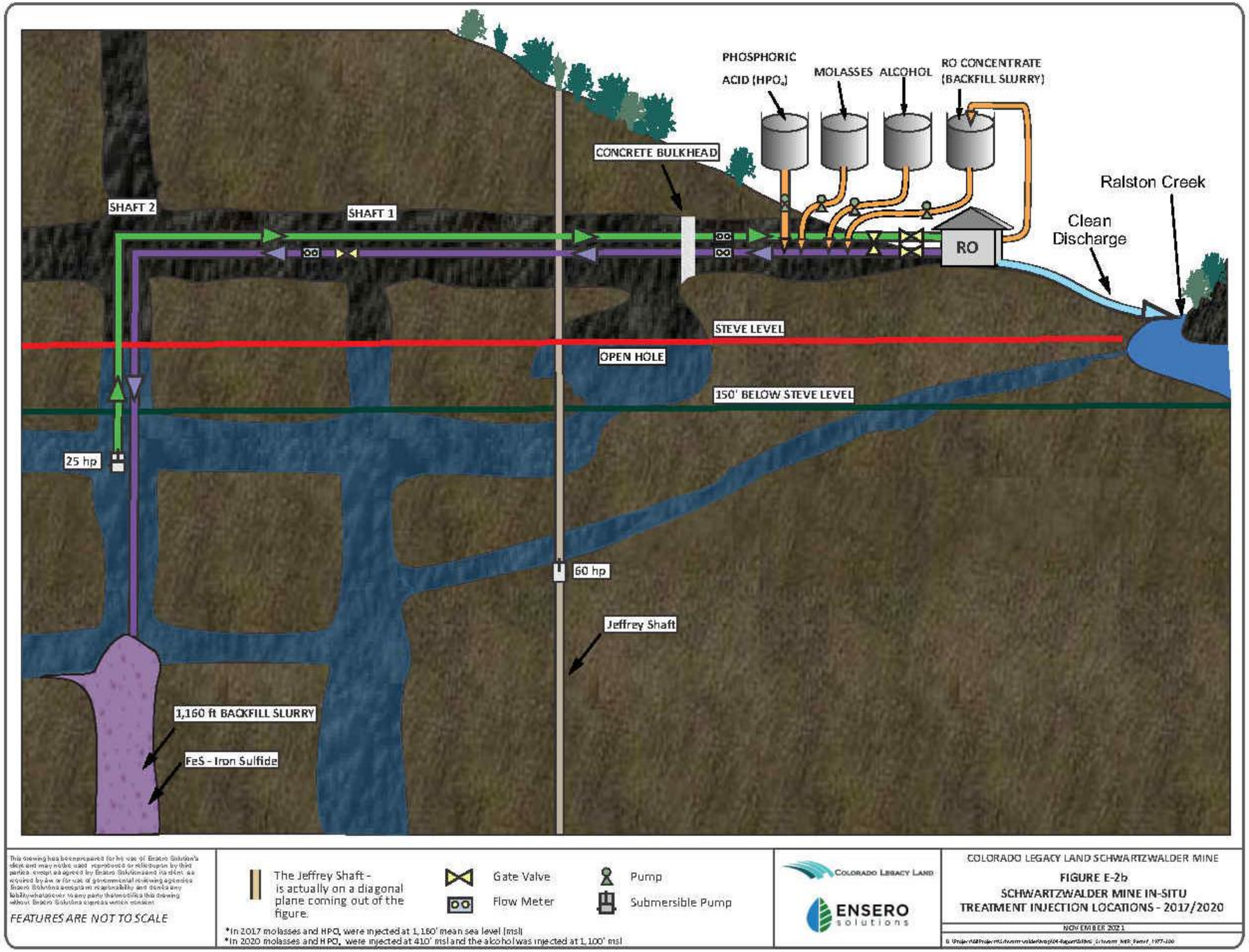


Schematic for 2013 and 2015 in-situ injection

ENSERO solutions

MINE WATER – IN SITU TREATMENT
SCHWARTZWALDER MINE SITE

- September 2021 injection:
  - WTP shut down for year 9/23/21.
  - Phosphoric nutrient: 10,857lbs on 9/24.
  - Ethanol: 6,700 gal on 9/29/21.
  - Pumps were recirculated after injection to promote mixing (~ 676,000 gal mixed).

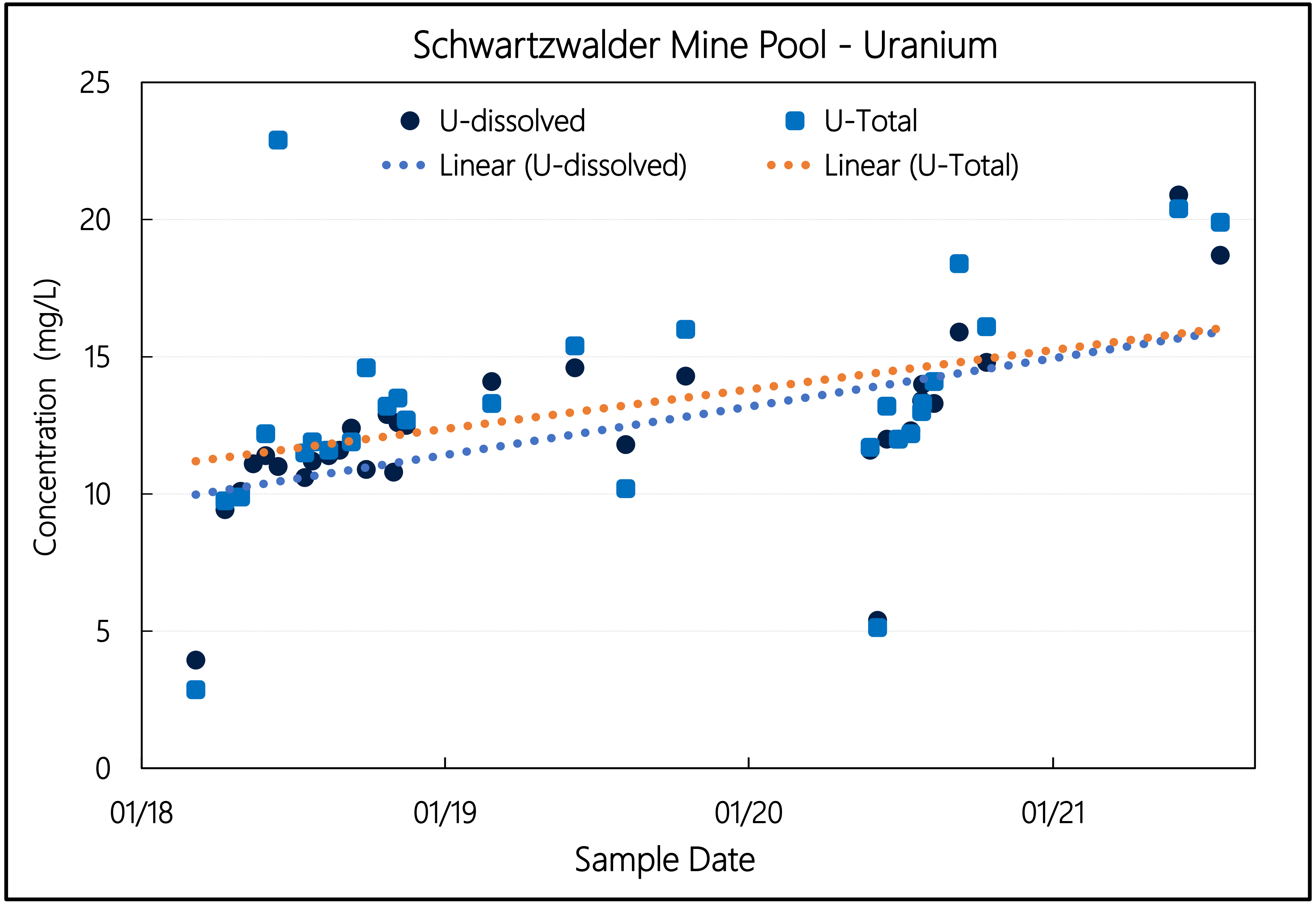


Schematic for 2017, 2020, and 2021 in-situ injection

ENSERO solutions

MINE WATER – IN-SITU TREATMENT
SCHWARTZWALDER MINE SITE

- Dissolved uranium concentrations in the mine pool:
  - Pre-treatment mean. (pre 2017). = 41.14 mg/L
  - Post treatment mean. = 12.75 mg/L
- CLL has successfully stabilized the mine pool to ~50% of pre-treatment concentrations.
  - Typical range (2018 to 2021) = 10 to 15 mg/L
- Cation/anion concentrations and ratios from pre-treatment vs. post treatment do not indicate degradation of general water quality parameters, overall TDS has remained unchanged.



MINE WATER – IN-SITU TREATMENT
SCHWARTZWALDER MINE SITE

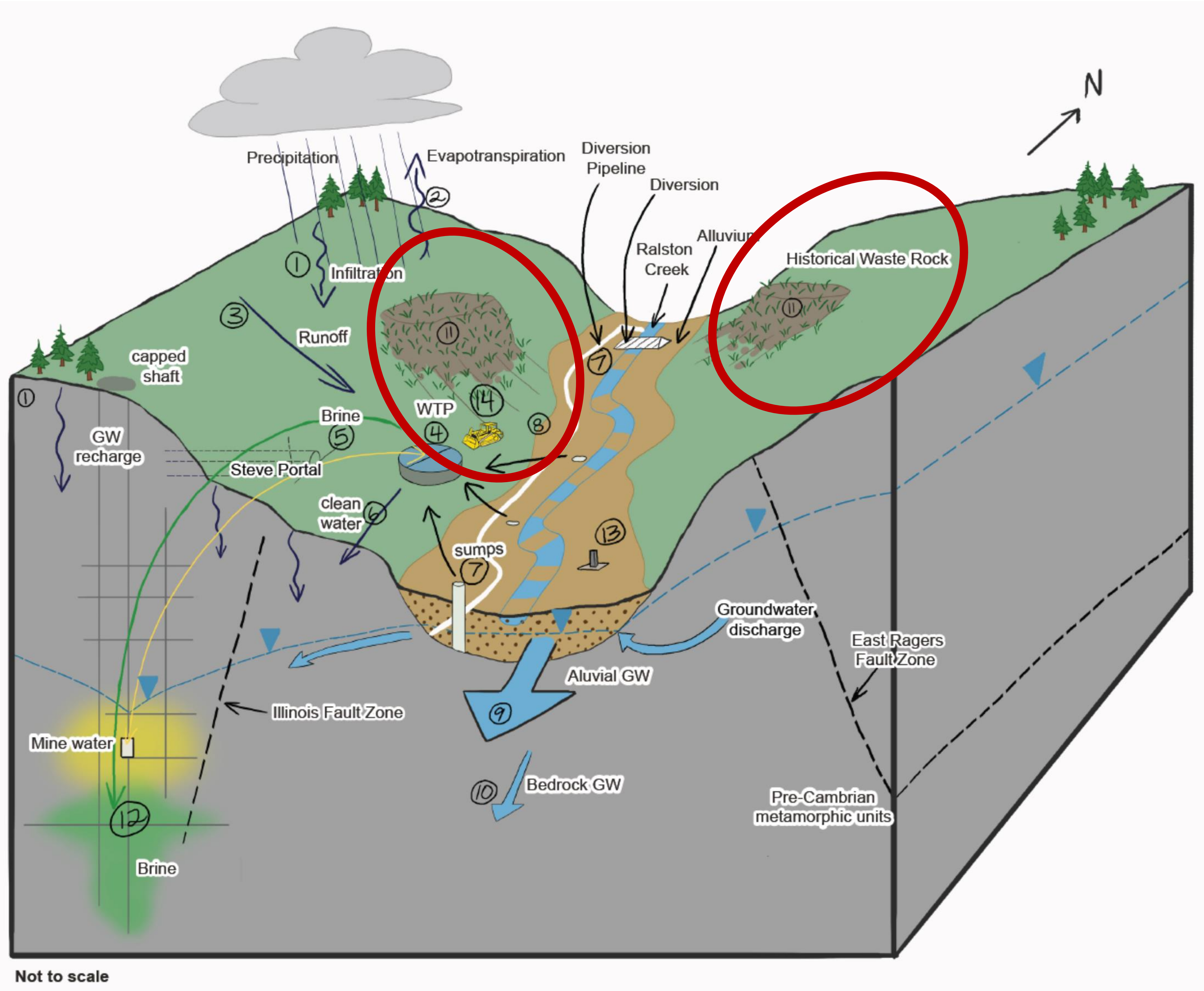
- Comparison of mine pool chemistry data indicates that general chemistry parameters are relatively stable while the concentration of uranium has decreased from 41 mg/L (Pre-treatment, 2000 to 2007) to 12 mg/L (Post-treatment, 2018 to 2021).

AM-06, Table E-2: Comparison of Schwartzwalder Mine Pool Concentrations pre-2017 and post-2017

Variable	Units	2018-2021	2000-2007
General Parameters			
Bicarbonate as $CaCO_3$	mg/L	790	374
Calcium	mg/L	302	299
Chloride	mg/L	43	31
Potassium	mg/L	27	17.2
Sodium	mg/L	235	197
Sulfate	mg/L	1,362	1,725
Total Dissolved Solids	mg/L	2,850	2,917
Dissolved Metals			
Antimony	mg/L	-	0.014
Arsenic	mg/L	0.013	0.0036
Iron	mg/L	4.1	0.020
Thallium	mg/L	-	0.025
Uranium -Dissolved	mg/L	12	41
Radionuclides			
Radium 226 - Dissolved	pCi/L	127	178

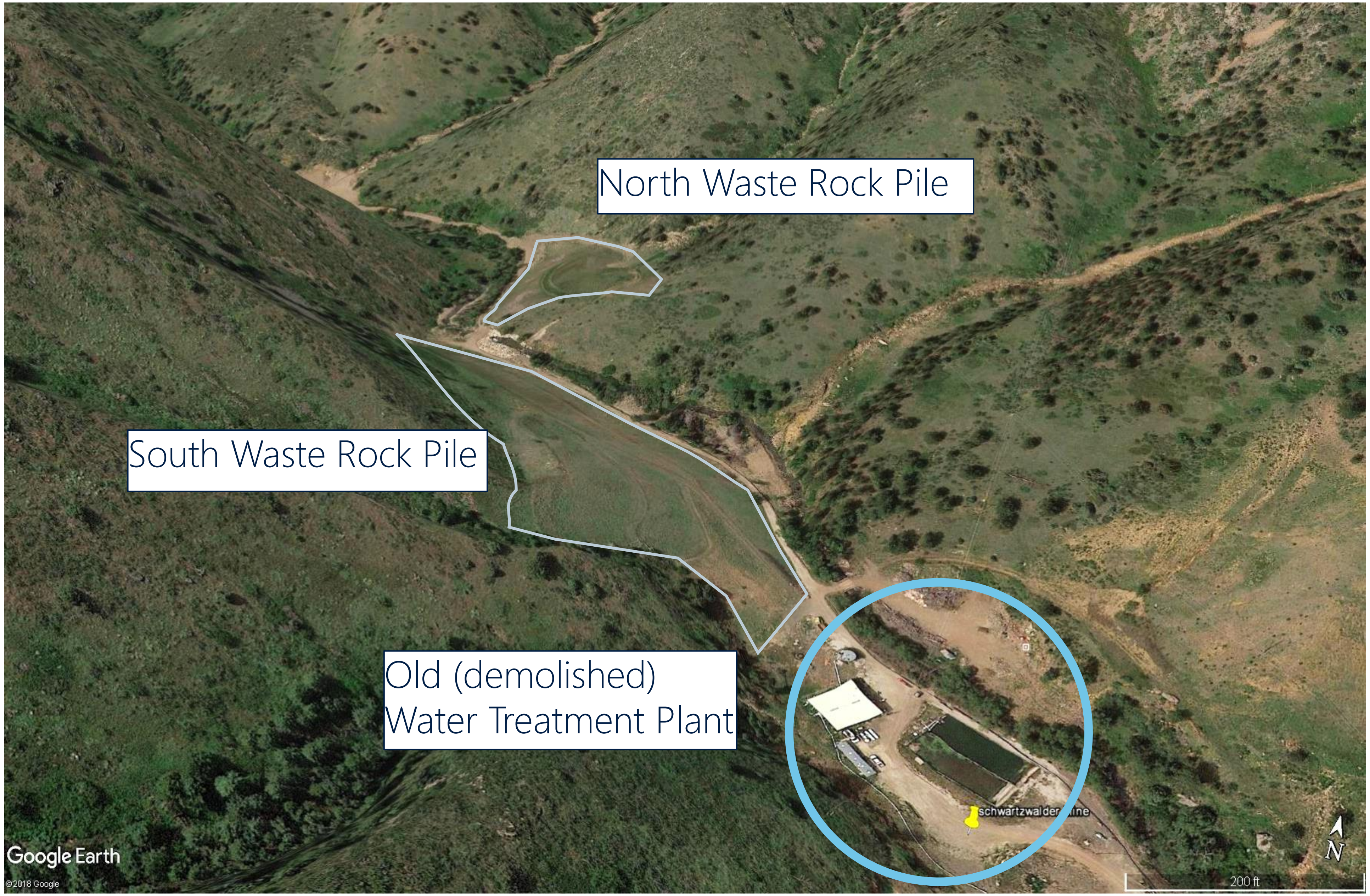
HISTORICAL FACILITIES
SCHWARTZWALDER MINE SITE

- #11 - Historical North and South Waste Rock Piles (Reclaimed)
- #14 – Mine Reclamation
  - Old (demolished) Water Treatment Plant
  - Mine Opening Closures



ENSERO solutions

RECLAIMED WASTE ROCK PILES
SCHWARTZWALDER MINE SITE



ENSERO solutions

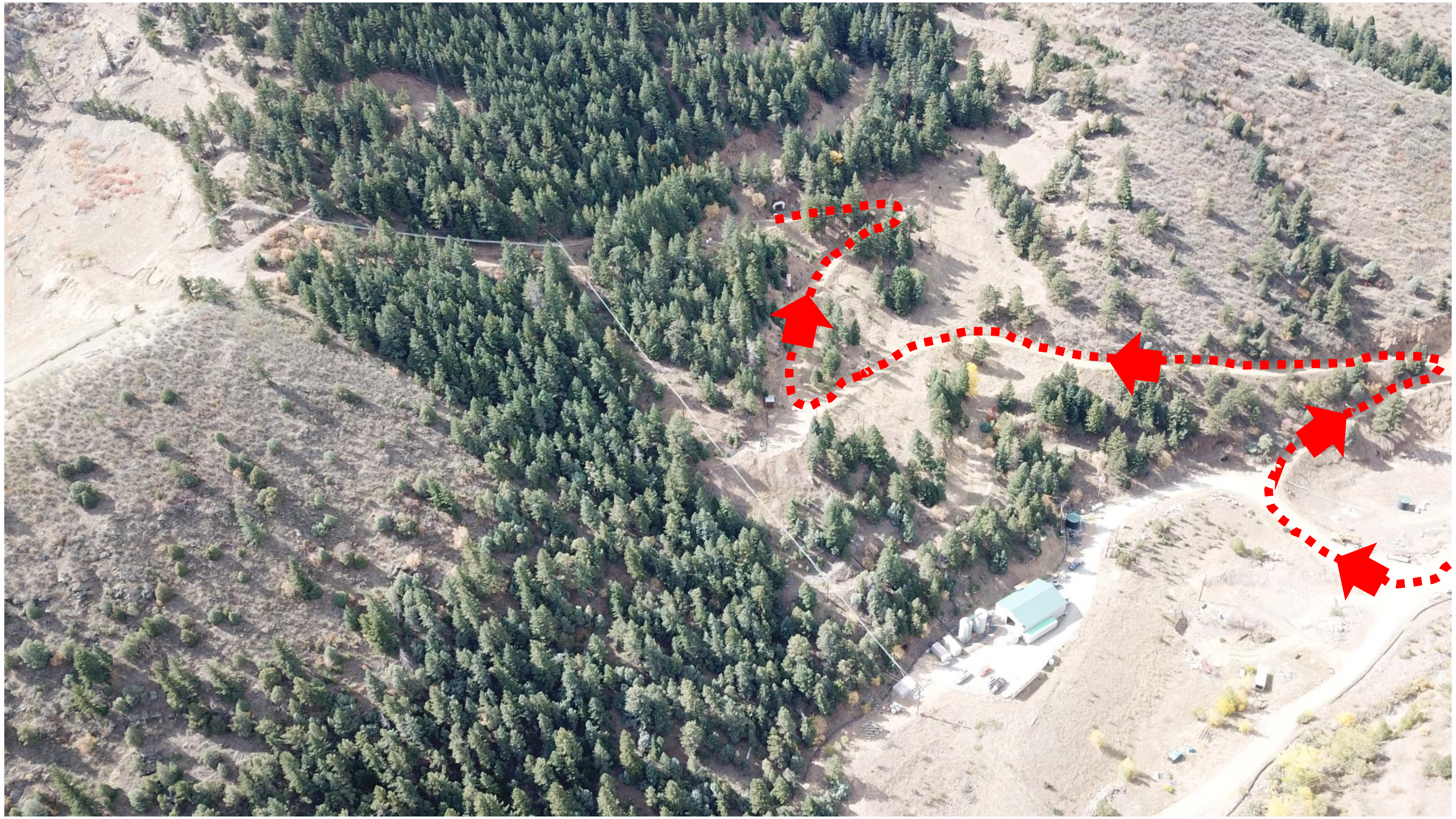
RECLAMATION: SITE PREPARATION (SPRING – SUMMER 2018)
SCHWARTZWALDER MINE SITE

- Regrade and widen haul road to Minnesota Adit. Prepare material staging area near Minnesota for underground disposal

Spring 2018: Haul road up to the Minnestoa Adit (left) and entrance to the Minnesota Adit (right).

RECLAMATION: SITE PREPARATION (SPRING – SUMMER 2018)
SCHWARTZWALDER MINE SITE

Haul Route to Glory Hole in Minnesota Adit



RECLAMATION: SITE PREPARATION (SPRING – SUMMER 2018)
SCHWARTZWALDER MINE SITE

- Reroute sump collection and relocate utilities.
- Demolish old water treatment plant, office trailer, concrete containment, parking apron

Spring 2018: Old Water Treatment Plant

Fall 2018: Demolished Old Water Treatment Plant

ENSERO solutions

RECLAMATION: SITE PREPARATION (SPRING – SUMMER 2018)
SCHWARTZWALDER MINE SITE

- Demolish old water treatment plant, office trailer, concrete containment, parking apron

Fall 2018: Demolished Old Water Treatment Plant

Fall 2018: Demolished Old Water Treatment Plant

ENSERO solutions

RECLAMATION: INSTALL 60 HP PUMP IN JEFFERY AIR SHAFT
SCHWARTZWALDER MINE SITE

- Winter 2018 – 2019. Began installation of 60 hp pump in Jeffery Air Shaft to allow for seasonal operation of WTP.
- Uncovered air shaft and performed down-hole camera inspection.
- Technical Revision #26.

Winter 2018-2019: 60HP Intake Pump

ENSERO solutions

RECLAMATION: INSTALL 60 HP PUMP IN JEFFERY AIR SHAFT
SCHWARTZWALDER MINE SITE

- Winter 2018 - 2019.
- Construct headframe, design pump & connect discharge line to WTP on mesa.
- Headframe / wench system allow CLL to service the pump without going underground.
- Intake at ~410 feet below the Steve Adit.
    - Jeffery Air Shaft is not perfectly straight.

Winter 2018-2019: 60HP Intake Pump

ENSERO solutions

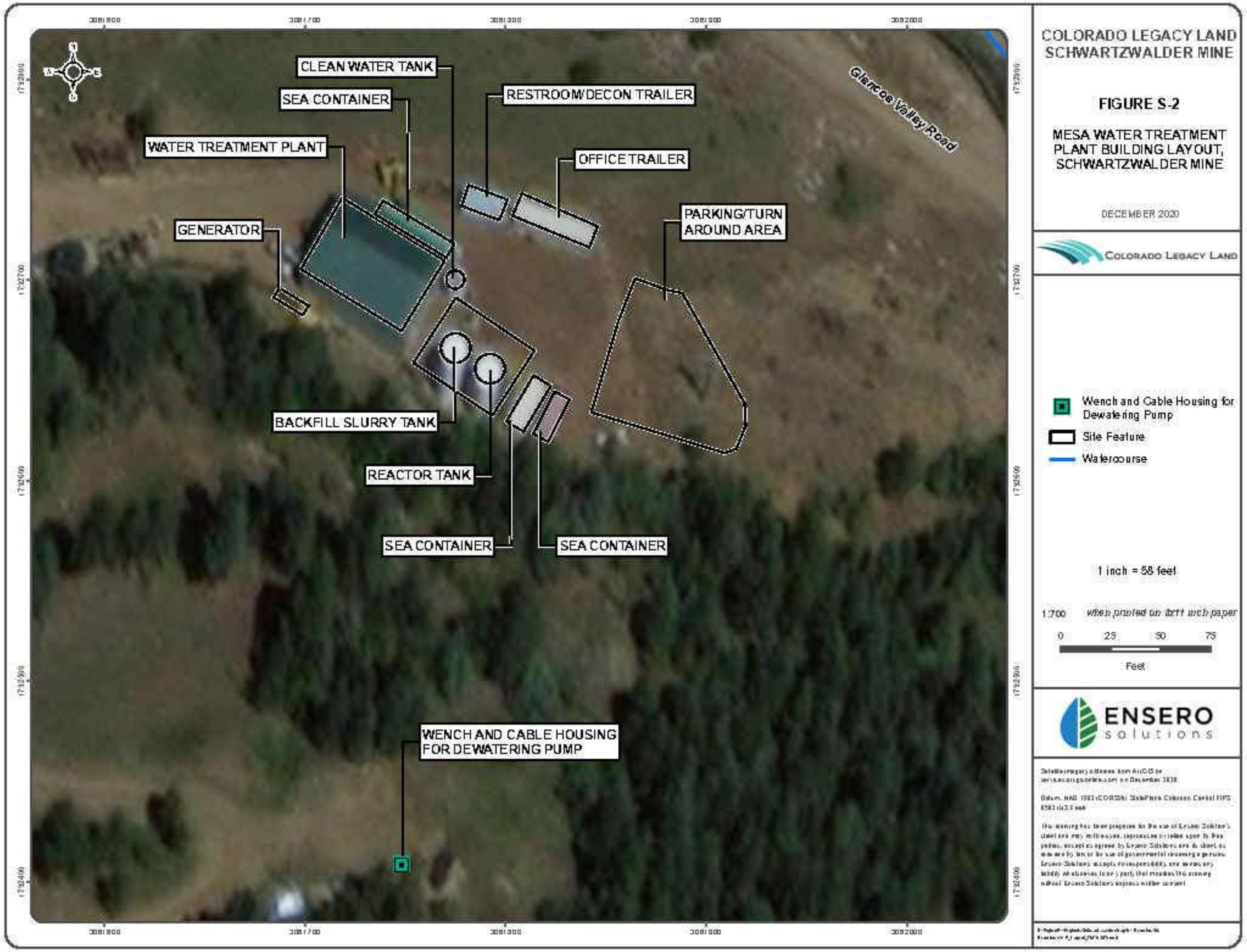
RECLAMATION: INSTALL 60 HP PUMP IN JEFFERY AIR SHAFT
SCHWARTZWALDER MINE SITE

- Winter 2018-2019: Lower new pump to depth and perform commissioning.

ENSERO solutions

RECLAMATION: RELOCATE WATER TREATMENT PLANT
SCHWARTZWALDER MINE SITE

- AM-05, Figure S-2 Mesa Water Treatment Plant Building Layout



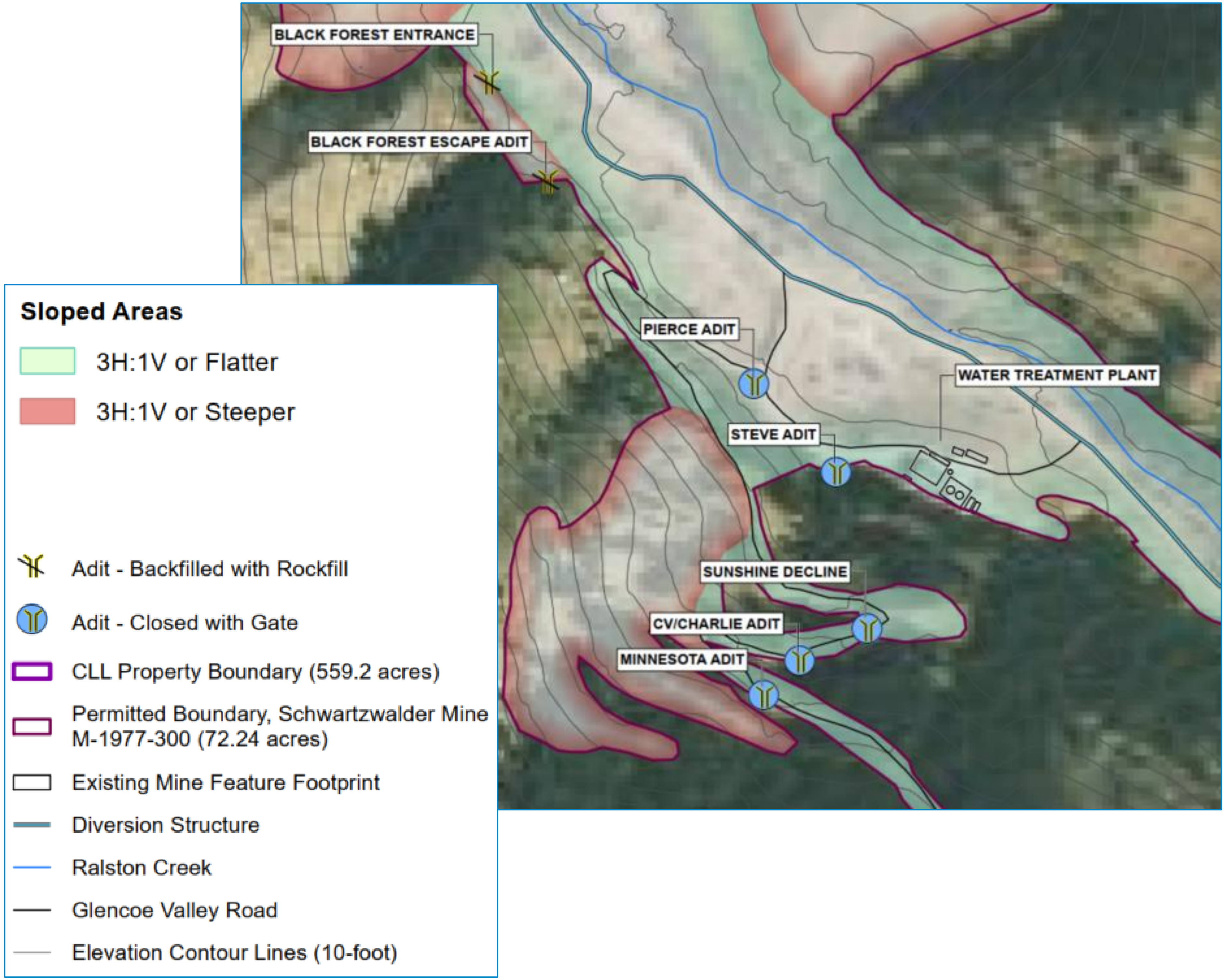
RECLAMATION: ALLUVIAL VALLEY EXCAVATION
SCHWARTZWALDER MINE SITE

- Fall/Winter 2018 to present.
- Excavation work is seasonal. Expected completion, Spring 2022.

Winter 2018: Alluvial Valley Excavation

MINE OPENING CLOSURE
SCHWARTZWALDER MINE SITE

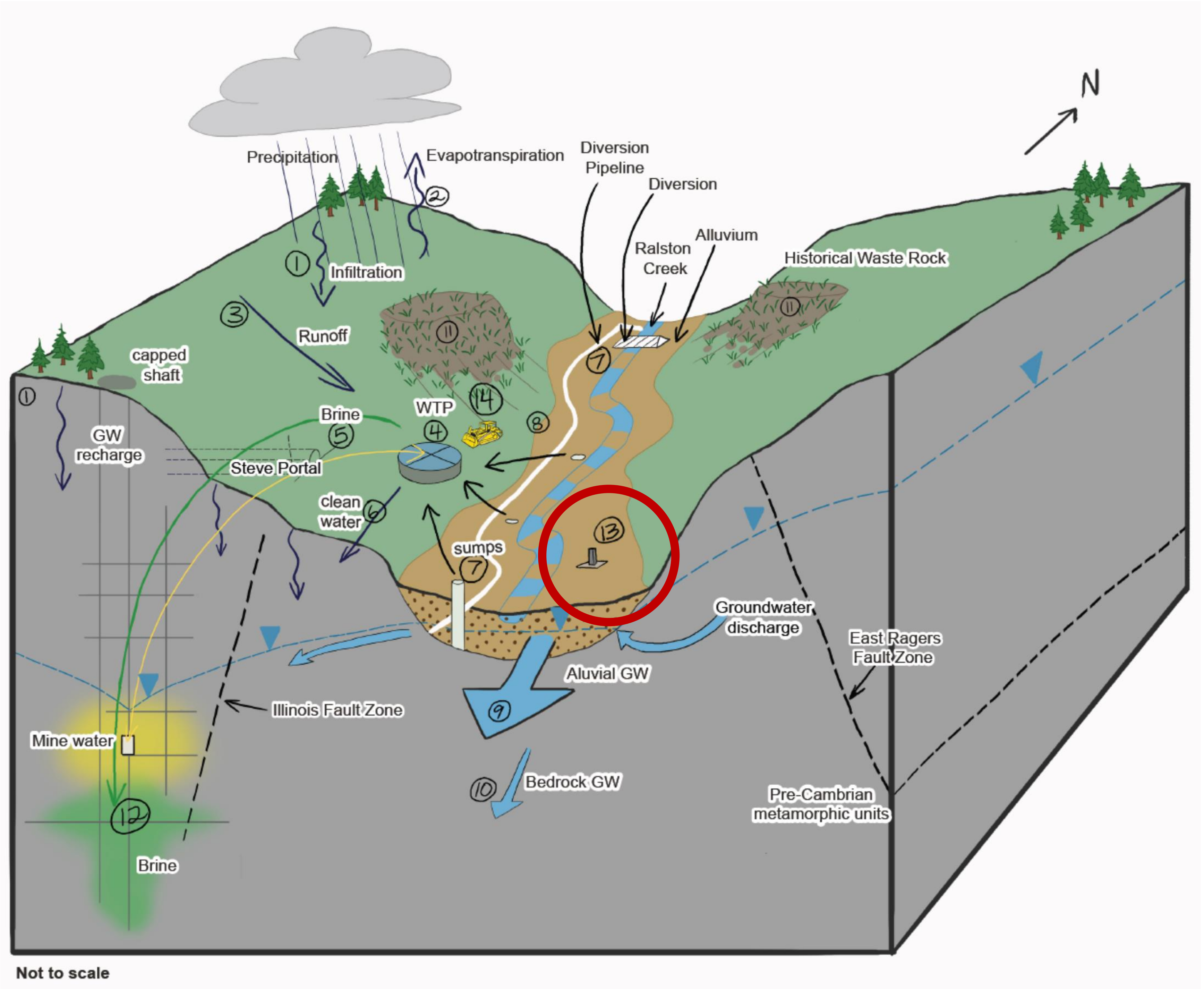
- Figure F-1 Reclamation Plan Map of AM-05 identifies adit closure types.
- Adits - Closed with gates by Cotter:
  - Minnesota
  - CV/Charlie
  - Sunshine
  - Steve
  - Pierce Adit
- Adits – Backfilled with Rockfill – 2022 Scope:
  - Black Forest Entrance
  - Black Forest Escape Adit



ENSERO solutions

WATER QUALITY MONITORING
SCHWARTZWALDER MINE SITE

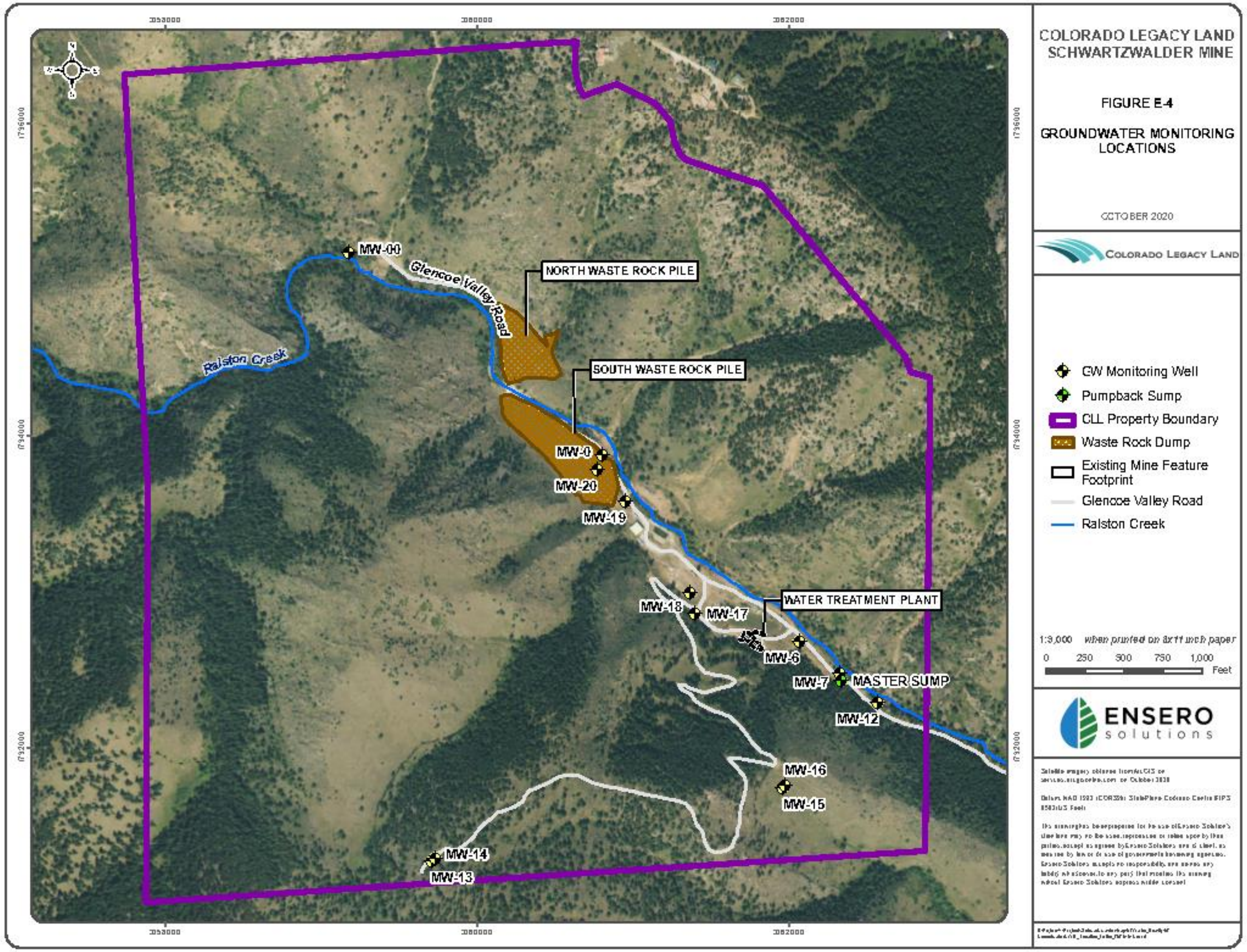
- #13 - Water Quality Monitoring
  - In addition to sampling for the discharge permit at the WTP, CLL performs quarterly surface water and groundwater monitoring for the Mine Land Reclamation Permit.



ENSERO solutions

GROUNDWATER MONITORING
SCHWARTZWALDER MINE SITE

- Quarterly monitoring of up to 13 wells.
  - Some alluvial wells were abandoned / removed during valley reclamation because the surrounding alluvium was removed.
- Upgradient, downgradient, and on-site adjacent to historical facilities and workings.
- Due to the dewatered condition of the mine and the bypass pipeline, many wells are dry.
- Deep Bedrock Monitoring Wells installed in 2012 to monitor the mine pool, Schwartz trend, and Illinois Fault zone.



ENSERO solutions

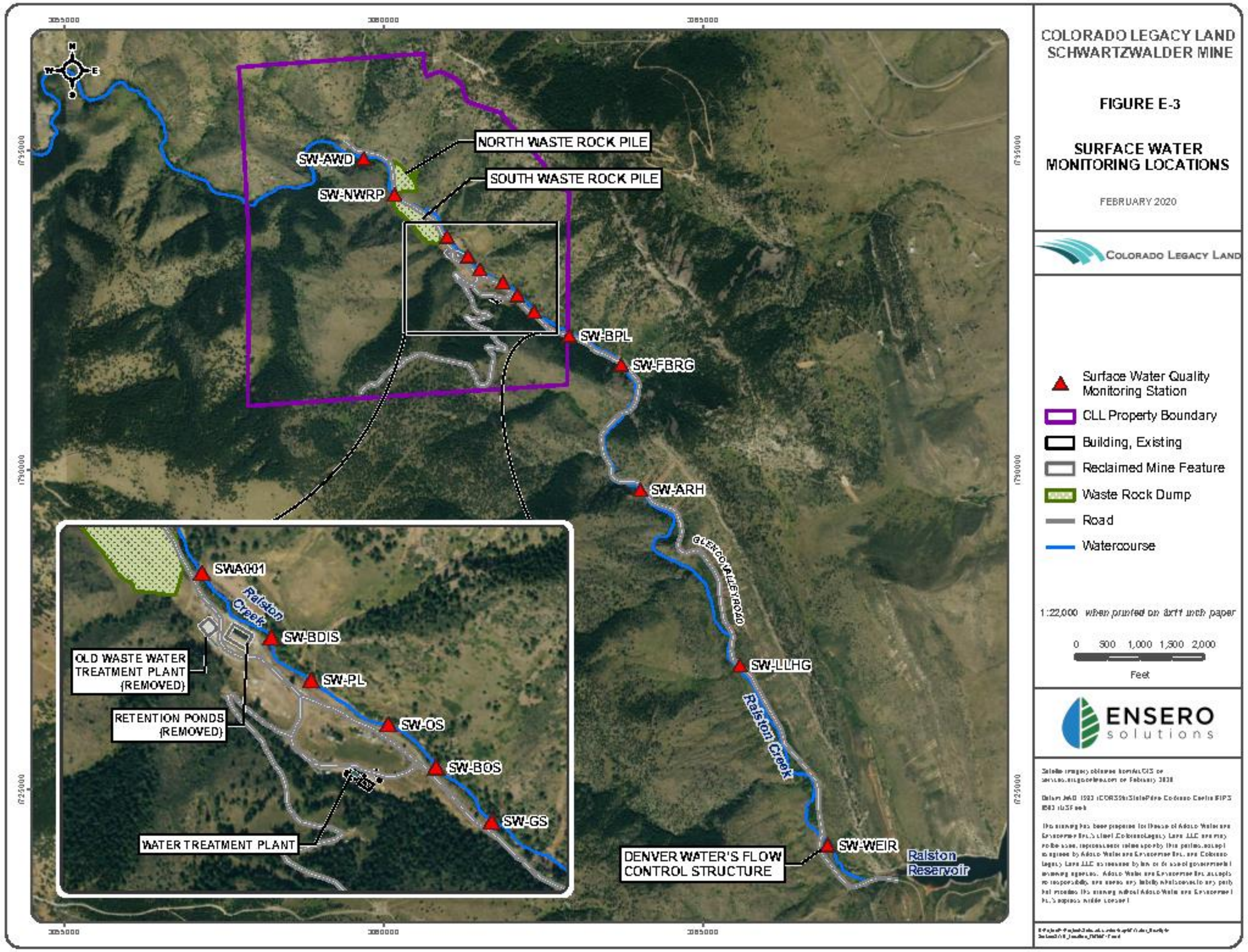
GROUNDWATER MONITORING – DEEP MONITORING WELLS (2012)

SCHWARTZWALDER MINE SITE

Well ID	Location Description	Depth (feet bgs)	Purpose
MW-13	Upgradient – Deep	499.76	Background – replacement for MW-11
MW-14	Upgradient - Shallow	154.34	Background – replacement for MW-10
MW-15	East of Schwartzwalder Mine, targeting Schwartz Trend geologic transition zone, downgradient relative to pre-mining static water level - Deep	1,007.13	Determine vertical and horizontal gradient/directions; determine water quality in bedrock east of Schwartzwalder Mine
MW-16	East of Schwartzwalder Mines downgradient relative to pre-mining static waste level - Shallow	324.74	Determine vertical and horizontal gradients/directions; determine water quality in bedrock east of Schwartzwalder Mine
MW-17	Valley floor	119.00	Target Illinois Fault, determine alluvium/bedrock head differences, determine water quality in bedrock
MW-18	Valley floor	239.90	Target Illinois Fault, determine alluvium/bedrock head differences; determine water quality in bedrock

SURFACE WATER MONITORING
SCHWARTZWALDER MINE SITE

- 13 surface water monitoring locations on Ralston Creek.
- 1 upstream
- 5 downstream
- 7 adjacent to site facilities
- Ralston creek is seasonally dry and several onsite sample locations (shown in call out box of Figure E-3) are typically dry because Ralston Creek is diverted in a bypass pipeline.



ENSERO solutions

RECLAMATION SUMMARY
SCHWARTZWALDER MINE SITE

Remediation Priorities:

- Maintained dewatered mine pool.
- Excavate contaminated alluvium (source area).

Ongoing Environmental Operations:

- Seasonal operation of WTP (2018 – present).
- In-situ treatment (2013, 2015, 2017, 2020, & 2021).

Reclamation Timeline:

- Demolition and site prep (2018).
- Relocate Water Treatment Plant (2018).
- Install new intake pump (2018-2019).
- North waste rock pile diversion channel (2019- 2020).
- Alluvial valley excavation (2018 – present).
- Mine opening closure (2022).
- Excavation has removed alluvium around all sumps, except for Sump 1, eliminating their usefulness (2020-2021).

Summer 2019: Alluvial Valley Excavation Work

2018 DATA ISSUES AND 2021 UPDATE: HYDROLOGY
SCHWARTZWALDER MINE SITE

- 2018: More accurate stream flow measurements to evaluate gaining/losing reaches with more confidence
  - 2021: CLL began collecting quarterly flow data in 2019. These data are reported with analytical results to all project stakeholders.
- 2018: Evaluation of future flood impacts on waste dumps and other facilities.
  - 2021: NWRP Channel was constructed in 2020. Onsite waste dumps and mesa were stable through 2013 flood.
- 2018: Additional evaluation of the Illinois Fault Zone, as it may be a significant connection between the mine area and Ralston Ck.
  - 2021: Currently N/A – CLL intends to maintain a dewatered mine pool to below required regulatory levels. Monitored by MW-15, MW-16, MW-17, and MW-18
- 2018: More robust infiltration/GW recharge evaluation
  - 2021: Provided in 2016 EPP and updated with new data in AM-06.
- 2018: More robust mine inflow analysis (in progress)
  - 2021: Provided in 2016 EPP and updated with new data in AM-06.
- 2018: Continued evaluation of mine pool geochemistry, inflows, in-situ treatment etc.
  - 2021: Provided in AM-06 & continued with quarterly monitoring program.

2018 DATA ISSUES AND 2021 UPDATE: CHEMISTRY
SCHWARTZWALDER MINE SITE

- Ongoing evaluation of contamination (mine, alluvium, bedrock, soils):
  - Surficial deposits (e.g., waste rock)
  - Soil/surface contamination from mining
  - Stored mass in alluvium (e.g., sorbed or labile phases like salts).
  - Mine pool connection to Ralston Creek and alluvium in dewatered condition.
  - Natural source from mineralized bedrock and secondary deposits in alluvium
- Ongoing monitoring of mine pool chemistry and groundwater quality in wells.

2018 DATA ISSUES AND 2021 UPDATE: NEXT STEPS
SCHWARTZWALDER MINE SITE

- 2018: Complete alluvial valley excavation of known contaminated soils (source materials).
  - Greater than 95% complete and expected to complete in 2022.
- 2018: Finish demolition of old WTP building in valley (concrete containment area, old WTP, old office trailer).
  - Completed in 2018
- 2018: Construct conveyance pipeline to prevent ephemeral SW drainage onto the North Waste Rock Facility.
  - Completed in 2020.
- 2018: Resume scheduled in-situ treatment of mine pool.
  - Completed in 2020 and 2021
- 2018: Lower WTP intake pump down in mine pool (60hp pump).
  - Completed in 2019.

2018 DATA ISSUES AND 2021 UPDATE: NEXT STEPS
SCHWARTZWALDER MINE SITE

- Continued environmental monitoring, reporting with Agencies and project stakeholders.
  - Application Amendment 05.
  - Application Amendment 06.
  - Technical Revisions 26, 27, 28, and 29.
  - Monthly surface water sampling report.
  - Monthly discharge report from water treatment plant.
  - Quarterly environmental monitoring (surface water and groundwater sampling) report.

2018 DATA ISSUES AND 2021 UPDATE: NEXT STEPS
SCHWARTZWALDER MINE SITE

- Communication with Agencies and project stakeholders:
  - May 2018: Meet & greet with Beartooth Ranch HOA.
  - July 2018: Meet & greet / site tour with Jefferson County Open Space. Open dialogue & access for wildlife biologists to study the site.
  - October 2018: Field trip for Colorado School of Mines students in "Mining & the Environmental Class".
  - November 2018: Presented initial Conceptual Site Model to DRMS, Denver Water & Geosyntec.
  - October 2019: Field trip for Colorado School of Mines students in "Mining & the Environmental Class".
  - June 2019: Site tour for DRMS, Denver Water & Geosyntec.
  - May – July, 2020: Correspondence with Denver Water on environmental monitoring data.
  - Summer 2020: Meet & greet / site tour with Conservation Land Trust(s).
  - October 2020: Site tour for DRMS, Denver Water & Geosyntec.
  - July – October 2020: Receive & respond to comments on AM-05.
  - January 2021: Virtual meeting with DRMS, Denver Water, Geosyntec, & City of Arvada to respond to comments on SR-9.
  - May 2021: Site tour with DRMS, Denver Water & Geosyntec.
  - May 2021: Virtual meeting with Denver Water, Geosyntec,
  - June 2021: Site tour with City of Arvada & DRMS.
  - July – December 2021: Receive and respond to comments on AM-06.
  - November 2021: Virtual meeting with City of Arvada, Denver Water, Geosyntec, and DRMS on AM-06 comments.

APPENDIX 2. TRACER TEST

(This page intentionally left blank.)

Tracer Test

During 2020, a two-chemical tracer test was conducted in the Schwartzwalder Mine to evaluate the system hydraulics and the degree that organic carbon placed underground would disperse within the mine workings to facilitate in-situ treatment. The tracer test setup is shown diagrammatically on Figure 1. Note that the Jeffrey Shaft connects to the #2 Shaft at about 1,100 ft below the Steve Level (bsl). After mine pool pumping was discontinued on December 20, 2019, the mine water level rose in response to groundwater inflows and sump water injected into the workings. On January 28, 2020, during the period of rising water level, 25 pounds (lbs) of Rhodamine WT dye was mixed with 49,400 lbs of beet molasses and gravity fed through a pipe in the #2 Shaft, discharging into the mine water at a depth of 410 ft bsl. On January 29, 2020, 6 lbs of Fluorescein dye was mixed with 44,800 lbs of ethanol and placed in a similar manner in the #2 Shaft at a depth of 1,110 ft bsl.

During the next three months, the fluorescent dyes dispersed within the mine workings as the mine water level continued to rise as shown on Figure 2. From April 19 to May 28, 2020, the mine pool was pumped using either the 60 horsepower (hp) pump set at 410 ft bsl in the Jeffrey Shaft or the 25 hp pump set at 210 ft bsl in the #2 Shaft. After seven days of non-operation, the system was then pumped starting on June 4, 2020, using the 60 hp pump. Pumping with the 60 hp pump was maintained until October 29, 2020, after which the mine water level again rose due to groundwater inflow and sump injection. During 2020, the highest mine water level was approximately 6,423 ft msl, which occurred during early May.

During mine pool pumping from May through October 2020, water samples were collected from the mine water (influent to the WTP) and sent to Ozark Underground Laboratory for analysis of Rhodamine WT and Fluorescein concentrations. Tracer sampling was discontinued on October 27, 2020, just before mine pool pumping was discontinued to initiate the winter shutdown. During the winter shutdown, the mine water level again rose due to groundwater inflows and sump water injection. Pumping with the 60 hp pump was resumed on June 4, 2021 and maintained into the fall. After 2021 pumping resumed, two additional samples of the WTP influent were obtained in mid-June and early August.

Tracer Test Concept

After injection, the tracers were expected to disperse within the mine workings by several mechanisms including advection and possible density variations. The Rhodamine WT/beet molasses mixture was used to create an injection mixture with a density greater than water and thus had the potential to sink downward within the #2 Shaft. Conversely the Fluorescein/ethanol mixture created an injection mixture with a density less than water and had the potential to rise upward in the #2 Shaft and possibly in the Jeffrey Shaft. In addition to density-related mechanisms, there was continuous upward advective flow in both the #2 Shaft and the Jeffrey Shaft, driven by deeper groundwater inflow to the mine and water going into storage within open voids at the rising water table.

When mine pool pumping was resumed, the tracers were expected to migrate to the pump and become part of the influent to the WTP. Because the WTP is based on reverse osmosis (RO), tracers entering the plant were retained and sent back into the mine via the RO reject. While a tracer could migrate vertically within the mine (e.g., due to density variations), it is unlikely that any tracer left the mine during the tracer test. In fact, no tracers left the mine/WTP system as confirmed by sampling the WTP treated-water discharge, which was non-detect for both Rhodamine WT and Fluorescein. The current water management strategy of depressing the mine water level by pumping ensures that water in the mine pool does not leave the mine and migrate into the outside groundwater flow system.

The interpreted flow conditions that occurred during early pumping (May 2020) using the 25 hp pump located in the #2 Shaft is shown on Figure 3. While there was a net water discharge from the mine (WTP treated discharge), the tracers in the WTP were returned to the #2 Shaft via the RO reject. Because there was upward flow from the lower mine workings, dissolved tracer would become “trapped” in an accumulation/recycle zone (ARZ) extending from the bottom of the return pipe at 1,100 ft bsl to the 25 hp pump intake at 210 ft bsl. New mine water would continuously pass through the ARZ, and if that water contained tracer, it would accumulate in the ARZ and one would expect to see systematically increasing tracer concentrations in the WTP influent. When mine pool pumping was transferred to the 60-hp pump, a new ARZ was established in the Jeffrey Shaft as shown on Figure 4. The tracer concentrations in the newly created Jeffrey Shaft ARZ would be expected to systematically increase over time as long as pumping was maintained. If the tracers were stable and chemically inert, and if the system had a high degree of collection efficiency, one would expect that after a long period of pumping, much of the originally injected tracer mass would end up recirculating in the prevailing ARZ

Groundwater Inflow Rates

An important component of the mine water balance is the rate of groundwater inflow into the mine, which should only depend on the mine pool elevation. For a given water level elevation in the mine, the inflow rate should be similar regardless of whether the mine is being pumped or is passively refilling.

Calculations were performed to estimate the mine inflow rate for two time periods shown as horizontal red lines on Figure 2. During the first period (December 1, 2019, to January 15, 2020), the mine water level ranged from 6,334 to 6,354 ft amsl and the computed total mine inflow rate was 60.6 gallons per minute (gpm). For the second period (October 7, 2020, to November 15, 2020), the mine water level ranged from 6,257 to 6,290 ft amsl and the computed inflow rate was 63.8 gpm. It is reasonable that the second inflow rate of 63.8 gpm is somewhat higher because the mine pool elevation was lower.

A separate calculation was performed to estimate the amount of inflow to the lower mine workings versus upper workings. For this analysis, “upper workings” were defined as those above 6,192 ft msl (or 410 ft bsl) and “lower workings” were those deeper than 6,192 ft msl. It was assumed that when the mine water level was 6,350 ft msl, the total mine inflow rate was 61 gpm. The calculations predict that for the mine water level at 6,350 ft msl, the inflow to upper workings would be 30 gpm and inflow to lower workings would be 31 gpm. The results suggest that during the entire tracer test, the continuous up flow from lower workings into the ARZ would be on the order of +/- 30 gpm.

When the mine was completely dewatered at full build-out, the reported inflow rate was 190 gpm. An additional calculation estimated that for this historical condition, inflow to the upper workings was 35 gpm and inflow to the lower workings was 155 gpm.

Tracer Concentrations

Tracer concentrations measured in the WTP influent are shown on Figure 5. Also shown on this figure are the periods when pumping was performed using the 60-hp pump located in the Jeffrey Shaft and the 25-hp pump in the #2 Shaft.

During early pumping with the 25-hp pump in the #2 Shaft, the Fluorescein concentration was at 13 to 16 micrograms per liter (µg/L), which may have resulted from density-driven upward migration of Fluorescein prior to pumping from its deep injection point in the #2 Shaft. In contrast, the Rhodamine WT concentration during early pumping was less than 3 µg/L. Although the Rhodamine WT/molasses mixture was placed at a shallower depth in the #2 Shaft, its higher density may have caused the mixture to migrate downward prior to pumping so that it only partially reached the pump. When the 60-hp pump was started in the Jeffrey Shaft in early June, there were marked changes in tracer concentrations. The Fluorescein concentration in the WTP influent dropped to less than 3 µg/L and the Rhodamine WT concentration increased to greater than 10 µg/L. The reasons for these concentration changes are unclear. While operating the 25 hp pump, an ARZ was set up in the #2 Shaft between the depths of 1,100 ft and 210 ft bls as shown on Figure 3. After 7 days of no pumping, the 60 hp pump was operated and a new ARZ was established in the Jeffrey Shaft between the depths of 1,100 ft and 410 ft bls as shown on Figure 4. It appears there was a loss of Fluorescein mass and an increase in Rhodamine WT mass in the WTP/mine recycle system when the ARZ shifted from the #2 Shaft to the Jeffrey Shaft.

After mid-June 2020, with continued pumping from the Jeffrey Shaft, the tracer concentrations were stable until pumping was discontinued at the end of October 2020. During this period, the Rhodamine WT concentrations ranged from 9 to 11 µg/L and the Fluorescein concentrations ranged from 2 to 3 µg/L. The systematic increase in tracer mass that was expected during continued operation of the Jeffrey Shaft ARZ was not observed in the tracer data. This observation suggests that nearly all available dissolved tracer had reached the ARZ and almost no additional dissolved tracer mass was migrating into the ARZ from other parts of the mine.

To investigate these observations further, a steady-state flow and Rhodamine WT mass balance was performed for the end of the pumping period (October 1 to October 28, 2020). These calculations are provided in Table 1 and flow/concentration values are shown graphically on Figure 6.

APPENDIX 2, TABLE 1: FLOW AND RHODAMINE WT MASS BALANCE FOR THE PERIOD 10/01/20 TO 10/28/20

$\mu g := 10^{-6} \cdot gm$

$Q_{wt} := 270 \cdot gpm$	WTP influent	
$Q_{rj} := 106.9 \cdot gpm$	WTP reject	
$Q_{sp} := 20.1 \cdot gpm$	Sump	$\frac{Q_{rj}}{Q_{wt}} = 39.6 \cdot \%$
$Q_{gw} := 63.8 \cdot gpm$	Groundwater inflow	
$C_{wt} := 9.82 \cdot \frac{\mu g}{liter}$	Conc in WTP influent (average of 4 samples taken during October 2020)	
$C_{rj} := 27.25 \cdot \frac{\mu g}{liter}$	Conc in WTP reject (average of 2 samples taken during October 2020)	

WTP Balance

$M_{wt} := C_{wt} \cdot Q_{wt}$	Mass flux to WTP	$M_{wt} = 0.032 \cdot \frac{lb}{day}$
$M_{rj} := C_{rj} \cdot Q_{rj}$	Mass flux in WTP reject	$M_{rj} = 0.035 \cdot \frac{lb}{day}$

This is a tight chemical mass balance indcating that no tracer mass is lost from the WTP. This is verified by tracer mass not detected in the WTP *treated* discharge.

Mine Balance

$Q_{st} := Q_{wt} - Q_{rj} - Q_{sp} - Q_{gw}$	Water released from mine storage by the downward-moving water table	$Q_{st} = 79.2 \cdot gpm$
$M_m := M_{wt} - M_{rj}$	Tracer mass coming into the system from other parts of the mine	$M_m = -0.003 \cdot \frac{lb}{day}$

This result is within measurement error and suggests that there is no significant gain or loss of tracer mass in the recycle/mixing system.

Mixing zone (Jeffrey shaft from 1100' to 410')

$D := 8 \cdot ft$	Shaft diameter ***(assumed)***	
$L := (1100 - 410) \cdot ft$	Length of mixing zone	$L = 690 \cdot ft$
$V := L \cdot \frac{\pi}{4} \cdot D^2$	Water volume	$V = 9.821 \times 10^5 \cdot lite$
$M := V \cdot C_{wt}$	Mass of tracer in recycle/mixing zone	$M = 0.021 \cdot lb$
$t := \frac{V}{Q_{wt}}$	Residence time in mixing zone	$t = 0.667 \cdot day$

The mass of tracer in the recycle/mixing zone (0.021 lb) is very small compared to the original mass of injected tracer (25 lb). Nearly all the tracer originally placed is not migrating towards the 60 hp pump or has somehow degraded within the system.

The conclusions of the Rhodamine WT mass balance are summarized below:

- The Rhodamine WT mass flux leaving the WTP (via the RO reject) was essentially equal to the mass flux entering the WTP. There was no significant loss of tracer mass from the WTP, which was confirmed by no tracer being detected in WTP treated-water effluent.
- There appeared to be no significant loss or gain of Rhodamine WT mass in the Jeffrey Shaft ARZ, suggesting that essentially no additional dissolved tracer from other parts of the mine was entering or leaving the ARZ.
- The mass of accumulated Rhodamine WT in the ARZ (0.021 lbs) was very small compared to the original mass of injected Rhodamine WT (25 lbs).

A similar water/mass balance for Fluorescein in the Jeffrey Shaft ARZ is provided in Table 2. The result of this analysis leads to the same bulleted conclusions presented above.

Discussion

During the duration of the tracer test, there was no flow leaving the mine as confirmed by the mine pool elevation being consistently below the regulatory limit of 150 ft bsl. Based on the absence of detected tracer in the WTP treated discharge and the unlikelihood that mine pool water could leave the mine hydraulically, it is considered that virtually all the Rhodamine WT and Fluorescein mass originally injected into the underground workings remained in the mine. However, after months of pumping the mine pool with the 60-hp pump, only a small fraction of the originally injected tracers made their way into the ARZ. This suggests several possibilities:

1. The tracers were dispersed and diluted within a very large volume of mine water that did not have sufficient time to migrate into the ARZ,
2. The tracers rapidly degraded within the underground environment, and/or
3. The tracers absorbed onto solids (e.g., mine walls, particulates, timbers, etc.) and became immobile; that is, no longer dissolved in mine water.

The tracer test data indicate that nearly all of the originally injected tracer mass did ***not*** migrate into the Jeffrey Shaft ARZ during 5 months of nearly continuous pumping. Several possible explanations for this observation are proposed above, but the exact cause(s) cannot be definitively determined at this time.

APPENDIX 2, TABLE 2: FLOW AND FLUORESCEIN MASS BALANCE FOR THE PERIOD 10/01/20 TO 10/28/20

$Q_{wt} := 270 \cdot gpm$ — WTP influent

$Q_{rj} := 106.9 \cdot gpm$ — WTP reject

$Q_{sp} := 20.1 \cdot gpm$ — Sump

$Q_{gw} := 63.9 \cdot gpm$ — Groundwater inflow

$C_{wt} := 2.89 \cdot \frac{\mu g}{liter}$ — Conc in WTP influent (average of 4 samples taken during October 2020)

$C_{rj} := 7.435 \cdot \frac{\mu g}{liter}$ — Conc in WTP reject (average of 2 samples taken during October 2020)

$\mu g := 10^{-6} \cdot gm$

$\frac{Q_{rj}}{Q_{wt}} = 39.6 \cdot \%$

WTP Balance

$M_{wt} := C_{wt} \cdot Q_{wt}$ — Mass flux to WTP — $M_{wt} = 0.00938 \cdot \frac{lb}{day}$

$M_{rj} := C_{rj} \cdot Q_{rj}$ — Mass flux in reject from WTP — $M_{rj} = 0.00955 \cdot \frac{lb}{day}$

This is a tight chemical mass balance for the WTP indcating that no tracer mass is lost from the system. This is verified by tracer mass not detected in the WTP *treated* discharge.

Mine Balance

$Q_{st} := Q_{wt} - Q_{rj} - Q_{sp} - Q_{gw}$ — Water released from mine storage by moving water table — $Q_{st} = 79.1 \cdot gpm$

$M_m := M_{wt} - M_{rj}$ — Tracer mass coming into the system from other parts of the mine — $M_m = -0.00017 \cdot \frac{lb}{day}$

This result is within measurement error and suggests that there is no signficant gain or loss of tracer mass in the recycle/mixing system.

Mixing zone (Jefjrey shaft from 1100' to 410')

$D := 8 \cdot ft$ — Shaft diameter ***(assumed)***

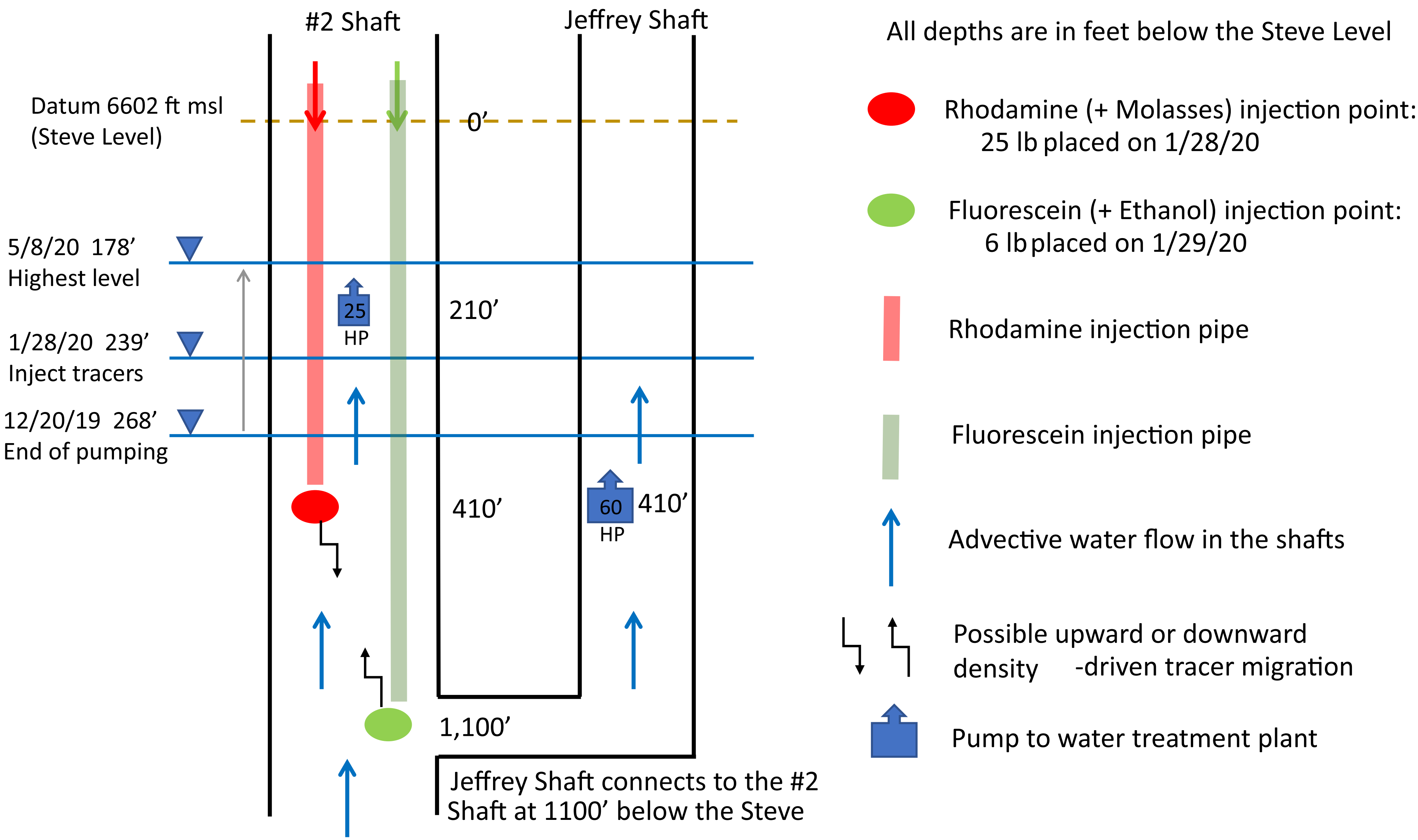
$L := (1100 - 410) \cdot ft$ — Length of mixing zone — $L = 690 \cdot ft$

$V := L \cdot \frac{\pi}{4} \cdot D^2$ — Water volume — $V = 9.821 \times 10^5 \cdot liter$

$M := V \cdot C_{wt}$ — Mass of tracer in recycle mixing zone — $M = 0.0063 \cdot lb$

$t := \frac{V}{Q_{wt}}$ — Residence time in mixing zone — $t = 0.667 \cdot day$

The mass of tracer in the recycle/mixing zone (0.0063 lb) is very small compared to the original mass of injected tracer (6 lb). Nearly all the tracer originally placed is not migrating towards the 60 hp pump or has somehow degraded within the system.



NOT TO SCALE

COLORADO LEGACY LAND

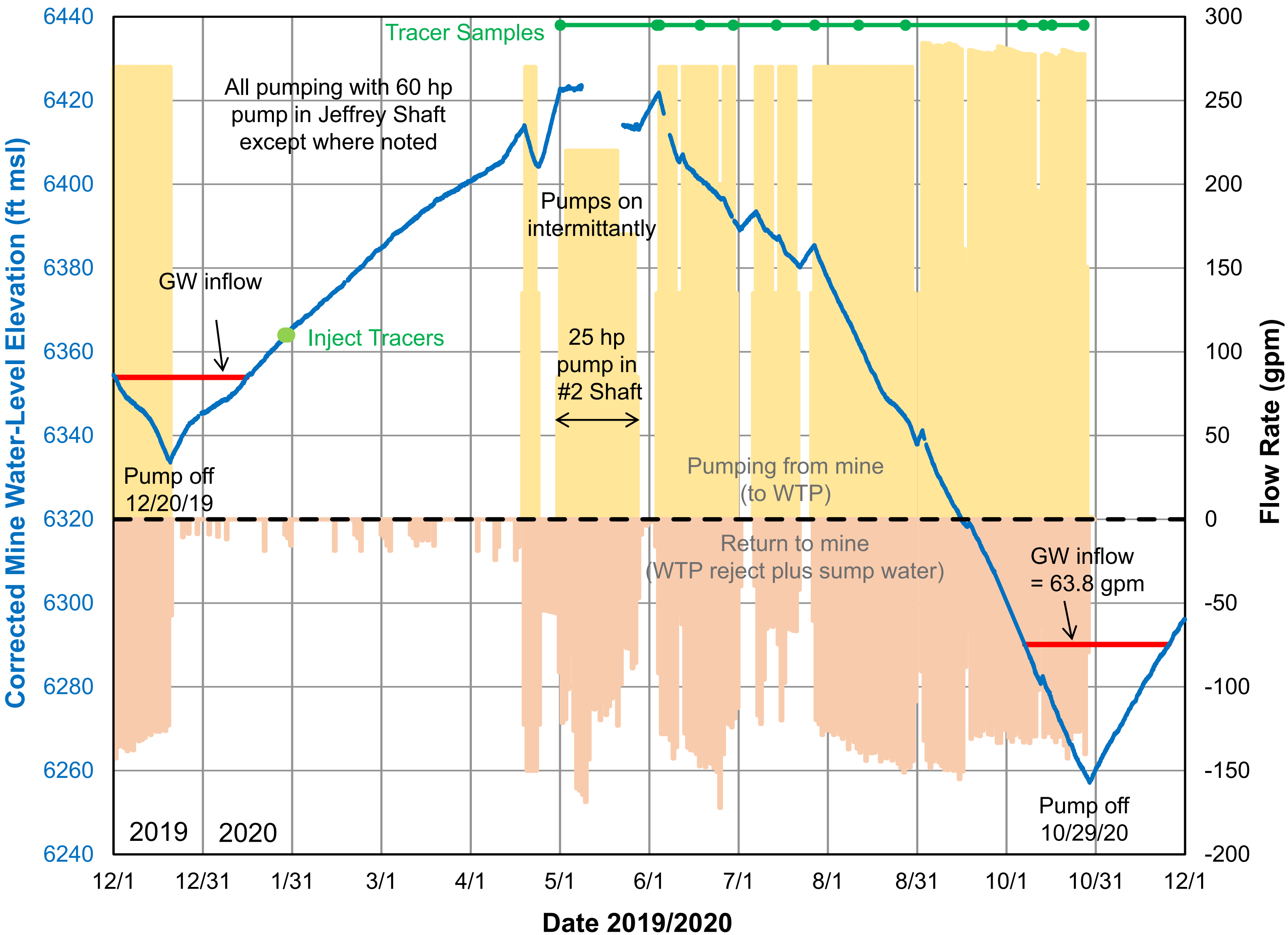
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 1
TRACER TEST SETUP

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



This drawing has been prepared for the use of Ensero Solution's client and may not be used, reproduced or relied upon by third parties, except as agreed by Ensero Solutions and its client, as required by law or for use of governmental reviewing agencies. Ensero Solutions accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without Ensero Solutions express written consent.

Colorado Legacy Land

ENSERO solutions

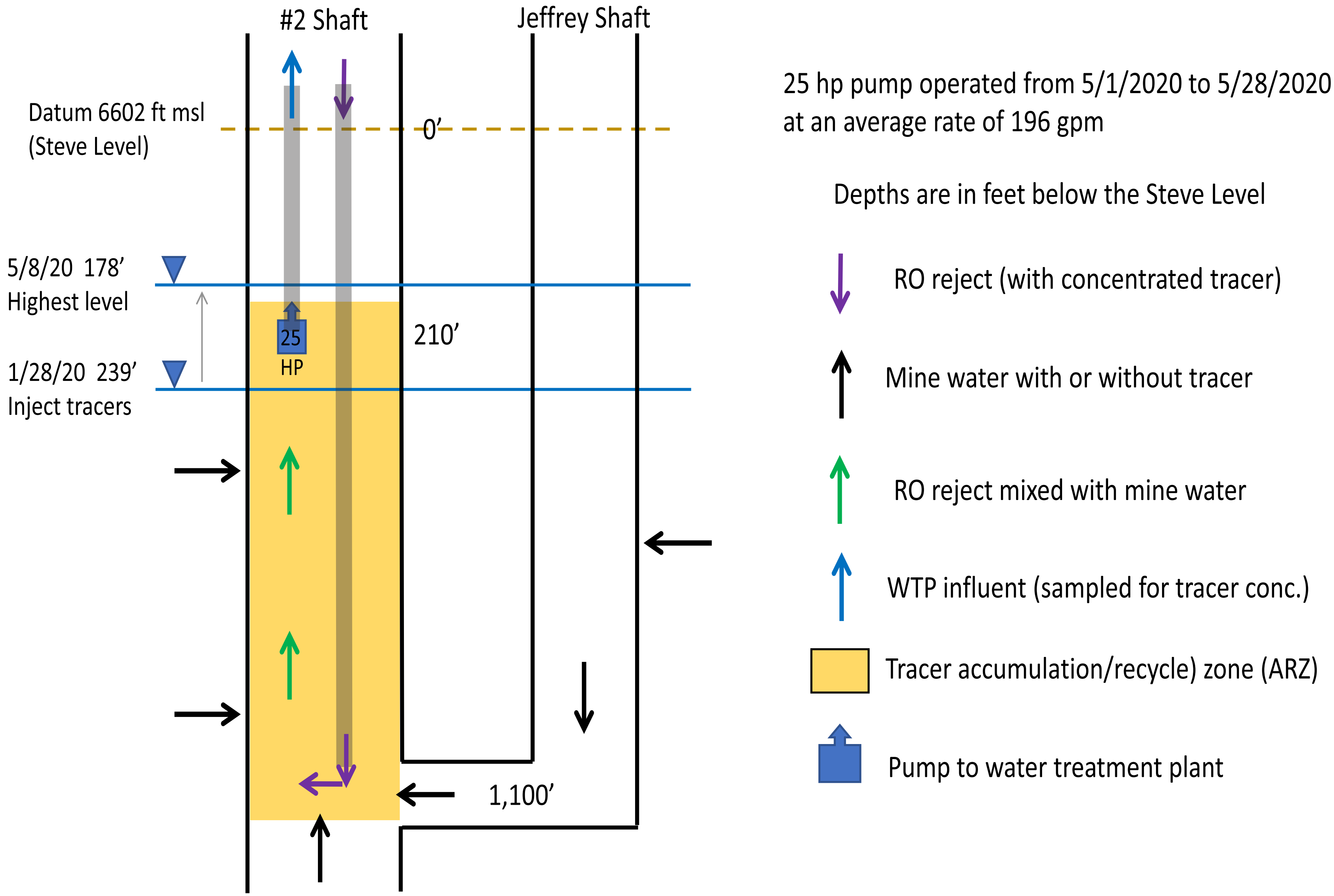
COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 2
FLOW AND WATER LEVELS
DURING TRACER TEST

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300

All tracer in the WTP influent returned to the mine via the RO reject



NOT TO SCALE

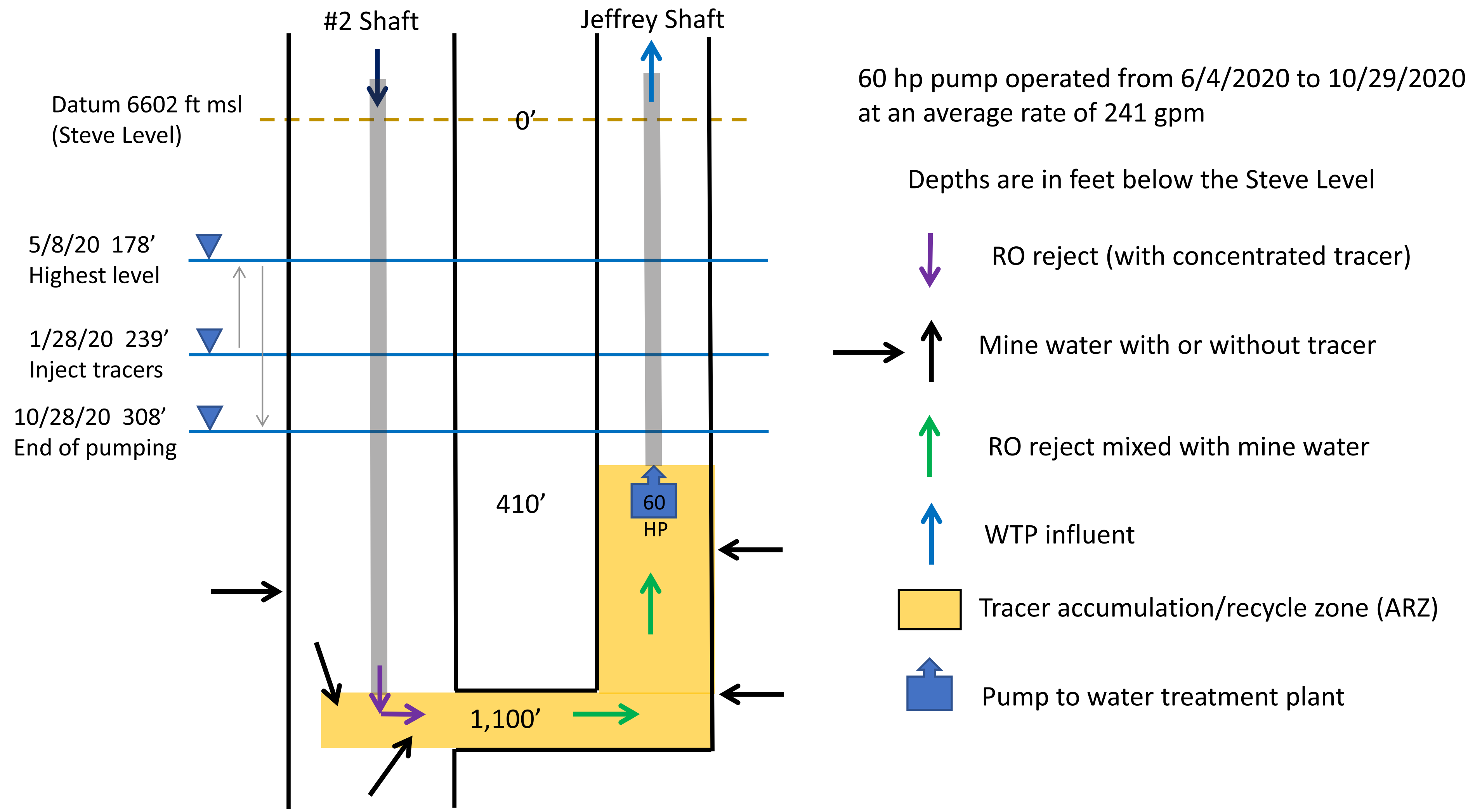
COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 3
EARLY PUMPING WITH 25HP PUMP

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300

All tracer in the WTP influent returned to the mine via the RO reject



NOT TO SCALE

Colorado Legacy Land

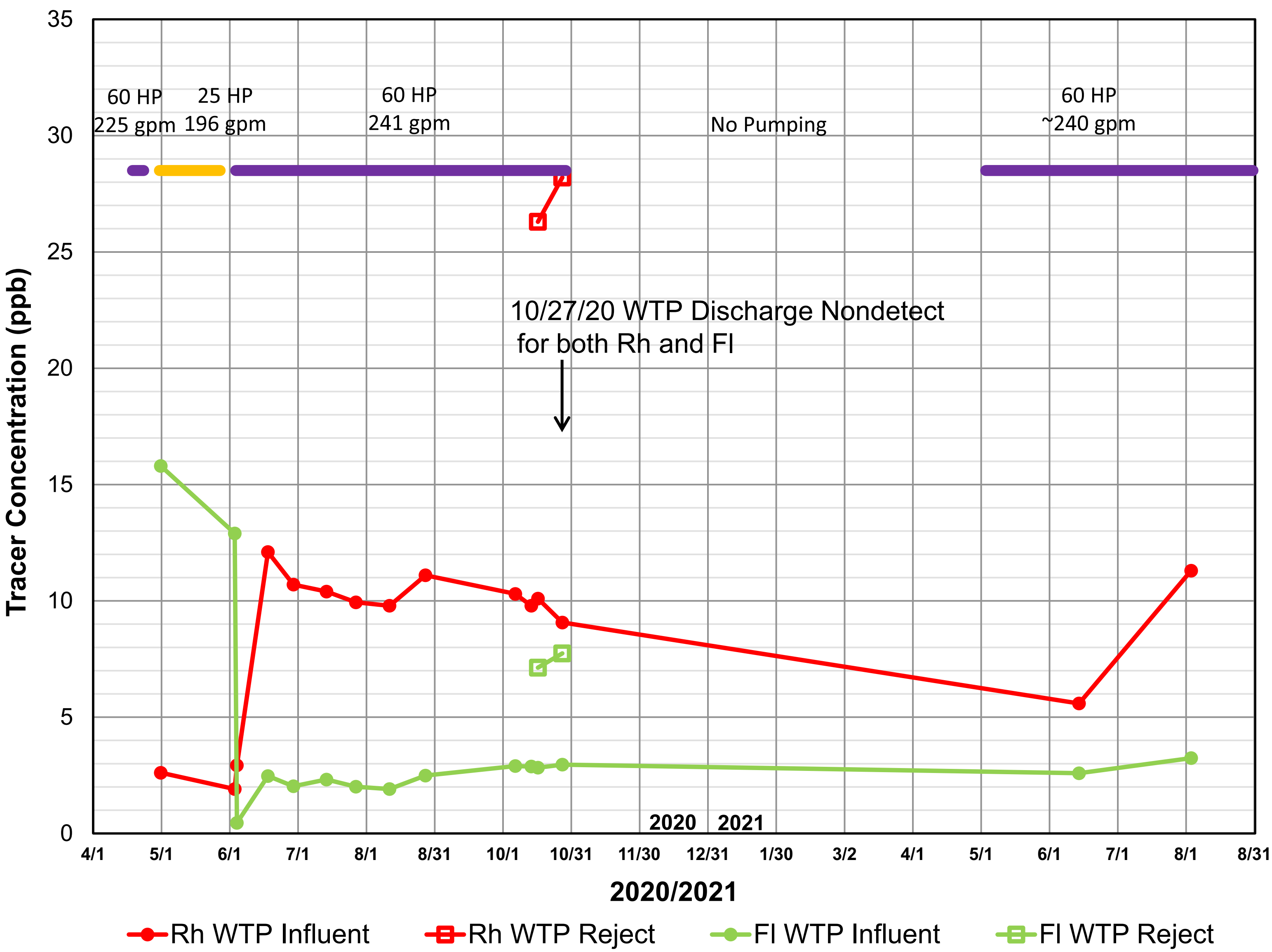
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 4
SUBSEQUENT PUMPING WITH 60HP PUMP

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



Colorado Legacy Land

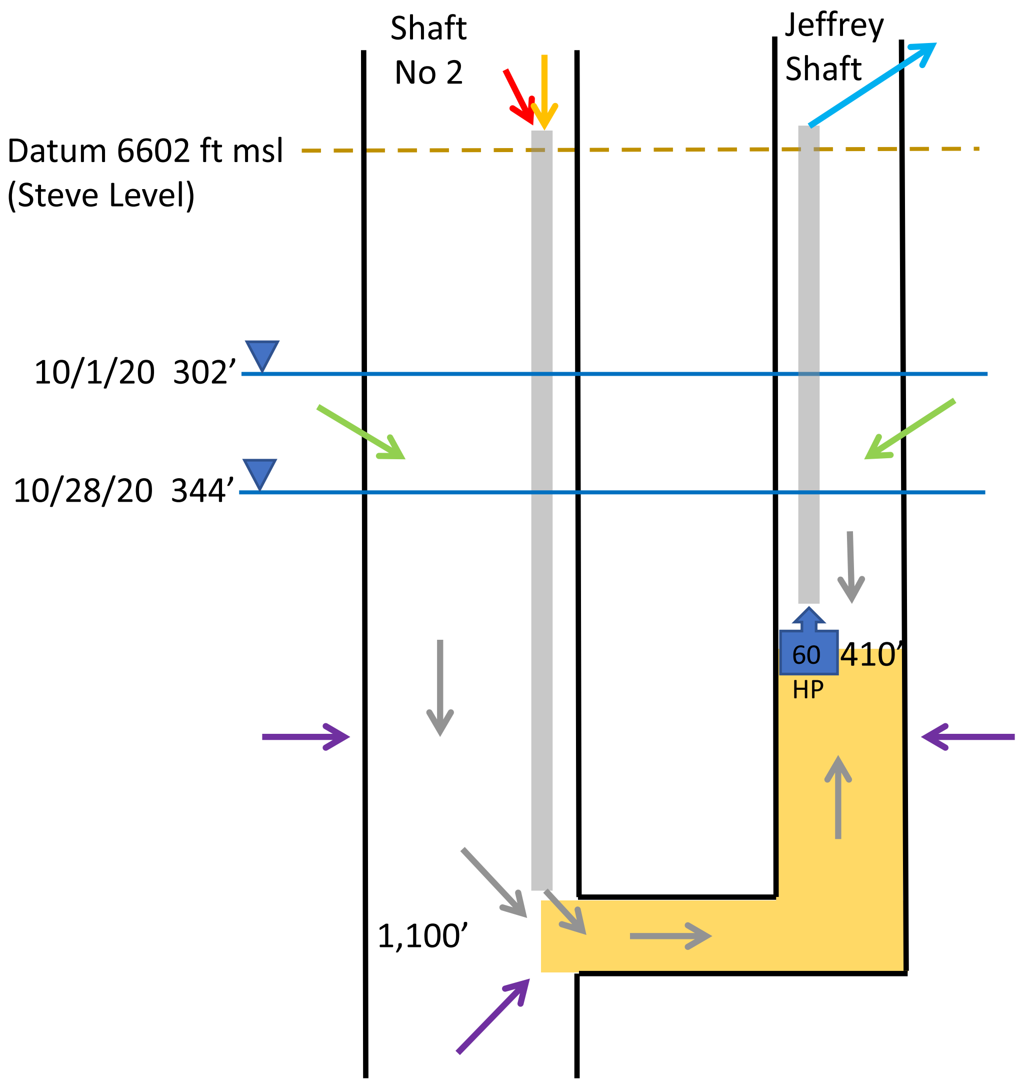
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 5
MEASURED TRACER CONCENTRATIONS

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



Time Period: 10/1/20 to 10/28/20

WTP Influent: 270.0 gpm, 9.82 ug/L

WTP reject: 106.9 gpm, 27.25 ug/L

Sump: 20.1 gpm, 0 ug/L

From water table dewatering: 79.2 gpm, ~0 ug/L

GW inflow: 63.8 gpm, ~0 ug/L

Tracer recycle/mixing zone
Rhodamine mass = 0.021 lb

Depths are in feet below the Steve Level

Jeffrey Shaft connects to Shaft No 2 at 1,100' below the Steve Level

NOT TO SCALE

Colorado Legacy Land
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 6
RHODAMINE STEADY-STATE CONDITIONS

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300

Appendix 3. Schwartzwalder Mine – Hydrogeology Associated with the Current Water Management Program

(This page intentionally left blank.)

Memorandum

To: Colorado Legacy Land, LLC

From: Ensero Solutions, Inc.

Date: December 1, 2021

Re: Schwartzwalder Mine – Hydrogeology Associated with the Current Water Management Program

1 INTRODUCTION

The current water management program at the Schwartzwalder Mine is to depress the mine water level by seasonal pumping. Per Agency agreement, the mine water level must be maintained lower than 6,452 feet mean sea level (ft msl), or greater than 150 feet (ft) below the Steve Level (collectively 'regulatory level'). From May through October, the mine is pumped at a relatively high rate, which causes the mine water level to drop well below the regulatory level. After pumping is discontinued (typically end of October), the mine passively refills via groundwater inflow and the mine water level rises during winter and spring. Pumping is resumed (typically beginning of May) before the rising water level reaches the regulatory level. The theoretical static water level for the mine is approximately 6,622 ft msl (20 ft above the Steve Level). Therefore, this water management strategy keeps the mine water level to be continuously depressed relative to both the theoretical static mine water level and the regulatory level.

Using this pumping strategy, the 2020 water level in the mine fluctuated between 6,260 and 6,420 ft msl (Figure 1), or 340 to 180 ft below the Steve Level. The hydraulic drawdown associated with this fluctuation range is estimated to have been 360 to 200 ft below the theoretical static (non-pumping) water level for the mine. The mine water level was maintained well below the elevation of the nearby Ralston Creek stream channel (6,540 to 6,590 ft msl).

The intent of the water management program is to sufficiently depress the mine water level, so the mine operates as a hydraulic sink and groundwater flows towards the mine from all directions. In this way, a hydraulic mechanism by which water in the mine pool can flow out of the workings and migrate away from the mine into the outside environment should not occur.

This memorandum evaluates the modified groundwater flow system that has evolved near the mine since initiation of the water management program. Of specific interest is the degree to which the current operation has transformed the mine workings into a permanent groundwater sink that would provide effective containment of the mine pool.

2 GROUNDWATER INFLOW RATES

An important component of the mine water balance is the rate of groundwater inflow into the mine, which as a first approximation should only depend on the mine water-level elevation. For a given mine pool elevation, the total inflow rate is the same regardless of whether the mine is being pumped or allowed to passively refill.

For an arbitrary time period, the mine water balance is given by:

net change in mine storage volume = groundwater inflow volume + water treatment plant (WTP) reject volume + sump water volume – mine pumping volume

Now if the time period is chosen so the begin time and end time correspond to the same water-level elevation, the net change in mine storage is zero and the groundwater inflow rate can be directly computed:

groundwater inflow rate = (mine pumping volume – WTP reject volume – sump water volume)/duration of the time interval

Using pumping and WTP return flow rates shown on Figure 1 to compute daily volumes, this calculation was performed for two time intervals shown as red horizontal lines on the figure. As shown in Table 1, the computed groundwater flow rate is 60.6 gpm for the time period of December 1, 2019, to January 15, 2021, when the water level ranged from 6,334 to 6,354 ft msl. For the period of October 7, 2020, to November 15, 2020, when the water level ranged from 6,257 to 6,290 ft msl, the computed inflow rate is 63.8 gpm. It is reasonable that the later inflow estimate is somewhat higher because the mine water level was lower, which would induce more groundwater flow into the mine.

Of interest is how the inflow to the mine is distributed vertically. As an approximation, the mine is divided into two zones designated as “Upper Workings” and “Lower Workings.” Upper Workings are taken to be those above 6,192 ft msl, which is the depth of the 60 hp pump (410 ft below the Steve Level). “Lower Workings” are those below 6192 ft msl. The “Nominal Pumping Condition” is a mine water level of 6,350 ft msl, which is approximately midway between the mine water level fluctuation that occurred during 2020. For this water level, the total groundwater inflow rate is estimated to have been approximately 61 gpm. The “Fully Dewatered Condition” is an historical condition when the mine was completely dewatered at full build-out. The reported dewatering rate for this historical condition was 190 gpm.

The delineation of the mine workings and hydraulic drawdowns for the Nominal Pumping Condition and Fully Dewatered Condition are shown diagrammatically on Figures 2 and 3, respectively. Note that when a vertical portion of the mine is dewatered, the average hydraulic drawdown within that zone is taken to be the static water level minus the average elevation of the dewatered interval. In saturated mine intervals, the hydraulic drawdown is equal to the static water level minus the mine water level. The drawdowns associated with saturated and dewatered intervals of the mine workings are shown on Figures 2 and 3.

The calculations that estimate groundwater inflow rates to the Upper and Lower Workings for different operating conditions are provided in Table 2. For the Nominal Pumping Condition, the estimated inflow rate to Upper Workings is 30 gpm and inflow to the Lower Workings is 31 gpm. It can be reasonably assumed that for the current water management program, approximately half of the mine inflow comes from workings above 6,192 ft msl and approximately half comes from workings below that elevation. Groundwater to the lower workings flows upward through the shafts and either (1) goes into the pump intake when the mine is being pumped or (2) goes into void storage at the rising water table when the mine is passively refilling.

For the historical condition when the mine was completely dewatered, the estimated inflow rate to the Upper Workings was approximately 35 gpm and inflow to Lower Workings was approximately 155 gpm.

3 GROUNDWATER FLOW NEAR THE MINE AREA

There are ten sets of contemporaneous bedrock water levels measured in the mine pool and three deeper monitoring wells (MW-13, MW-15, and MW-18) located near the mine. After initiation of the Schwartzwalder water management program, quarterly bedrock water levels were measured at these locations from September 2019 to October 2021. The measured groundwater levels along a northwest to southeast section through the mine workings and well MW-15 is shown on Figure 4. Water levels at MW-18 are also shown; however, this well is located off-section to the northeast. MW-15 is located southeast of the mine workings and is in an area of concern for potential southeast groundwater migration towards Ralston Creek and Ralston Reservoir. As shown on Figure 4, for all available data sets, there is a strong hydraulic gradient (+/- 0.25 ft/ft) indicating northwest groundwater flow from the area of concern towards the mine. As long as the mine water level is depressed by pumping, there should not be a hydraulic mechanism by which mine pool water could migrate in bedrock southeast of the mine area.

A bedrock water-level contour for the mine area based on June 2020 (second quarter) measurements is shown on Figure 5, which was constructed using the four bedrock water-level monitoring locations and reasonable hydrogeologic interpretation. To a certain degree, the contour map is conceptual; however, standard hydrogeologic interpretations were used to develop contours where data are sparse. The interpreted contours indicate the following:

- All groundwater near the mine flows towards the mine.
- Northeast of the mine, the bedrock water levels are below Ralston Creek.
- Southeast of the mine is a groundwater divide. North of the divide, groundwater flows into the mine. South of the divide, groundwater flows towards Ralston Creek.

For the current groundwater conditions, hydraulic mechanisms do not exist by which the mine pool water can exit the mine workings and discharge to Ralston Creek or into the surrounding bedrock groundwater system. This condition will persist as long as the mine water level is depressed by pumping.

4 DISCUSSION

This technical memorandum presents solid evidence that the Schwartzwalder water management program, which uses pumping to depress the mine water level, has converted the mine workings to a large-scale groundwater sink. Hydraulic mechanisms do not exist whereby mine pool water can exit the workings and migrate towards Ralston Creek and Ralston Reservoir. This hydraulic behavior should continue as long as the water level in the mine is depressed below the regulatory level.

Table 1. Total Groundwater Inflow Rates During 2020

$MG := 10^6 \cdot gal$

Period: 12/1/19 to 1/15/20

$t := 45.1 \cdot day$	Duration of time period where the water table elevation at the beginning and end is 6353.9 ft msl. For the period as a whole, the net change in storage is zero.	
$V_{wt} := 7.582 \cdot MG$	Total volume of water extracted from the mine	
$V_{bs} := 3.646 \cdot MG$	Total volume of water reinjected into mine (WTP reject + sump)	
$V_{gw} := V_{wt} - V_{bs}$	Total volume of groundwater inflow	$V_{gw} = 3.936 \cdot MG$
$Q_{gw} := \frac{V_{gw}}{t}$	Average groundwater inflow rate	$Q_{gw} = 60.6 \cdot gpm$

Period: 10/7/20 to 11/25/20

$t := 49.3 \cdot day$	Duration of time period where the water table elevation at the beginning and end is 6290.1 ft msl. For the period as a whole, the net change in storage is zero.	
$V_{wt} := 8.607 \cdot MG$	Total volume of water extracted from the mine	
$V_{bs} := 4.076 \cdot MG$	Total volume of water reinjected into mine (WTP reject + sump)	
$V_{gw} := V_{wt} - V_{bs}$	Total volume of groundwater inflow	$V_{gw} = 4.531 \cdot MG$
$Q_{gw} := \frac{V_{gw}}{t}$	Average groundwater inflow rate	$Q_{gw} = 63.8 \cdot gpm$

Table 2. Groundwater Inflow Rates to Upper and Lower Workings

Governing equation

$$Q = \frac{2 \cdot \pi \cdot K \cdot b \cdot s}{F}$$

General equation for steady-state radial flow to a sink (Theim equation)
where:
Q = flow rate
K = hydraulic conductivity
s = drawdown
F = shape factor

General inputs

$H_s := 6622 \cdot ft$	Static water-level elevation (assume 20 feet above Steve Level)	Elevations are NAD 27
$H_1 := 6350 \cdot ft$	Nominal pumping water-level elevation	
$H_2 := 6192 \cdot ft$	Elevation at bottom of Upper Workings (same as current pump set at 410 ft below Steve Level)	
$H_3 := 4306 \cdot ft$	Mine bottom elevation	
$F := 6.2$	Steady-state shape factor for essentually horizontal radial flow	

Nominal (current) pumping condition

$b_{c1} := H_s - H_1$	Thickness of Zone 1	$b_{c1} = 272 \cdot ft$
$b_{c2} := H_1 - H_2$	Thickness of Zone 2	$b_{c2} = 158 \cdot ft$
$b_{c3} := H_2 - H_3$	Thickness of Zone 3	$b_{c3} = 1886 \cdot ft$

Note: Zones 1 and 2 constitute "Upper Workings";
Zone 3 constitutes "Lower Workings"

$s_{c1} := \frac{H_s - H_1}{2}$	Average drawdown in Zone 1 (dewatered seepage face)	$s_{c1} = 136 \cdot ft$
$s_{c2} := H_s - H_1$	Drawdown in Zone 2 (saturated)	$s_{c2} = 272 \cdot ft$
$s_{c3} := H_s - H_1$	Drawdown in Zone 3 (saturated)	$s_{c3} = 272 \cdot ft$

$$Q_c(K_u, K_l) := \frac{2 \cdot \pi \cdot K_u \cdot b_{c1} \cdot s_{c1}}{F} + \frac{2 \cdot \pi \cdot K_u \cdot b_{c2} \cdot s_{c2}}{F} + \frac{2 \cdot \pi \cdot K_l \cdot b_{c3} \cdot s_{c3}}{F}$$

Total mine inflow for current conditions where the mine is partially dewatered. K_u is the average hydraulic conductivity of the upper workings and K_l is the conductivity of the lower workings.

Historical (fully dewatered) condition

All of Zone 1 is dewatered
There is no Zone 2
All of Zone 3 is dewatered

$b_{h1} := H_s - H_2$	Thickness of Zone 1	$b_{h1} = 430 \cdot ft$
$b_{h3} := H_2 - H_3$	Thickness of Zone 3	$b_{h3} = 1886 \cdot ft$

Note: Zone 1 constitues "Upper Workings";
Zone 3 constitutes "Lower Workings"

$s_{h1} := \frac{H_s - H_2}{2}$	Average drawdown in Zone 1 (seepage face)	$s_{h1} = 215 \cdot ft$
$s_{h3} := \frac{(H_s - H_2) + (H_s - H_3)}{2}$	Average drawdown in Zone 3 (seepage face)	$s_{h3} = 1373 \cdot ft$

$$Q_h(K_u, K_l) := \frac{2 \cdot \pi K_u \cdot b_{h1} \cdot s_{h1}}{F} + \frac{2 \cdot \pi \cdot K_l \cdot b_{h3} \cdot s_{h3}}{F}$$

Total mine inflow for historical condition when the mine was fully dewatered. K_u is the average hydraulic conductivity of the upper workings and K_l is the conductivity of the lower workings.

Table 2 (cont.)

Solution

We now have two equations (Q_c and Q_h) and two unknowns (K_u and K_l)

Iterate on the two unknowns until current inflow rate (Q_c) is 61 gpm and historical inflow rate (Q_h) is 190 gpm

$K_u := 2.54 \cdot 10^{-5} \cdot \frac{cm}{sec}$

$K_l := 4.01 \cdot 10^{-6} \cdot \frac{cm}{sec}$

These hydraulic conductivities are calibrated by iteration

$Q_c(K_u, K_l) = 61.01 \cdot gpm$ **This should be 61 gpm**

$Q_h(K_u, K_l) = 190.00 \cdot gpm$ **This should be 190 gpm**

Inflow distribution for nominal (current) water level condition

$Q_{upperzone1} := \frac{2 \cdot \pi \cdot K_u \cdot b_{c1} \cdot s_{c1}}{F}$ $Q_{upperzone1} = 14.02 \cdot gpm$

$Q_{upperzone2} := \frac{2 \cdot \pi \cdot K_u \cdot b_{c2} \cdot s_{c2}}{F}$ $Q_{upperzone2} = 16.29 \cdot gpm$

$Q_{upper} := Q_{upperzone1} + Q_{upperzone2}$ Inflow from Upper Workings; above elevation 6192 ft msl $Q_{upper} = 30.31 \cdot gpm$

$Q_{lower} := \frac{2 \cdot \pi \cdot K_l \cdot b_{c3} \cdot s_{c3}}{F}$ Inflow from Lower Workings; below elevation 6192 ft msl $Q_{lower} = 30.70 \cdot gpm$

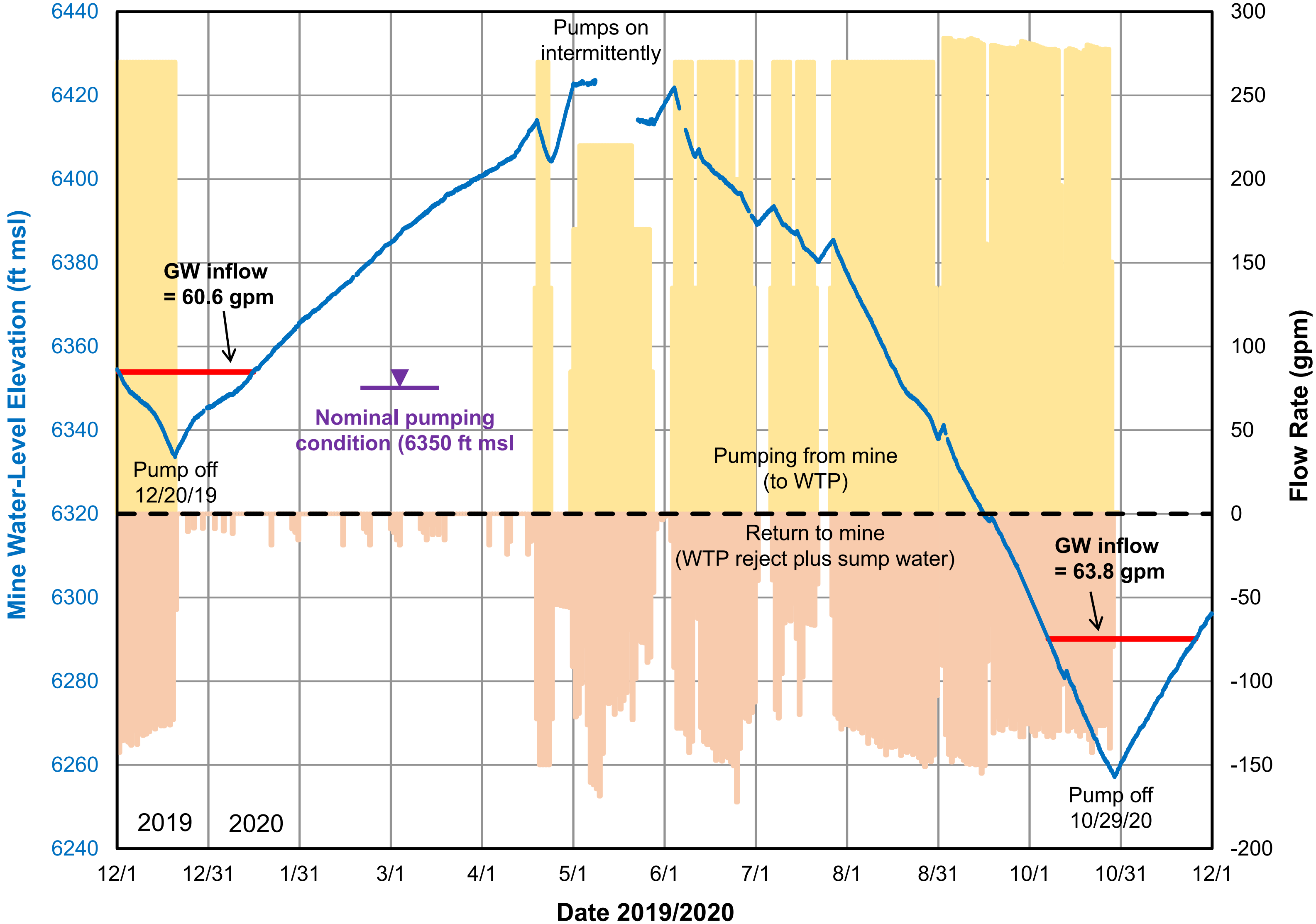
$Q_{upper} + Q_{lower} = 61.01 \cdot gpm$

Inflow distribution for historical water level condition

$Q_{upper} := \frac{2 \cdot \pi \cdot K_u \cdot b_{h1} \cdot s_{h1}}{F}$ Inflow from Upper Workings; above elevation 6192 ft msl $Q_{upper} = 35.04 \cdot gpm$

$Q_{lower} := \frac{2 \cdot \pi \cdot K_l \cdot b_{h3} \cdot s_{h3}}{F}$ Inflow from Lower Workings; below elevation 6192 ft msl $Q_{lower} = 154.96 \cdot gpm$

$Q_{upper} + Q_{lower} = 190 \cdot gpm$



Colorado Legacy Land

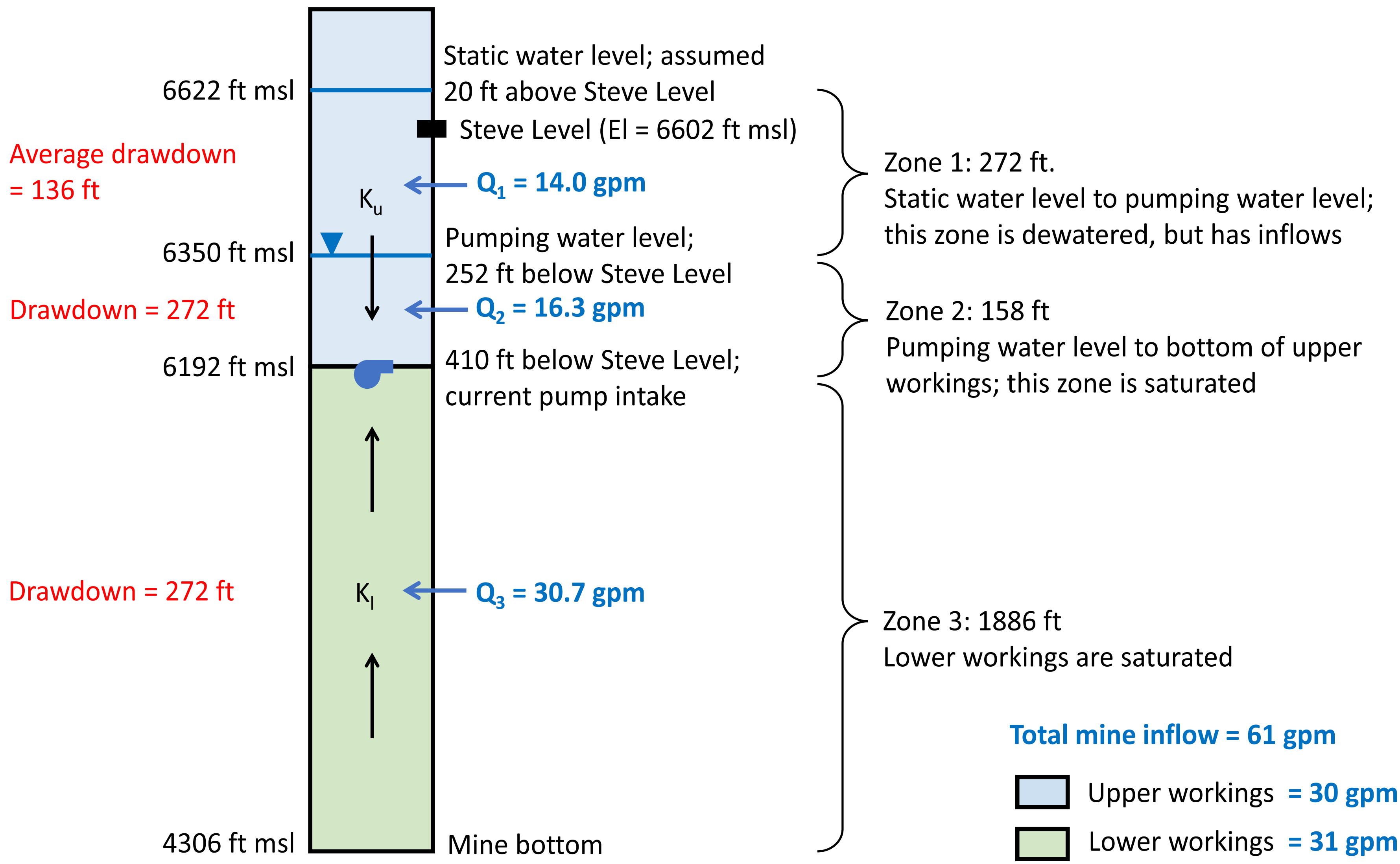
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 1
MINE WATER-LEVEL ELEVATION
AND FLOW RATE

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



NOT TO SCALE

Colorado Legacy Land

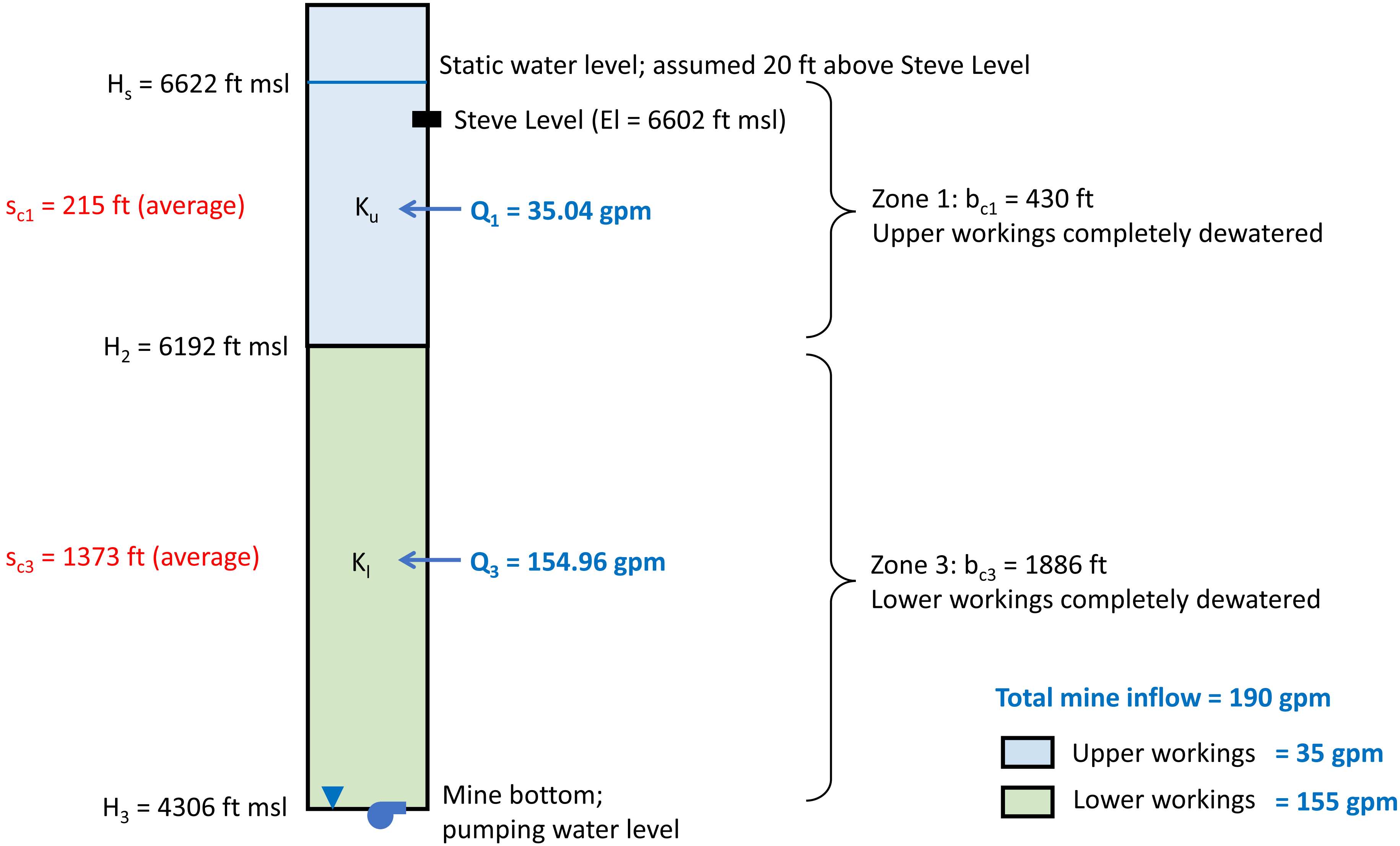
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 2
NOMINAL PUMPING CONDITION

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



NOT TO SCALE

Colorado Legacy Land

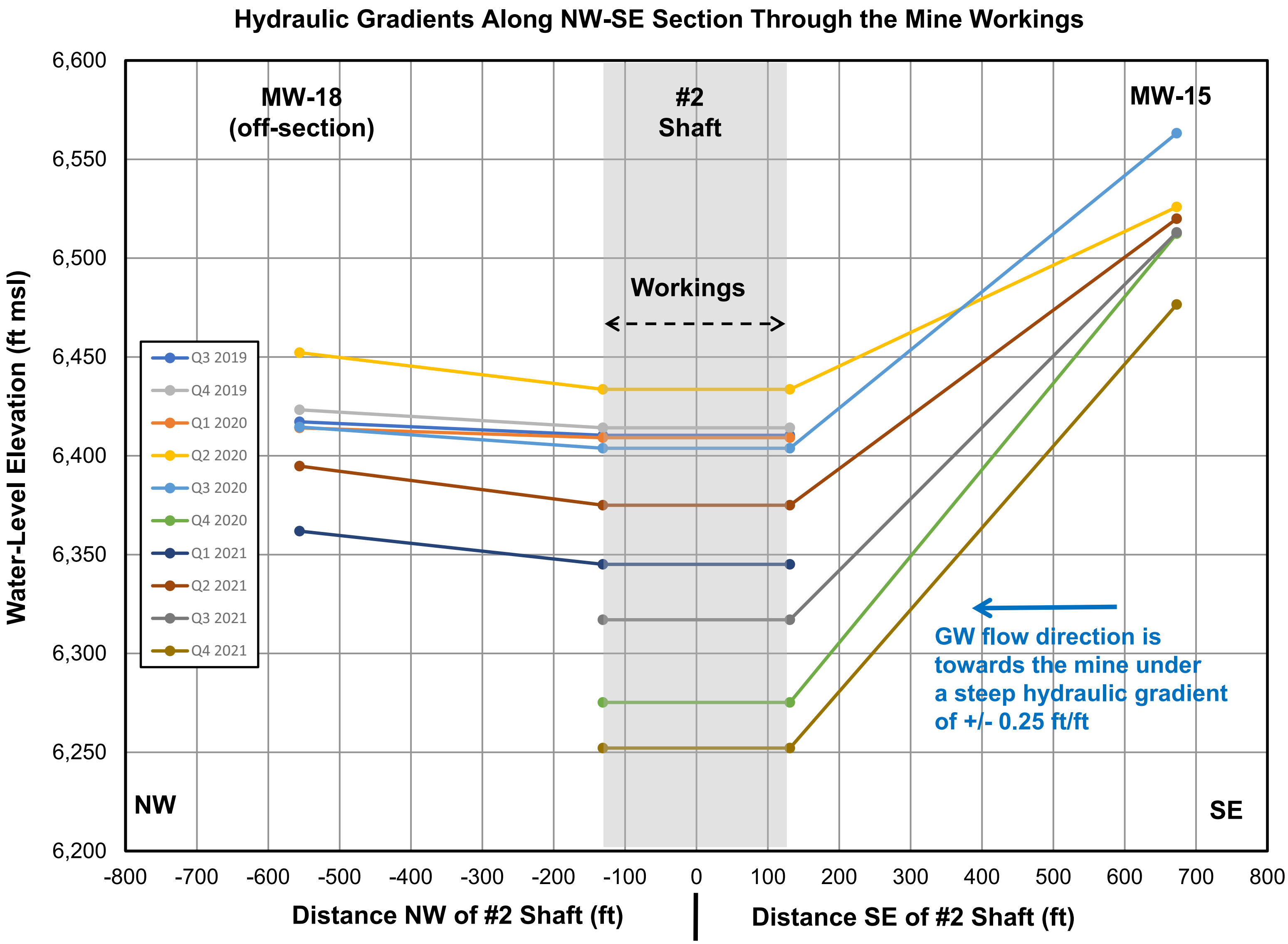
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 3
FULLY DEWATERED CONDITION

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



COLORADO LEGACY LAND

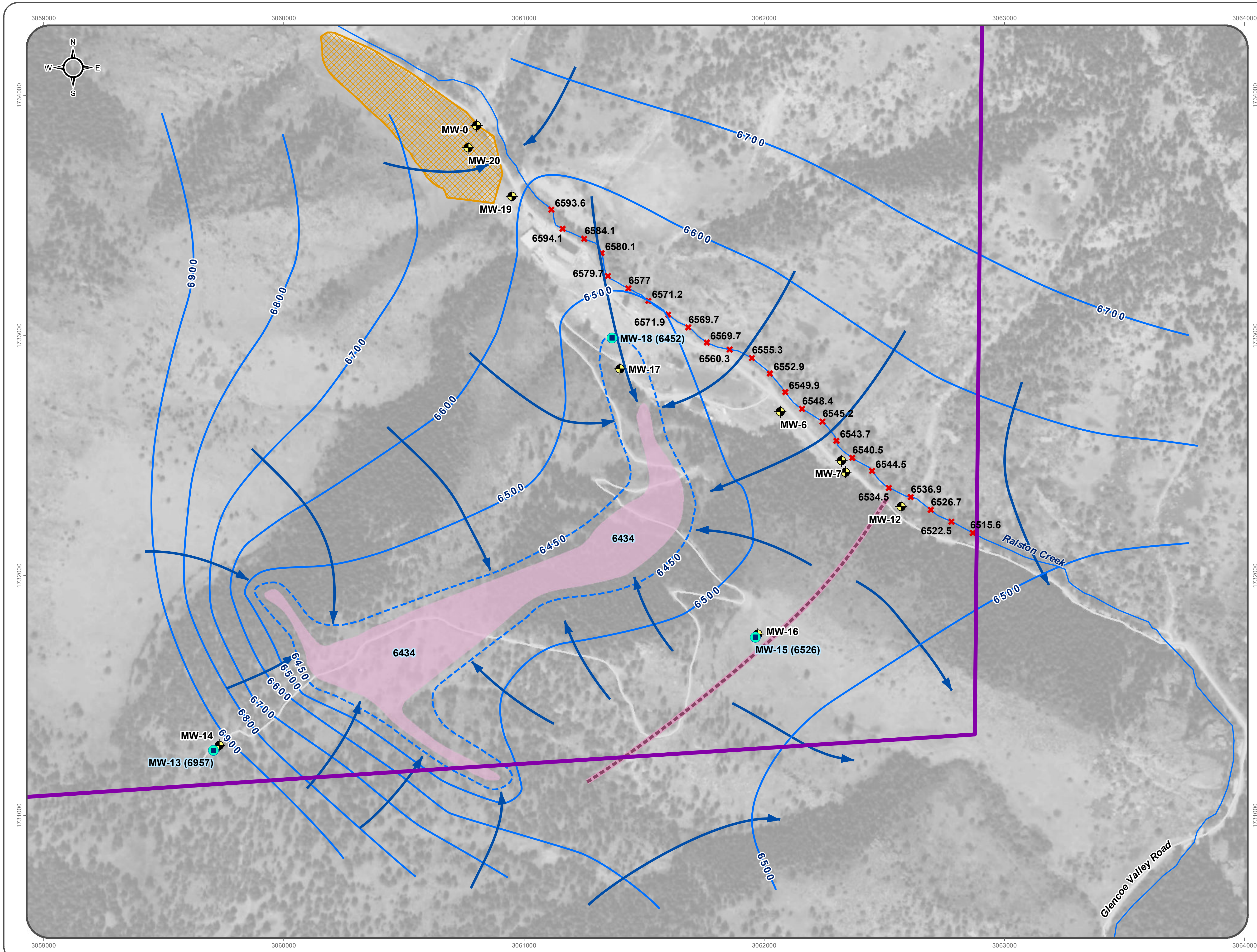
ENSERO solutions

COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 4
HYDRAULIC GRADIENTS ALONG NW-NE SECTION THROUGH THE MINE WORKINGS

NOVEMBER 2021

D:\Project\AllProjects\Schwartzwalder\Map\04-Report\DRMS_Schwartz_MLR_Permit_1977-300



COLORADO LEGACY LAND
SCHWARTZWALDER MINE

FIGURE 5

BEDROCK GROUNDWATER CONTOUR MAP

DECEMBER 2021

COLORADO LEGACY LAND

- (6526) Deep Bedrock Monitoring Well with Measured Q2-2020 Water Level (ft msl)
- Alluvial or Shallow Bedrock Monitoring Well
- 100 foot Groundwater Contour (ft msl)
- 50 foot Groundwater Contour (ft msl)
- Groundwater Flow Direction
- Groundwater Divide
- Ralston Creek Elevation Point (ft msl)
- Underground Workings
- Waste Rock Dump
- CLL Property Boundary
- Ralston Creek

1 inch = 380 feet

0 250 500 750 ft

ENSERO solutions

Satellite imagery obtained from ESRI ArcGIS map service https://services.arcgisonline.com/ArcGIS/rest/service on December 09 2021.

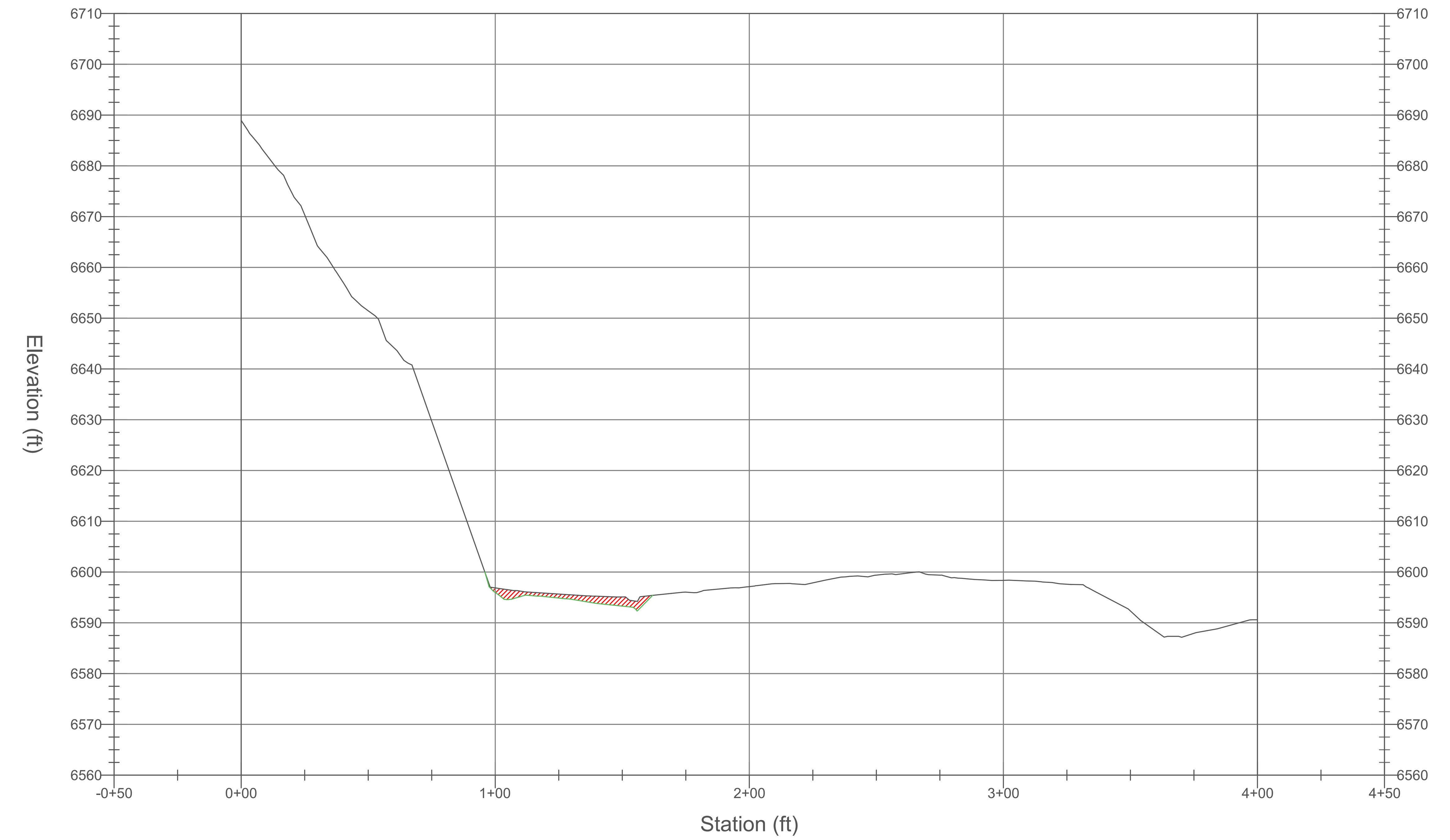
Datum: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet

D:\Project\AllProjects\Schwartzwalder\Map\02-Water_Quality\02-Groundwater\GW_Contours\GW_Contours_20211208.mxd
(*Last edited by: amatlashevska;2021-12-09/15:09 PM*)

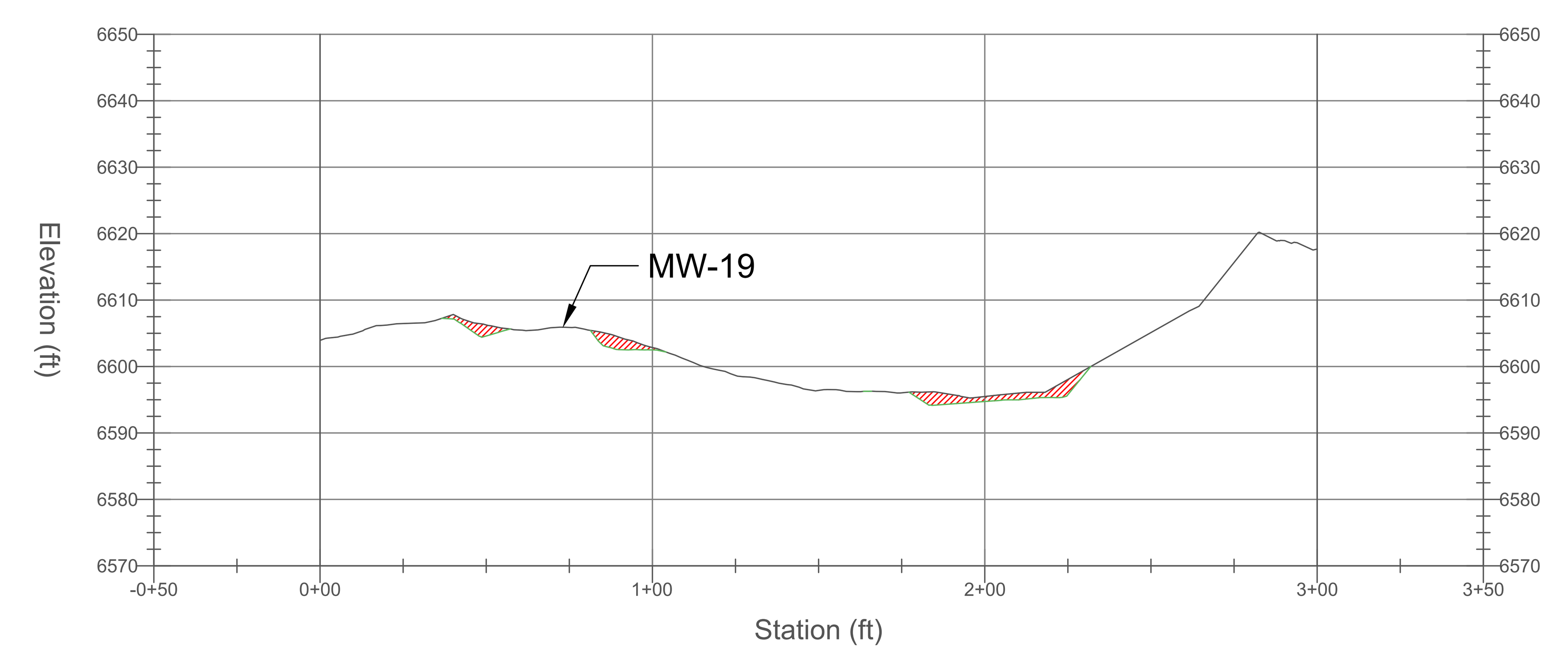
APPENDIX 4. SOUTH WASTE ROCK PILE EXTENSION PLAN SET

(This page intentionally left blank.)

Alignment A-A' Profile View



Alignment B-B' Profile View



Notes:

1. LiDAR data: U.S. Geological Survey, 20140929, USGS Lidar Point Cloud (LPC) CO_Denver_2008_000056 2014-08-27 LAS: U.S. Geological Survey.
2. Aerial imagery provided by Bing, circa 2017.
3. Contour interval: 5ft.
4. Alignment A-A' bisects the Black Forest Mine Entrance.
5. Alignment B-B' intersects MW-19.
6. All excavation areas have perimeter slopes of -33%.
7. North Initial Excavation 2D surface area: 7,070 ft^2.
8. North Initial Excavation cut volume: 450 yd^3.
5. South Initial Excavation 2D surface area: 3,807 ft^2.
6. South Initial Excavation cut volume: 200 yd^3.
7. North and South Initial Excavation cut depth is 2 ft. below grade.
5. East Cover Material 2D surface area: 21,287 ft^2.
6. East Cover Material cut volume: 2,940 yd^3.
7. East Cover Material cut depth is 5 ft. below grade.
8. Profiles have 2:1 vertical exaggeration.

Revision History

Rev.	Description	Date
A	Issued for Review	3/18/2022

Engineer's Seal

DRAFT
NOT FOR
CONSTRUCTION

	Name	Date
Design	B. Ray	2022-03-18
Drawn	N. Lambert	2022-03-18
Checked	E. Busby	2022-03-18
Approved	B. Ray	2022-03-18

Project/Drawing Information

Project Name	Schwartzwalder Mine South Waste Rock Pile Extension
Project Number	EUS21CO00084
Project Location	Golden, Colorado

Drawing Name

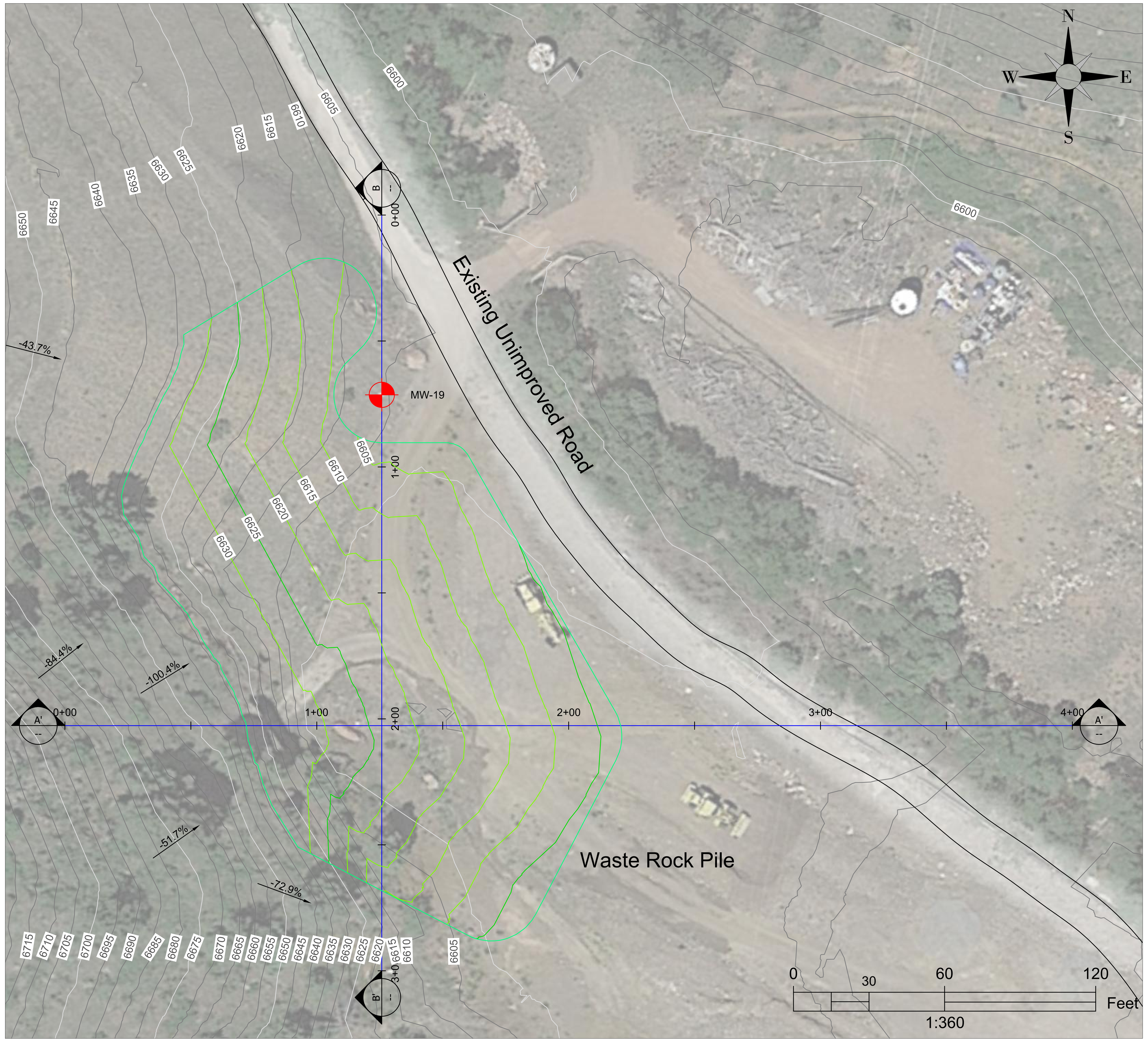
Schwartzwalder Mine
South Waste Rock Pile Existing Topography and Extension Design
Cover Material Excavations

Drawing Number

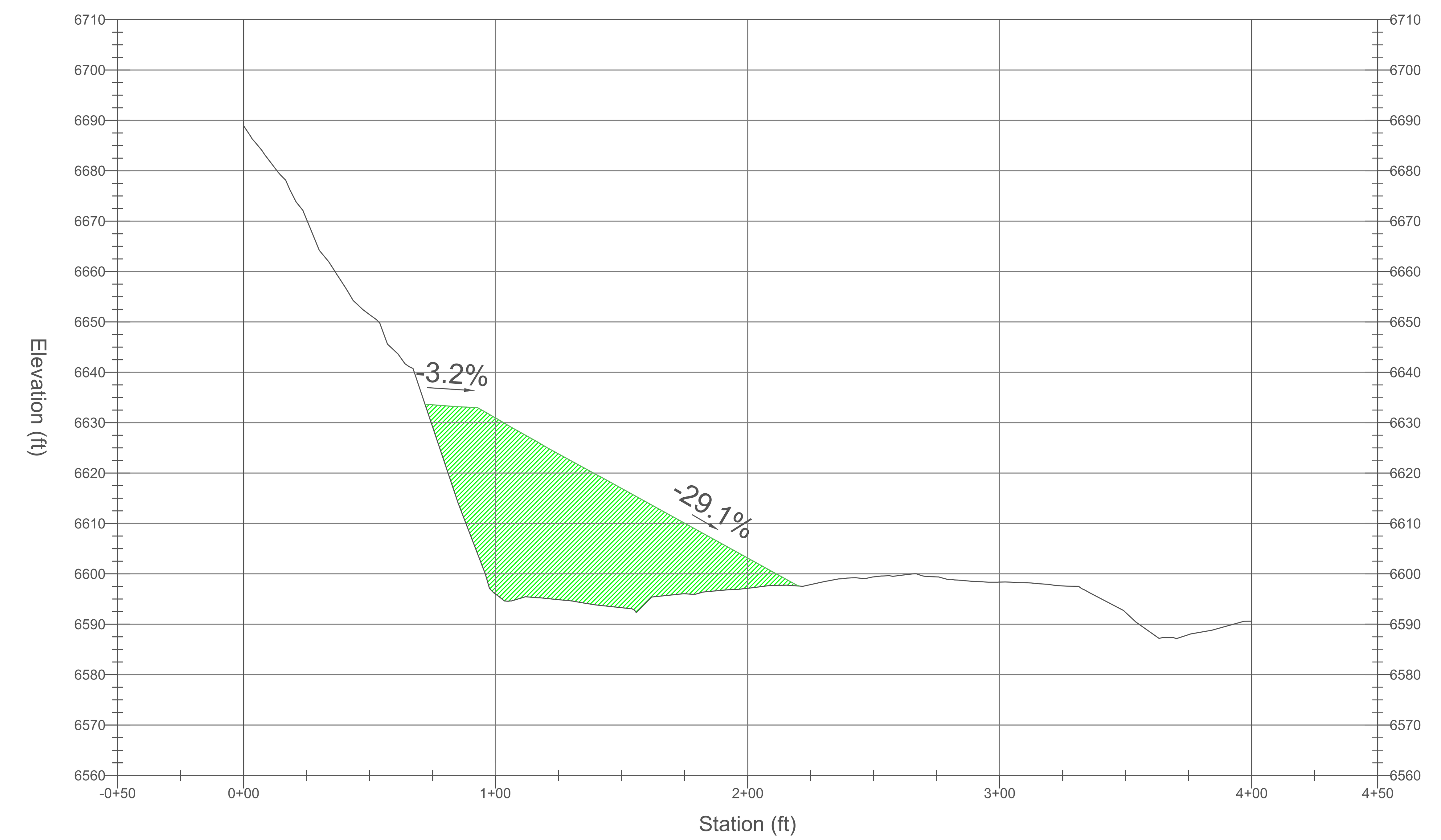
EUS21CO00084-C101

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

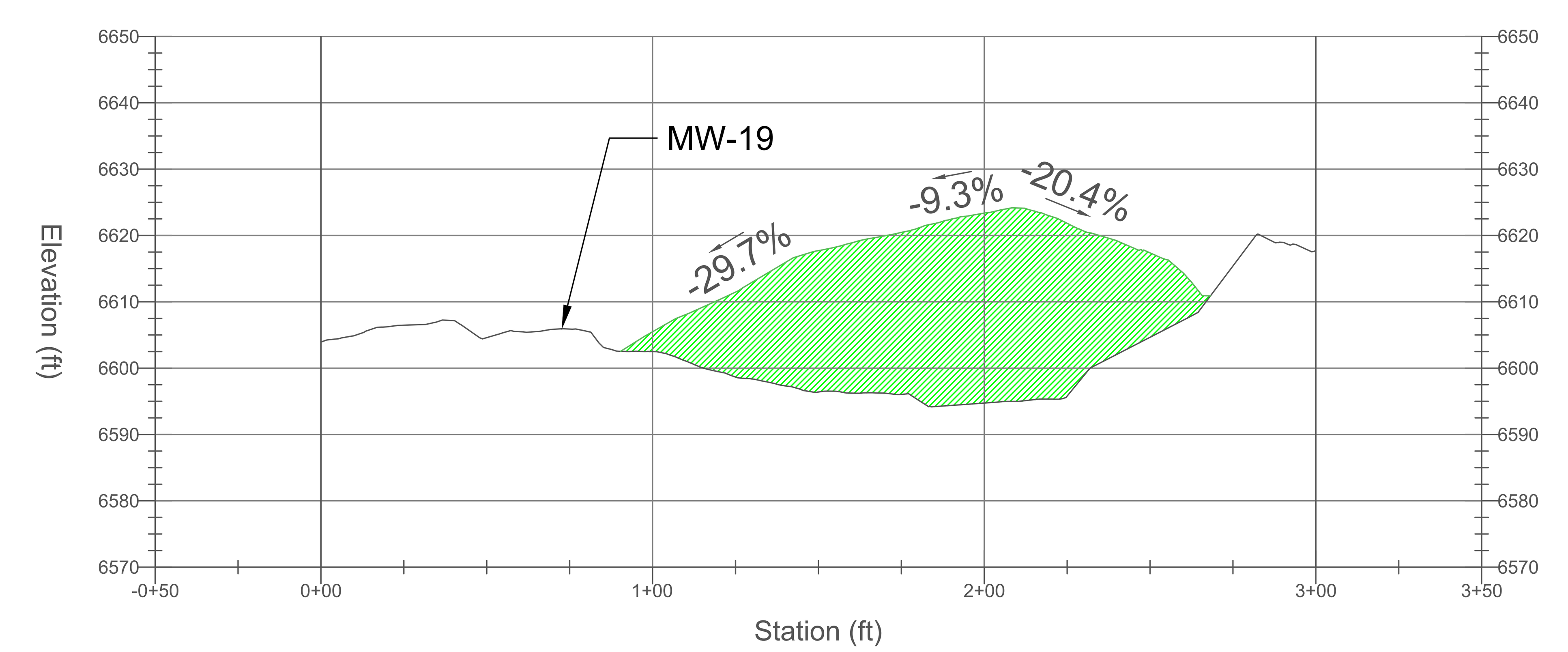
Colorado Legacy Land, LLC



Alignment A-A' Profile View



Alignment B-B' Profile View



Notes:

1. LiDAR data: U.S. Geological Survey, 20140929, USGS Lidar Point Cloud (LPC) CO_Denver_2008_000056 2014-08-27 LAS: U.S. Geological Survey.
2. Aerial imagery provided by Bing, circa 2017.
3. Contour interval: 5 ft.
4. Alignment A-A' bisects the Black Forest Mine Entrance.
5. Alignment B-B' intersects MW-19.
6. Waste Rock Pile 2D surface area: 29,685 ft².
7. Waste Rock Pile Capacity: 12,313 yd³.
8. Profiles have 2:1 vertical exaggeration.

Revision History		
A	Issued for Review	3/18/2022
Rev.	Description	Date

Engineer's Seal

DRAFT
NOT FOR
CONSTRUCTION

	Name	Date
Design	B. Ray	2022-03-18
Drawn	N. Lambert	2022-03-18
Checked	E. Busby	2022-03-18
Approved	B. Ray	2022-03-18

Project/Drawing Information	
Project Name	Schwartzwalder South Waste Rock Pile Extension
Project Number	EUS21CO00084
Project Location	Golden, Colorado

Drawing Name

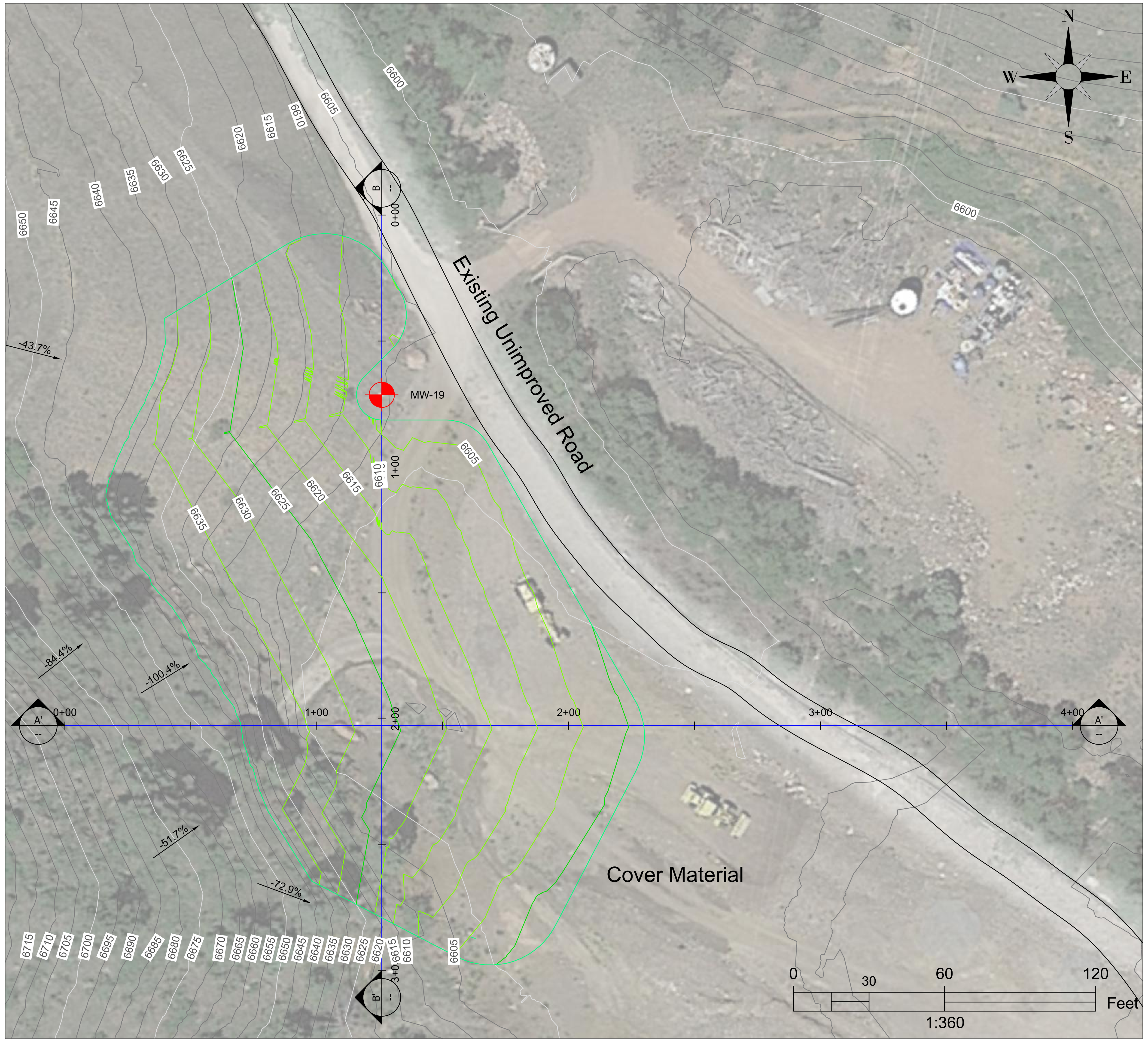
Schwartzwalder Mine
South Waste Rock Pile Existing Topography and Extension Design
Waste Rock Placement

Drawing Number

EUS21CO00084-C102

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

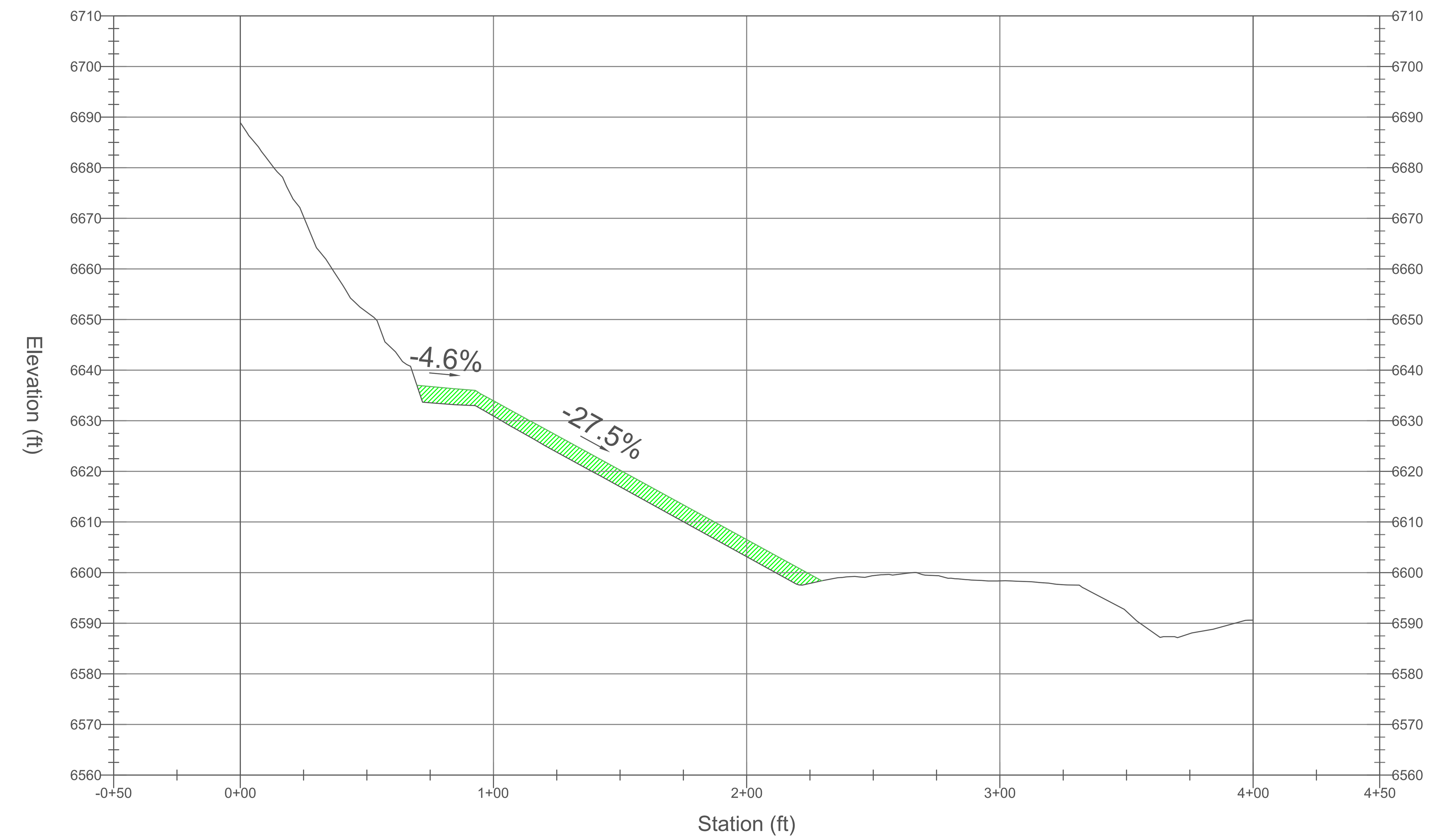
Colorado Legacy Land, LLC



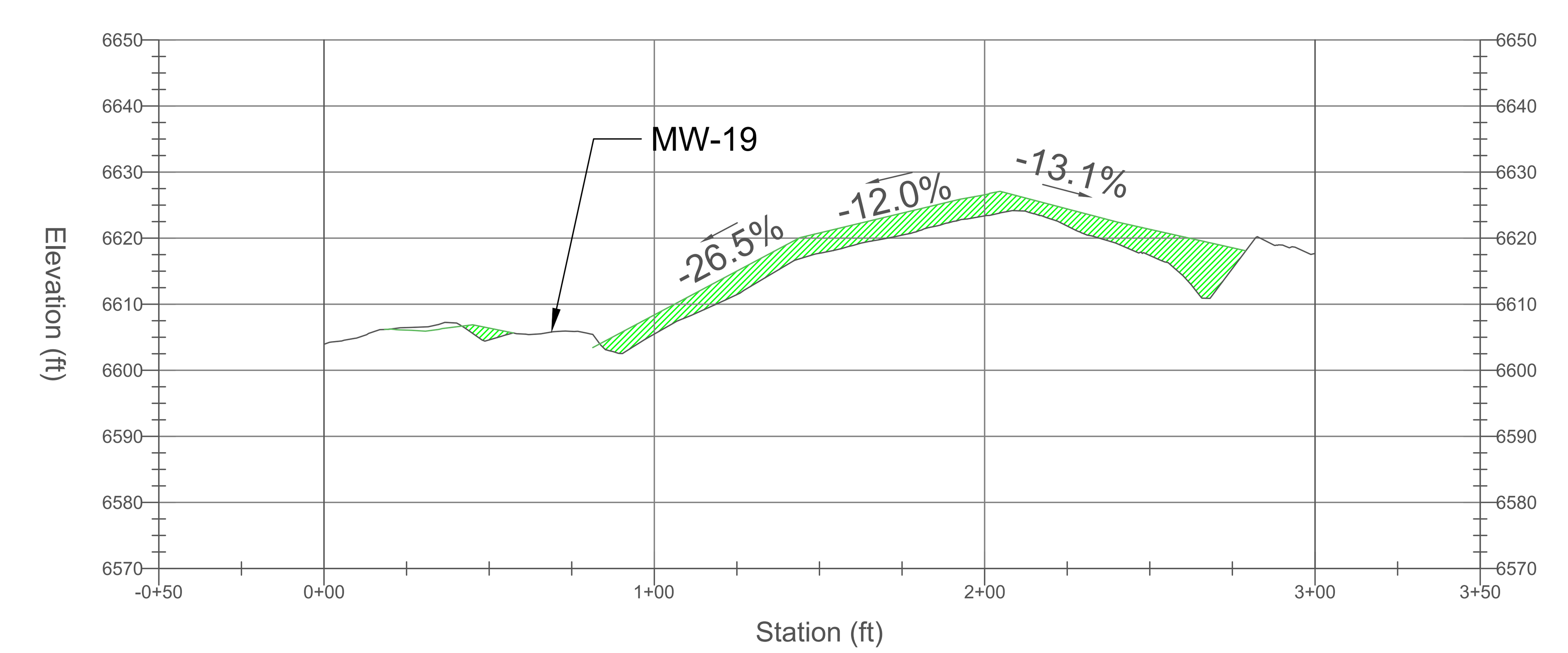
Notes:

1. LiDAR data: U.S. Geological Survey, 20140929, USGS Lidar Point Cloud (LPC) CO_Denver_2008_000056 2014-08-27 LAS: U.S. Geological Survey.
2. Aerial imagery provided by Bing, circa 2017.
3. Contour interval: 5 ft.
4. Alignment A-A' bisects the Black Forest Mine Entrance.
5. Alignment B-B' intersects MW-19.
6. Cover is 3 ft. deep.
7. Cover Material 2D surface area: 35,635 ft².
8. Cover Material volume: 3,895 yd³.
9. Profiles have 2:1 vertical exaggeration.

Alignment A-A' Profile View



Alignment B-B' Profile View



Rev.	Description	Date
A	Issued for Review	3/18/2022

Engineer's Seal

DRAFT
NOT FOR
CONSTRUCTION

	Name	Date
Design	B. Ray	2022-03-18
Drawn	N. Lambert	2022-03-18
Checked	B. Ray	2022-03-18
Approved	F. Lastname	2022-03-18

Project/Drawing Information

Project Name	Schwartzwalder South Waste Rock Pile Extension
Project Number	EUS21CO00084
Project Location	Golden, Colorado

Drawing Name

Schwartzwalder Mine
South Waste Rock Pile Existing Topography and Extension Design
Cover Material

Drawing Number

EUS21CO00084-C103

ENSERO solutions
131 Lincoln Ave Suite 200
Ft. Collins, CO 80524

Colorado Legacy Land, LLC