Official Draft Public Notice Version **March 30, 2026**
The findings, determinations, and assertions contained in this document are not final and subject to change following the public comment period.

FACT SHEET
FOSSIL ROCK RESOURCES, LLC – FOSSIL ROCK MINE
UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM (UPDES)
DISCHARGE PERMIT MODIFICATION
UPDES PERMIT NUMBER: UT0023728
MINOR INDUSTRIAL FACILITY

FACILITY CONTACTS

Person Name:	Kirt Tatton
Position:	General Manager & Signatory
Person Name:	Ryan Wilson
Position:	Manager of Land and Regulatory Affairs
Phone Number:	970-852-0110
Permittee:	Fossil Rock Resources, LLC
Facility Name:	Fossil Rock Mine
Facility Location:	5125 N Cottonwood Canyon Rd Orangeville, UT 84537
Mailing Address:	9815 South Monroe Street, Suite 203 Sandy, UT 84070

DESCRIPTION OF FACILITY

Fossil Rock Resources, LLC – Fossil Rock Mine (Mine) is an underground coal mine facility with standard industrial classification (SIC) code 1222 for bituminous coal underground mining. The Mine recently restarted mining operations beginning in late 2024 after previous operations had ceased since the Mine was last active in 2001 as formerly owned and operated under the name, PacifiCorp - Energy West Mining Company - Trail Mountain Mine. Currently, there are three (3) permitted discharge outfalls (001, 002, & 003). Discharges from Outfall 001 are associated with an onsite sedimentation pond for collecting surface water runoff from precipitation and snowmelt events at the Mine facility, while discharges from Outfall 002 are associated with previous active Mine dewatering operations. Discharges from Outfall 003 are associated with a sedimentation pond that collects surface water runoff from precipitation and snowmelt events at the Mine's offsite waste rock collection site. Current Mine owners have requested a UPDES Permit (Permit) modification to include a new Outfall 004 located downstream of the existing facility to allow the effluent flow limitation to be increased up to 10 million gallons per day (MGD) total for mine dewatering discharges in anticipation of encountering increased water underground that will need to be dewatered and discharged for continued safe operations of the Mine. Therefore, applicable effluent limitations and monitoring requirements have been included for the new Outfall 004, while remaining unchanged for the existing Outfalls 001, 002 & 003. This Permit modification will authorize discharges from the Mine during the remainder of the five-year Permit cycle as appropriate.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

As mentioned above, the Permit is being modified to include a new Outfall 004 for increased mine water dewatering discharge operations. Due to the proposed increase in effluent flow from the mine water discharges, the new Outfall 004 will have increased monitoring requirements as compared to the existing Outfalls (001, 002, & 003). In conjunction with the increased effluent flow limit, Outfall 004 will also include additional monitoring requirements for Whole Effluent Toxicity (WET) testing to be conducted and reported quarterly as detailed in the Permit and discussed further in the BIOMONITORING REQUIREMENTS section of this Fact Sheet. The frequency of Outfall 004 monitoring for all effluent parameters in the Permit (excluding WET) shall be twice monthly, as opposed to once monthly for the other existing Outfalls, which is a result of the maximum proposed effluent flows as projected from this new Outfall. This will be re-evaluated during the remaining Permit period based upon actual effluent flows as discharged for any further adjustments to the monitoring frequency as appropriate.

The addition of Outfall 004 and associated Permit requirements as proposed are the only Permit provisions that are subject to comments during the public notice period. All other permit conditions remain unchanged.

DISCHARGE INFORMATION

DESCRIPTION OF DISCHARGE

The Mine has been reporting self-monitoring results on Discharge Monitoring Report (DMR) forms through NetDMR on a monthly basis as appropriate. There have been no Permit violations during the previous 5-year Permit period and the only discharges since 2001 have been from the sedimentation pond Outfall 001 during the past year following start up activities in late 2024. The existing Outfalls and the proposed new Outfall 004 are described as listed below:

Outfall	Description of Discharge Points
001	Located at latitude 39° 19' 00" and longitude 111° 11' 20". Outfall from sedimentation pond for surface water runoff from the mine site into Cottonwood Canyon Creek drainage.
002	Located at latitude 39° 19' 03" and longitude 111° 11' 25". Outfall for mine water discharges from mine portals into Cottonwood Canyon Creek drainage.
003	Located at latitude 39° 17' 43" and longitude 111° 7' 18". Outfall from sedimentation pond for surface water runoff from nearby waste rock pile site into Grimes Wash drainage.
004	Located at latitude 39° 18' 32" and longitude 111° 11' 6". Outfall for mine water discharges from mine portals into Cottonwood Canyon Creek downstream from mine.

RECEIVING WATERS AND STREAM CLASSIFICATION

Discharges from Outfalls 001 & 002 are to Cottonwood Canyon Creek located at the Mine facility within U.S. Forest Service boundary and within a Utah Category 1 High Quality Waters stream segment as listed in Utah Administrative Code (UAC) R317-2-12.1, whereas any new discharges or increases in existing discharges are prohibited under the Antidegradation Rules found in UAC R317-2-3. However, these Outfalls and the Mine facility were originally permitted in 1980 and predate the adoption of the Antidegradation Rules, as promulgated in 1994 and thereby remain grandfathered discharges in the Category 1 Waters. Discharges from Outfalls 001 & 002 then flow into Category 3 Waters at the U.S. Forest Service boundary located less than a half-mile downstream from the Mine along Cottonwood Canyon Creek and then continuing into Cottonwood Creek near Highway 29. While a new discharge or an expansion of existing discharges is prohibited in the Category 1 Waters at the Mine facility, a new discharge located in Category 3 Waters is not prohibited. Thereby, the Mine has proposed a new Outfall 004 downstream of the facility within Category 3 Waters to allow for safe dewatering and continued operations of the Mine.

For reference, discharges from Outfall 003 at the offsite waste rack facility are to nearby Grimes Wash, which is located in a Category 3 Waters stream segment and is an intermittent tributary of Cottonwood Creek. Cottonwood Creek is classified as follows according to UAC R317-2-13:

Class 1C -- Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.

Class 2B -- Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.

Class 3A -- Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.

Class 4 -- Protected for agricultural uses including irrigation of crops and stock watering.

TOTAL MAXIMUM DAILY LOAD (TMDL) REQUIREMENTS

According to the Utah's Final 2024 Integrated Report on Water Quality dated April 30, 2024 (UDWQ, 2024), the receiving water for Outfalls 001, 002, and 004 discharge "*Cottonwood Creek and tributaries, from Highway U-57 crossing to headwaters* (AU name: *Cottonwood Creek Upper,* AU ID: *UT14060009-007_00*)" was listed as "Not Supporting" for Maximum Temperature, Total Dissolved Solids, and pH. A TMDL study addressing the TDS impairment for the San Rafael River and tributaries was completed as part of the West Colorado River Watershed TMDL in 2004. As part of the TMDL study, site specific standards were developed for several stream segments in the watershed. A site-specific standard of 3,500 mg/L TDS was developed for Cottonwood Creek from the confluence with Huntington Creek to Highway 57. The Fossil Rock Mine (formerly known as the 'Trail Mountain Mine') discharges to Cottonwood Canyon Creek approximately 8 miles above this stream segment. The TMDL included a TDS limit of 1,136 mg/L as applied to the discharge points from the 'Trail Mountain Mine' in order to be protective of downstream uses as applied to all Outfalls in the Permit as appropriate. The receiving waters do not have an approved TMDL for any of the other parameters, however monitoring for temperature and pH has been included in the Permit for all Outfalls. For more information, the approved TMDL study can be found at https://documents.deq.utah.gov/water-quality/watershed-protection/total-maximum-daily-loads/DWQ-2015-006611.pdf.

BASIS FOR EFFLUENT LIMITATIONS

In accordance with regulations promulgated in Title 40 of Code of Federal Regulations (40 CFR) Part 122.44 and in UAC R317-8-4.2, effluent limitations are derived from technology-based effluent limitation guidelines, Utah Secondary Treatment Standards (UAC R317-1-3.2) or Utah Water Quality Standards (UAC R317-2-14) as applicable. In cases where multiple limits have been developed, those that are more stringent apply. In cases where no limits or multiple limits have been developed, Best Professional Judgment (BPJ) of the permitting authority may be used where applicable. Best Professional Judgment or BPJ, refers to a discretionary, best professional decision made by the permit writer based upon precedent, prevailing regulatory standards or other relevant information.

Permit limits can also be derived from a Wasteload Analysis (WLA), which incorporates Utah Secondary Treatment Standards, Utah Water Quality Standards (WQS), including any applicable TMDL impairments as appropriate, Antidegradation Reviews (ADR) and designated uses into a water quality model that projects the effects of discharge concentrations on receiving water quality. Effluent limitations are those that the model demonstrates are sufficient to meet WQS in the receiving waters. During this UPDES permit modification development, a WLA and ADR were completed as appropriate. The WLA further supports that the effluent limitations will be sufficiently protective of water quality, in order to meet WQS in the receiving waters. Additionally, as part of the ADR process, An ADR Level I review was performed and concluded that an ADR Level II Review (Review) was also required for the proposed new Outfall 004. The Review was completed by the Mine as required and submitted to DWQ as part of the Permit modification request and application information. This separate Review concluded that the proposed new Outfall 004 and future Mine dewatering is not only needed to continue safely operating the Mine but is recommended as the most practicable and preferred least degrading treatment option. The WLA and ADR information are included as an attachment to this Fact Sheet.

The following list is the basis of the effluent limitations for Outfall 004:

1. Effluent limitations for pH are derived from current Utah WQS found in UAC R317-2-14 and are consistent with the other existing Permit outfalls.

2. Total Suspended Solids (TSS) effluent limitations have been included to be consistent with the existing TSS effluent limitations for mine water discharges via Outfall 002. The TSS daily maximum effluent limitation is derived from technology-based effluent limitations found in 40 CFR Part 434.45 for coal mine facilities defined with an alkaline mine drainage. The TSS monthly and weekly average effluent limitations for Outfall 002 were originally based upon Utah Secondary Treatment Standards, and then subsequently based upon a Level II ADR that was previously completed and approved by DWQ in 2013 as applied previously for the mine water discharges.

3. The iron limitation is water quality based as derived in the WLA, which is based upon the Utah WQS of 1.0 mg/L for dissolved iron (UAC R317-2 Table 2.14.2) and is included in the Permit as 1.0 mg/L for total iron. Total iron includes the dissolved iron component and is therefore considered a more protective permit provision and is consistent with the existing Permit outfalls as well as with other similar permits in Utah.

4. The Oil & Grease limitation is based on BPJ of the permitting authority and is consistent with the existing Permit outfalls as well as with other similar permits in Utah.

5. TDS limitations are based upon the existing TMDL for effluent concentration values as mentioned previously, and are also based the Colorado River Basin Salinity Control Forum (CRBSCF) for mass loading values as authorized in UAC R317-2-4 to further control salinity in the Utah portion

of the Colorado River Basin. Regarding TDS loading, the CRBSCF Policy entitled "NPDES Permit Program Policy for Implementation of Colorado River Salinity Standards" (Policy), with the most current version dated October 2023, requires the TDS loading limitation of one-ton (2,000 lbs) per day, or 366 tons per year as a sum from all discharge points, unless the average concentration of TDS is 500 mg/L or less. If the concentration of TDS at any Outfall is less than or equal to 500 mg/L as a thirty-day average, then no loading limit applies for that Outfall. The one-ton per day (or 366 tons per year) loading limit applies only to those Outfalls exceeding 500 mg/L as a thirty-day average. Only those Outfalls exceeding 500 mg/L as a thirty-day average, collectively, need to meet the one-ton (2,000 lbs) per day, or 366 tons per year limitation. The TDS limitations and requirements are consistent with the existing Permit outfalls as well as with other similar permits in Utah.

6. The effluent flow limitation is based upon the design flow of the new outfall as provided by the Mine and included in the Permit modification request information.

7. The WET testing requirements are based upon the WLA and are consistent with other similar permits in Utah.

Reasonable Potential Analysis
Since January 1, 2016, DWQ has conducted reasonable potential analysis (RP) on all new and renewal applications received after that date. RP for this permit renewal was conducted following DWQ's September 10, 2015 Reasonable Potential Analysis Guidance (RP Guidance). There are four outcomes defined in the RP Guidance: Outcome A, B, C, or D. These Outcomes provide a framework for what routine monitoring or effluent limitations are required.

Since there have been no discharges of Mine water in decades, none of the parameters of concern, including metals could be evaluated for a reasonable potential to exceed the applicable WQS and RP could not be conducted at this time. Therefore, this modified permit will once again require that the permittee obtains metals discharge data by monitoring the Mine water upon start up and discharges for total recoverable concentrations of arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, selenium and zinc so that a more thorough RP analyses can be performed as appropriate.

Mine is expected to be able to comply with the Permit limitations for Outfall 004 as follows:

Parameter, Units	**Outfalls 001, 002 & 003** Effluent Limitations *a			
	Maximum Monthly Avg	Maximum Weekly Avg	Daily Minimum	Daily Maximum
Total Flow, MGD *b, *c	0.5	--	--	--
TSS, mg/L (Outfalls 001 & 003)	25	35	--	70
TSS, mg/L (Outfall 002)	20	30	--	70
Total Iron, mg/L	--	--	--	1.0
TDS, mg/L *d	1136	--	--	Report
TDS, tons/day/year *d	--	--	--	1/366
pH, Standard Units	--	--	6.5	9.0
Oil & Grease, mg/L *e	--	--	--	10.0
Temperature, °F	--	--	--	Report
Total Metals, mg/L *f	--	--	--	Report

Parameter, Units	**Outfall 004** Effluent Limitations *a			
	Maximum Monthly Avg	Maximum Weekly Avg	Daily Minimum	Daily Maximum
Total Flow, MGD *b, *c	9.5	--	--	--
TSS, mg/L	20	30	--	70
Total Iron, mg/L	--	--	--	1.0
TDS, mg/L *d	1136	--	--	Report
TDS, tons/day/year *d	--	--	--	1/366
pH, Standard Units	--	--	6.5	9.0
Oil & Grease, mg/L *e	--	--	--	10.0
Temperature, °F	--	--	--	Report
Total Metals, mg/L *f	--	--	--	Report
Whole Effluent Toxicity (WET), Chronic Biomonitoring *g	--	--	--	IC_{25}> 100% effluent

SELF-MONITORING AND REPORTING REQUIREMENTS

The following self-monitoring requirements for the new Outfall 004 are similar to the existing Outfalls as permitted, with the addition of quarterly WET testing and increased monitoring for all other parameters as mentioned previously. The sampling frequency is consistent with other similar types of UPDES permits. The Permit will once again require self-monitoring reports to be submitted monthly and quarterly on DMR forms via NetDMR due 28 days after the end of the monitoring period. Effective January 1, 2017, monitoring results must be submitted using NetDMR unless the permittee has successfully petitioned for an exception.

Outfalls 001, 002 & 003 Self-Monitoring and Reporting Requirements *a			
Parameter	Frequency	Sample Type	Units
Total Flow *b, *c	Monthly	Measured	MGD
TSS	Monthly	Grab	mg/L
Total Iron	Monthly	Grab	mg/L
TDS *d	Monthly	Grab	mg/L, tons/day/yr
pH	Monthly	Grab	SU
Oil & Grease *e	Monthly	Visual/Grab	mg/L
Temperature	Monthly	Grab	°F
Total Metals *f	Quarterly	Grab	mg/L

Outfall 004 Self-Monitoring and Reporting Requirements *a			
Parameter	Frequency	Sample Type	Units
Total Flow *b, *c	Twice Monthly	Measured	MGD
TSS	Twice Monthly	Grab	mg/L
Total Iron	Twice Monthly	Grab	mg/L
TDS *d	Twice Monthly	Grab	mg/L, tons/day/yr
pH	Twice Monthly	Grab	SU
Oil & Grease *e	Twice Monthly	Visual/Grab	mg/L

Temperature	Twice Monthly	Grab	°F
Total Metals *f	Quarterly	Grab	mg/L
WET – Biomonitoring (Outfall 004 only) *g			
Ceriodaphnia - Chronic	1st & 3rd Quarter	Composite/Grab	Pass/Fail
Fathead Minnows - Chronic	2nd & 4th Quarter	Composite/Grab	Pass/Fail

*a See Permit Definitions, Part VII, for definition of terms.

*b Flow measurements of effluent volume shall be made in such a manner that the Permittee can affirmatively demonstrate that representative values are being obtained.

*c If the rate of discharge is controlled, the rate and duration of discharge shall be reported.

*d No tons per day loading limit will be applied at a specific Outfall if the concentration of TDS in the discharge is equal to or less than 500 mg/L as a thirty-day average. However, if the thirty-day average TDS concentration exceeds 500 mg/L at any Outfall, then the permittee cannot discharge more than 1 ton per day (or 366 tons per year) as a sum from all discharge points exceeding 500 mg/L as a thirty-day average. If the permittee cannot achieve one ton per day (or 366 tons per year) as a sum from all applicable Outfalls as determined by the Director, the permittee will either be required to account for the excess salinity/TDS tonnage by developing a treatment process, participating in a salinity off-set program, or other type of mechanism to remove or offset the excess salinity (TDS); or shall complete and submit to the Director a TDS loading evaluation and exemption demonstration report in accordance with the Colorado River Basin Salinity Control Forum NPDES Policies entitled, "2023 Review, Water Quality Standards for Salinity, Colorado River System, Appendix B." The selection of a salinity control program, other types of treatment process, or exemption evaluation must be approved by the Director of the Division of Water Quality.

*e Oil & Grease shall be sampled when sheen is present or observed. If no sheen is present or visible, then report NA. In addition to monthly monitoring for oil and grease, a visual inspection for floating solids, sanitary waste, and visible foam shall be performed monthly at all Outfalls. There shall be no sheen, floating solids, sanitary waste, or visible foam in other than trace amounts.

*f Starting on the effective date of this permit, the following total metals analyses shall be monitored quarterly from all discharging outfalls; Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver and Zinc. The permittee is required to utilize the lowest detection limit possible using sufficiently sensitive standard test methods and certified laboratories.

*g Outfall 002 quarterly Chronic WET testing for Ceriodaphnia shall be conducted from during the 1st and 3rd quarters and the Chronic WET testing for fathead minnows shall be conducted during the 2nd and 4th quarters.

BIOMONITORING REQUIREMENTS

A nationwide effort to control toxic discharges where effluent toxicity is an existing or potential concern is regulated in accordance with the Utah Pollutant Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity Control (biomonitoring), dated February 2018 (WET Policy). Authority to require effluent biomonitoring is provided in Permit Conditions, UAC R317-8-4.2,

Permit Provisions, UAC R317-8-5.3 and Water Quality Standards, UAC R317-2-5 and R317 -2-7.2.

The permittee is categorized as a minor industrial facility that has essentially been inactive since 2001 until recent start up activities in late 2024. Discharges from the Mine are to an intermittent stream that typically has limited upstream flows for most of the year, however the facility is located in a Class 1C designation for the protection of drinking water sources, as well as a Class 3A for the protection of cold-water aquatic species. Based upon these considerations, as well as the Mine water discharge increasing up to 10 MGD total, and following the WET Policy, the Mine water discharges via Outfall 004 will be subject to biomonitoring as appropriate. As such, the permittee will be required to quarterly conduct Chronic WET testing, alternating the test species which is consistent with other similar facilities in Utah. Additionally, the Permit will once again contain a toxicity limitation re-opener provision. This provision allows for modification of the Permit at any time in the future to include additional WET limitations and/or monitoring, should additional information indicate the presence of toxicity in the discharge. The chronic WET testing provisions as well as the toxicity limitation re-opener provision are detailed further in the Permit.

PERMIT DURATION

It is recommended that this permit be effective for the duration of the five-year permit period.

Drafted & Reviewed by
Jeff Studenka, Discharge Permit Writer & Colorado River Basin Salinity Control
Lonnie Shull, Biomonitoring
Amy Dickey, Watershed Protection/TMDL
Chris Shope, Wasteload Analysis & ADR
Utah Division of Water Quality (801) 536-4300

PUBLIC NOTICE INFORMATION (to be updated after)

Began: Month Day, Year
Ended: Month Day, Year

Comments will be received at: 195 North 1950 West
PO Box 144870
Salt Lake City, UT 84114-4870

The Public Noticed of the draft permit will be published on the Division of Water Quality website for at least 30 days as required.

During the public comment period provided under R317-8-6.5, any interested person may submit written comments on the draft permit and may request a public hearing, if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments will be considered in making the final decision and shall be answered as provided in R317-8-6.12.

ADDENDUM TO FSSOB

During finalization of the Permit certain dates, spelling edits and minor language corrections were completed. Due to the nature of these changes, they were not considered Major and the permit is not required to be re Public Noticed.

Responsiveness Summary
(provide any comments received and response sent if applicable)

DWQ-2026-000531

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ATTACHMENT 1

Wasteload Analysis Information
(DWQ-2026-001737 & DWQ-2026-001739)
and
Antidegradation Review
(DWQ-2026-001286)

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State of Utah
SPENCER J. COX
Governor

DEIDRE HENDERSON
Lieutenant Governor

Department of
Environmental Quality

Tim Davis
Executive Director

DIVISION OF WATER QUALITY
Candice A. Hasenyager, P.E.
Director

Utah Division of Water Quality
Statement of Basis ADDENDUM
Wasteload Analysis and Antidegradation Level I Review – MODIFICATION Outfall 004

Date: **March 24, 2026**

Prepared by: **Christopher L. Shope, PhD**
Standards and Technical Services

Facility: **Fossil Rock Mine - Fossil Rock Resources, LLC**
UPDES Permit No. UT0023728

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

DISCHARGE

There are three discharge points listed in the permit renewal application (Figure 1).

- Outfall 001 discharges effluent from a sedimentation pond to Cottonwood Canyon Ck.
- Outfall 002 discharges groundwater from the mine to Cottonwood Canyon Ck.
- Outfall 003 discharges effluent from a waste rock sedimentation pond to Grimes Wash, which flows into Cottonwood Ck.
- Outfall 004 discharges groundwater from the mine to Cottonwood Canyon Ck.

Expected combined maximum effluent discharge is up to 10.0 million gallons per day (MGD). This wasteload analysis is specifically for the new discharge at Outfall 004.

RECEIVING WATER

The receiving water for Outfalls 001, 002, and 004 is *Cottonwood Canyon Creek, which is an intermittent tributary of Cottonwood Creek.* Per UAC R317-2-13.1.b, the designated beneficial

uses for *Cottonwood Creek and tributaries, from Highway U-57 crossing to headwaters* are *1C, 2B, 3A, and 4*.

- *Class 1C - Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water*

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.*

- *Class 3A - Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain*

- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering.*

The receiving water for Outfall 003 is Grimes Wash, which is an intermittent tributary of Cottonwood Creek. Per UAC R317-2-13.1.b, the designated beneficial uses for *Cottonwood Creek and tributaries, from confluence with Huntington Creek to Highway U-57 crossing* are *2B, 3C, and 4*.

- *Class 3C - Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.*

Per UAC R317-2-8 Protection of Downstream Uses, all actions to control waste discharges under these rules shall be modified as necessary to protect downstream designated uses.

Per UAC R317-2-3 Antidegradation Policy, Outfalls 001 and 002 are in Category 1 Waters, while Outfalls 003 and 004 are in Category 3 Waters.

WATER QUALITY STANDARDS

Numeric criteria based on designated beneficial uses are specified in UAC R317-2-14. In addition, narrative water quality standards must not be violated per UAC R317-2-7.2:

> *It shall be unlawful, and a violation of these rules, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures; or determined by biological assessments in Subsection R317-2-7.3.*

No permit may be issued by the Director per UAC R317-8-2.2(7) to a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or [a] new discharger

proposing to discharge into a water segment which does not meet Utah water quality standards or is not expected to meet those standards even after the application of the effluent limitations required by the UPDES rules and for which the Director has performed a wasteload allocation for the pollutants to be discharged, must demonstrate, before the close of the public comment period, that:

(a) There are sufficient remaining wasteload allocations to allow for the discharge; and
(b) The existing dischargers into the segment are subject to schedules of compliance designed to bring the segment into compliance with Utah Water Quality Standards. (See UAC R317-2.)

CRITICAL LOW FLOW

Typically, the critical flow for the receiving water in a wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten-year return frequency (7Q10). Because the receiving water, Cottonwood Creek, is a seasonally dry, intermittent stream, the 7Q10 is assumed to be zero and effluent limits revert to end-of-pipe (EOP) water quality standards.

Due to severe lack of flow and water quality data, Cottonwood Canyon Creek and Grimes Wash water quality inputs were estimated. Upstream hardness was assumed to be consistent with monitoring location DWQ 4930710 WILBERG MINE WATER OUTFALL 001. Upstream pH and temperature were estimated based on data provided in the 2023 wasteload analysis.

RECEIVING WATER ASESSMENT AND TOTAL MAXIMUM DAILY LOAD (TMDL)

According to the Utah's Final 2024 Integrated Report on Water Quality dated April 30, 2024 (UDWQ, 2024), the receiving water for Outfalls 001, 002, and 004 discharge "*Cottonwood Creek and tributaries, from Highway U-57 crossing to headwaters* (AU name: *Cottonwood Creek Upper,* AU ID: *UT14060009-007_00*)" was listed as "Not Supporting" for Maximum Temperature, Total Dissolved Solids, and pH. The receiving waters do not have an approved TMDL for any parameters.

The receiving water for Outfall 003 discharge "*Cottonwood Creek and tributaries, from confluence with Huntington Creek to Highway U-57 crossing* (AU name: *Cottonwood Creek Lower,* AU ID: *UT14060009-011_00*)" was listed as "Not Supporting but has Approved TMDL for some parameters". The parameters of concern are Total Dissolved Solids and pH. The receiving waters have an approved TMDL (1139) for Total Dissolved Solids (UDWQ 2004). This downstream receiving water also has a site specific total dissolved solids (TDS) standard of 3500 mg/L.

A Total Maximum Daily Load (TMDL) addressing the TDS impairment for the San Rafael River and tributaries was completed as part of the West Colorado River Watershed TMDL in August of 2004. As part of the TMDL, site specific standards were developed for several stream segments in the watershed. A site-specific standard of 3,500 mg/l TDS was developed for Cottonwood Creek (and has since been incorporated into the Utah Water Quality Standards) from the confluence with Huntington Creek to Highway 57.

The Trail Mountain Mine (now Fossil Rock Mine), as well as Wilberg-Cottonwood 001, discharge to Cottonwood Creek approximately 8 miles above this stream segment. The TMDL indicated a TDS permit limit of 1,136 mg/l for the Trail Mountain Mine in order to be protective of downstream uses. The approved TMDL is silent on the Wilberg-Cottonwood 001 discharge, but because the mine discharges to the same segment as the Trail Mountain Mine, a 1,136 mg/l

TDS permit limit has also been applied for its discharge for consistency to protect downstream water uses.

MIXING ZONE
Per UAC R317-2-5, the maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and 2,500 feet for chronic conditions. Water quality standards must be met at the end of the regulatory mixing zone. In this case, because the 7Q10 was assumed to be zero, no mixing zone is allowed, and no dilution factor was applied.

PARAMETERS OF CONCERN
The potential parameters of concern identified for the discharge/receiving water were determined in consultation with the UPDES Permit Writer, the Utah Water Quality Assessment Reports, and the industry SIC codes from https://www.osha.gov/data/sic-search. The potential parameters of concern for this facility include: total dissolved solids (TDS), total suspended solids (TSS), temperature, pH, and total metals (specifically, Iron).

WET LIMITS
The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits. The LC_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC_{50} is typically 100% effluent and does not need to be determined by the WLA.

WET limits for Outfalls 001, 002, 003, and 004 for IC25 should be based on 100% effluent due to critical low flow conditions of zero.

WASTELOAD ALLOCATION METHODS
Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ 2021). The mass balance analysis is summarized in the Wasteload Addendum.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. Background data were not sampled for this location. To evaluate effluent discharge water quality, the discharge monitoring report (DMR) would typically be used. Due to a lack of flow dilution, effluent limits for this discharge are water quality standards for the specific receiving water. The applicable water quality standards are attached as an appendix to this wasteload.

For parameters without a WQBEL, permit limits should be set according to rules found in R317-1-3 and categorical UPDES discharge requirements.

Models and supporting documentation are available for review upon request.

ANTIDEGRADATION LEVEL I REVIEW
The objective of the Level I Antidegradation Review (ADR) is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the

receiving water. Therefore, the beneficial and existing uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

ANTIDEGRADATION LEVEL II REVIEW REQUIREMENTS

A Level II ADR is required for this facility. This is a new effluent discharge at Outfall 004 and concurrent contaminant loading is being increased under this new permit. Outfalls 001 and 002 are approximately 0.5 miles within Category 1 Waters, where waters shall be maintained at existing high quality. Trail Mountain Mine was previously permitted as a grandfathered discharge within Category 1 Waters, as the outfalls predated the adoption of the Antidegradation Rule. A flow limit was not included in the permit until 2014 and an expanded discharge was not contemplated at the time, as the mine was shut down since 2001 with no plans to reopen until more recently. Outfalls 003 and 004 are outside the Category 1 boundary in Category 3 Waters.

LOCATION MAP

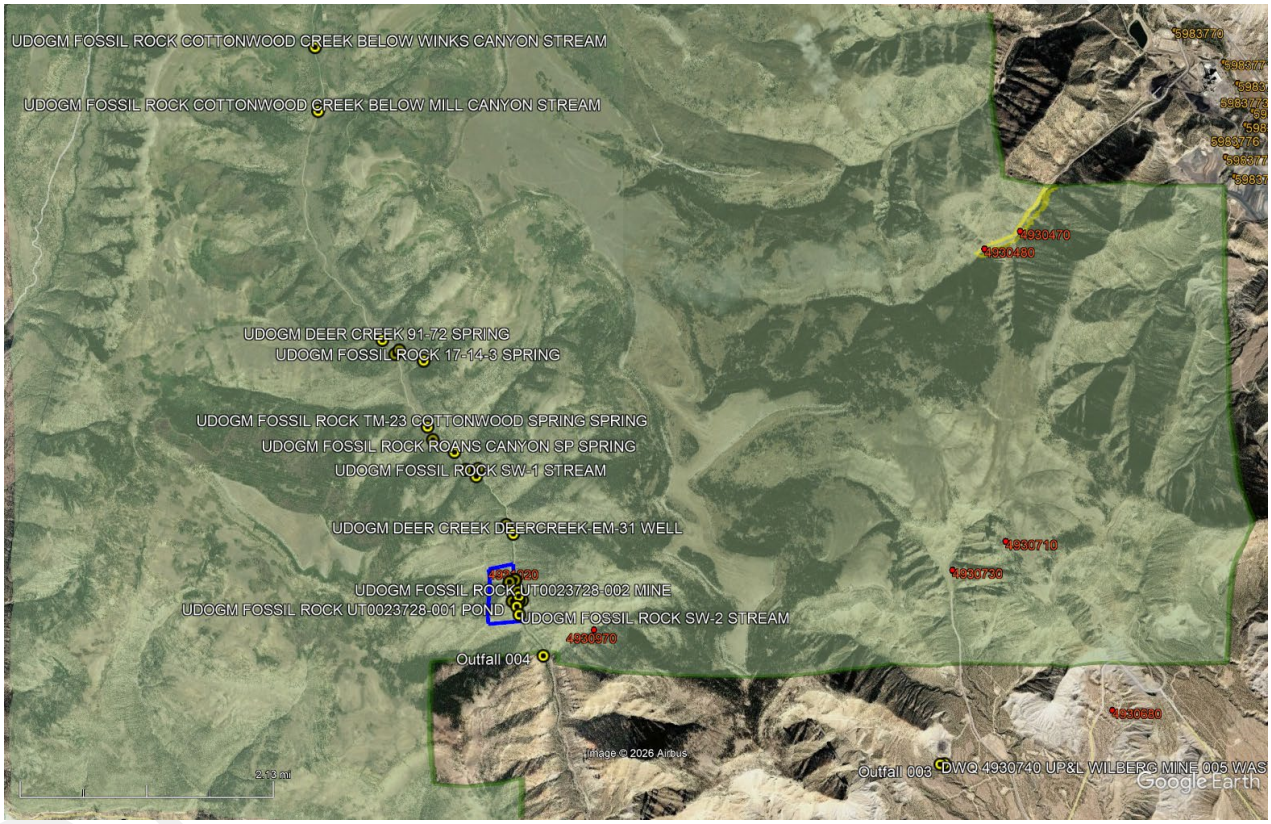

Figure 1: Location map of outfalls, monitoring locations, and surface water channels.

OUTFALL LOCATIONS

001: 39 19 00, -111 11 20, sedimentation pond to Cottonwood Canyon Ck
002: 39 19 03, -111 11 25, GW from mine to Cottonwood Canyon Ck
003: 39 17 43, -111 07 18, waste rock sedimentation pile to Grimes Wash to Cottonwood Canyon Ck
004: 39 18 32, -111 11 06, GW from mine to Cottonwood Canyon Ck

DOCUMENTS
WLA Document*: 260324-Fossil_Rock_Mine_EOP_WLA_2026.docx*
Wasteload Analysis and Addendums: *260324-Fossil_Rock_Mine_EOP_WLA_2026.xlsm*

REFERENCES
Utah Division of Water Quality. 2024. Final 2024 Integrated Report on Water Quality. https://lf-public.deq.utah.gov/WebLink/DocView.aspx?id=87957&repo=Public&searchid=fcd9ea4c-51e1-4227-aa29-fb1921c2cc19&cr=1

Utah Division of Water Quality. 2021. Utah Wasteload Analysis Procedures Version 2.0. https://documents.deq.utah.gov/water-quality/standards-technical-services/DWQ-2021-000684.pdf

Utah Division of Water Quality. 2004. Price River, San Rafael River, and Muddy Creek TMDLs for Total Dissolved Solids, West Colorado Watershed Management Unit, Utah. https://lf-public.deq.utah.gov/WebLink/DocView.aspx?id=15505&dbid=0&repo=Public&cr=1

WASTELOAD ANALYSIS [WLA] Not influded in WLA Date: 3/25/2026

Appendix A: Mass Balance Mixing Analysis for Conservative Constituents

A Level II Antidegradation Review (ADR) is required for this facility.

Discharging Facility:	Fossil Rock Mine-Fossil Rock Resources, LLC		
UPDES No:	7UT0023728		
	NA		
Permit Flow [MGD]:	10.00000	Annual	Max. Daily
	10.00000	Annual	Max. Monthly
Receiving Water:	Cottonwood Canyon Ck or Grimes Wash to Cottonwood Canyon Creek		
Stream Classification:	1C,2B,3A,4		
Stream Flows [cfs]:	0.00	All Seasons	Critical Low Flow
	-	All Seasons	Critical Low Flow (20th %)
Fully Mixed:	YES		
Acute River Width:	100%		
Chronic River Width:	100%		

Modeling Information

A mass balance mixing analysis was used to determine the effluent limits.

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort reflect the environmental conditions expected at low stream flows.

The calculations in this wasteload analysis utilize the maximum effluent discharge flow of 10 MGD. If the discharger is allowed to have a flow greater than 10 MGD during 7Q10 conditions, and effluent limit concentrations as indicated, then water quality standards will be violated. In order to prevent this from occuring, the permit writers must include the discharge flow limititation as indicated above; or, include loading effluent limits in the permit.

Effluent Limitations for Protection of Drinking Water (Class 1C Waters) (R317-2-14.1)

Physical Parameter	Concentration Minimum	Maximum
pH	6.5	9.0

Bacteriological

E. coli (30 Day Geometric Mean)	206	(#/100 mL)
E. coli (Maximum)	668	(#/100 mL)

Metals-Dissolved Maximum

Parameter	Standard[1]	Maximum Background	Limit
Arsenic (µg/L)	10.0		10.0
Barium (µg/L)	1000.0		1000.0
Beryllium (µg/L)	4.0		4.0
Cadmium (µg/L)	10.0		10.0
Chromium (µg/L)	50.0		50.0
Lead (µg/L)	15.0		15.0
Mercury (µg/L)[2]	2.000		2.000
Selenium (µg/L)	50.0		50.0

Silver (µg/L)	50.0	50.0

Inorganics-Maximum

Parameter	Standard[1]	Maximum Background	Limit
Bromate (mg/L)	0.01		0.01
Chlorite (mg/L)	1.0		1.0
Fluoride (mg/L)	4.0		4.0
Nitrates as N (mg/L)	10.0		10.0
Total Dissolved Solids (mg/L)	1200.0		1200.0

Radiological

Parameter	Maximum Concentration Standard
Gross Alpha (pCi/L)	15

Effluent Limitations for Protection of Recreation (Class 2B Waters) (R317-2-14.1)

Physical Parameter	Concentration Minimum	Maximum
pH	6.5	9.0
Turbidity Increase (NTU)		10.0

Bacteriological (R317-2-14.1)

E. coli (30 Day Geometric Mean)	206	(#/100 mL)
E. coli (Maximum)	668	(#/100 mL)

Effluent Limitations for Protection of Aquatic Wildlife (Class 3A Waters) (R317-2-14.21)

Physical Parameter	Concentration Minimum	Maximum
pH	6.5	9.0
Turbidity Increase (NTU)		10.0
Temperature (deg C)		20
Temperature Change (deg C)		2

Dissolved Oxygen (mg/L)	Minimum Concentration ELS Present	Others Present
Instantaneous	8.0	4.0
30-day Average	6.5	6.5
7-day Average	9.5	5

Inorganics Parameter	Chronic (30-day ave)	Acute (1-hour ave) Standard
Phenol (mg/L)		0.010
Hydrogen Sulfide (Undissociated-mg/L)		0.002
Total Residual Chlorine (mg/L)	0.011	0.019

Ammonia-Total (mg/L)

	Chronic (30-day ave) ELS Present			Acute (1-hour ave)		
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	1.4		1.4	3.8		3.8
Fall	2.4		2.4	5.6		5.6
Winter	2.4		2.4	5.6		5.6
Spring	2.1		2.1	4.6		4.6

	ELS Absent					
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	1.4		1.4	3.8		3.8
Fall	2.9		2.9	5.6		5.6
Winter	4.0		4.0	5.6		5.6

Spring	2.5	2.5	4.6	4.6

Metals-Total Recoverable

	Chronic (4-day ave)			Acute (1-hour ave)		
Parameter	**Standard[1]**	**Background**	**Limit**	**Standard[1]**	**Background**	**Limit**
Aluminum (µg/L)	87.0		87.0	750.0		750.0
Arsenic (µg/L)	150.0		150.0	340.0		340.0
Cadmium (µg/L)	2.2		2.2	6.6		6.6
Chromium VI (µg/L)	11.0		11.0	16.0		16.0
Chromium III (µg/L)	245.6		245.6	5138.4		5,138
Copper (µg/L)	27.8		27.8	46.7		46.7
Cyanide (µg/L)[2]	5.2		5.2	22.0		22.0
Iron (µg/L)				1000.0		1,000
Lead (µg/L)	16.2		16.2	415.8		415.8
Mercury (µg/L)[2]	0.0		0.012	2.4		2.4
Nickel (µg/L)	153.9		153.9	1384.0		1,384
Selenium (µg/L)	4.6		4.6	18.4		18.4
Silver (µg/L)				34.1		34.1
Tributylin (µg/L)[2]	0.1		0.072	0.5		0.46
Zinc (µg/L)	354.0		354.0	354.0		354.0

1: Based upon a Hardness of 359.2 mg/l as CaCO3

2: Background concentration assumed 67% of chronic standard

Organics [Pesticides]

	Chronic (4-day ave)		Acute (1-hour ave)	
Parameter	**Standard**	**Limit**	**Standard**	**Limit**
Aldrin (µg/L)			1.5	1.5
Chlordane (µg/L)	0.0043	0.0043	1.2	1.2
DDT, DDE (µg/L)	0.001	0.001	0.55	0.55
Diazinon (µg/L)	0.17	0.17	0.17	0.17
Dieldrin (µg/L)	0.0056	0.0056	0.24	0.24
Endosulfan, a & b (µg/L)	0.056	0.056	0.11	0.11
Endrin (µg/L)	0.036	0.036	0.086	0.086
Heptachlor & H. epoxide (µg/L)	0.0038	0.0038	0.26	0.26
Lindane (µg/L)	0.08	0.08	1.0	1.0
Methoxychlor (µg/L)			0.03	0.03
Mirex (µg/L)			0.001	0.001
Nonylphenol (µg/L)	6.6	6.6	28.0	28.0
Parathion (µg/L)	0.0130	0.0130	0.066	0.066
PCB's (µg/L)	0.014	0.014		
Pentachlorophenol (µg/L)	15.0	15.0	19.0	19.0
Toxephene (µg/L)	0.0002	0.0002	0.73	0.73

Radiological

	Maximum Concentration
Parameter	**Standard**
Gross Alpha (pCi/L)	15

LEVEL II ANTIDEGRADATION REVIEW FORM
UTAH DIVISION OF WATER QUALITY

Instructions

The objective of antidegradation rules and policies is to protect existing high quality waters and set forth a process for determining where and how much degradation is allowable for socially and/or economically important reasons. In accordance with Utah Administrative Code (UAC R317-2-3), an antidegradation review (ADR) is a permit requirement for any project that will increase the level of pollutants in waters of the state. The rule outlines requirements for Level I and Level II ADRs, as well as public comment procedures. This review form is intended to assist the applicant and Division of Water Quality (DWQ) staff in complying with the rule but is not a substitute for the complete rule in R317-2-3.5. Additional details can be found in the *Utah Antidegradation Implementation Guidance* and relevant sections of the guidance are cited in this review form.

ADRs should be among the first steps of an application for a UPDES permit because the review helps establish treatment expectations. The level of effort and amount of information required for the ADR depends on the nature of the project and the characteristics of the receiving water. To avoid unnecessary delays in permit issuance, the Division of Water Quality (DWQ) recommends that the process be initiated at least one year prior to the date a final approved permit is required.

DWQ will determine if the project will impair beneficial uses (Level I ADR) using information provided by the applicant and whether a Level II ADR is required. The applicant is responsible for conducting the Level II ADR. For the permit to be approved, the Level II ADR must document that all feasible measures have been undertaken to minimize pollution for socially, environmentally or economically beneficial projects resulting in an increase in pollution to waters of the state.

For permits requiring a Level II ADR, this antidegradation form must be completed and approved by DWQ before any UPDES permit can be issued. Typically, the ADR form is completed in an iterative manner in consultation with DWQ. The applicant should first complete the statement of social, environmental and economic importance (SEEI) in Part C and determine the parameters of concern (POC) in Part D. Once the POCs are agreed upon by DWQ, the alternatives analysis and selection of preferred alternative in Part E can be conducted based on minimizing degradation resulting from discharge of the POCs. Once the applicant and DWQ agree upon the preferred alternative, the review is considered complete, and the form must be signed, dated, and submitted to DWQ.

Utah Division of Water Quality
Level II Antidegradation Review Form

Part A: Application Information

Facility Name: Fossil Rock Mine

Facility Owner: Fossil Rock Resources, LLC

Facility Location: 5125 N Cottonwood Canyon Rd, Orangeville, UT 84537

Form Prepared By: Ryan Wilson, Manager of Land and Regulatory Affairs

Outfall Number: New Outfall 004

Receiving Water: Cottonwood Canyon Creek (tributary to Cottonwood Creek)

Designated Beneficial Uses of the Receiving Water (R317-2-13):
Domestic Water Supply: ☒ 1C
Recreation: ☒ 2B
Aquatic Life: ☒ 3A
Agricultural Water Supply: ☒ 4
Great Salt Lake: NA

Antidegradation Category of Receiving Water (R317-2-12):
☐ 1 ☐ 2 ☒ 3

UPDES Permit Number: UT0023738

Effluent Flow Reviewed: 9.5 MGD at new Outfall 004
Typically, this is the maximum monthly average discharge at design capacity. Exceptions should be noted.

What is the application for? (check all that apply)

☒ A UPDES permit for a new facility, project, or outfall.

☐ A UPDES permit renewal with an expansion or modification of an existing wastewater treatment works.

☐ A UPDES permit renewal requiring limits for a pollutant not covered by the previous permit and/or an increase to existing permit limits.

☐ A UPDES permit renewal with no changes in facility operations.

Part B. Determination of Need for Level II Review

This section of the form is intended to help applicants determine if a Level II ADR is required for specific permitted activities. In addition, the Executive Secretary may require a Level II ADR for an activity with the potential for major impact on the quality of waters of the state (R317-2-3.5a.1).

B1. The UPDES permit is new or is being renewed and the proposed effluent concentration and loading limits are higher than the concentration and loading limits in the previous permit and any previous antidegradation review(s).

☒ **Yes** (Proceed to Part B2 of the Form)

☐ **No** No Level II ADR is required and there is no need to proceed further with review questions.

B2. Will any pollutants use assimilative capacity of the receiving water, i.e. do the pollutant concentrations in the effluent exceed those in the receiving waters at critical conditions? For most pollutants, effluent concentrations that are higher than the ambient concentrations require an antidegradation review. For a few pollutants, such as dissolved oxygen, an antidegradation review is required if the effluent concentrations are less than the ambient concentrations in the receiving water. (Refer to Section 3.3 of Implementation Guidance)

☒ **Yes** (Proceed to Part B3 of the Form)

☐ **No** No Level II ADR is required and there is no need to proceed further with review questions.

B3. Are water quality impacts of the proposed project temporary and limited (Section 3.3.3 of Implementation Guidance)? Proposed projects that will have temporary and limited effects on water quality can be exempted from a Level II ADR.

☐ **Yes** Identify the reasons used to justify this determination in Part B3.1 and proceed to Part G. No Level II ADR is required.

☒ **No** A Level II ADR is required (Proceed to Part C)

Utah Division of Water Quality
Level II Antidegradation Review Form

B3.1 Complete this question only if the applicant is requesting a Level II review exclusion for temporary and limited projects (see R317-2-3.5(b)(3) and R317-2-3.5(b)(4)). For projects requesting a temporary and limited exclusion please indicate the factor(s) used to justify this determination (check all that apply and provide details as appropriate) (Section 3.3.3 of Implementation Guidance):

☐ Water quality impacts will be temporary and related exclusively to sediment or turbidity and fish spawning will not be impaired.

Factors to be considered in determining whether water quality impacts will be temporary and limited:

a) The length of time during which water quality will be lowered:
b) The percent change in ambient concentrations of pollutants:
c) Pollutants affected:
d) Likelihood for long-term water quality benefits:
e) Potential for any residual long-term influences on existing uses:
f) Impairment of fish spawning, survival and development of aquatic fauna excluding fish removal efforts:

Additional justification, as needed:

Utah Division of Water Quality
Level II Antidegradation Review Form

LEVEL II ANTIDEGRADATION REVIEW

Part C, D, E, and F of the form constitute the Level II ADR Review. The applicant must provide as much detail as necessary for DWQ to perform the antidegradation review. Questions are provided for the convenience of applicants; however, for more complex permits it may be more effective to provide the required information in a separate report. Applicants that prefer a separate report should record the report name here and proceed to Part G of the form.

Optional Report Name: ***Attachment A – Supplemental Information***

Part C. Statement of Social, Economic and Environmental Importance

This section determines whether the degradation from the project is necessary to accommodate important social and/or economic development in the area in which the waters are located. The applicant must provide as much detail as necessary for DWQ to concur that the project is socially and economically necessary when answering the questions in this section. More information is available in Section 6.2 of the Implementation Guidance.

SEE ATTACHMENT A – SUPPLEMENTAL INFORMATION

Part D. Parameters of Concern

This section identifies and ranks the parameters of concern from increasing to decreasing potential threat to beneficial uses of the receiving waters. Parameters of concern are constituents in the effluent at concentrations greater than ambient concentrations in the receiving water. The applicant is responsible for identifying parameter concentrations in the effluent and UDWQ will provide parameter concentrations for the receiving water through the wasteload allocation. More information is available in Section 3.3.3 of the Implementation Guidance.

SEE ATTACHMENT A – SUPPLEMENTAL INFORMATION

Part E. Alternative Analysis

Level II ADRs require the applicant to determine whether there are feasible less-degrading alternatives to the proposed project. For new and expanded discharges, the Alternatives Analysis must be prepared under the supervision of and stamped by a Professional Engineer registered with the State of Utah. DWQ may grant an exception from this requirement under certain circumstances, such as the alternatives considered potentially feasible do not include engineered treatment alternatives. More information regarding the requirements for the Alternatives Analysis is available in Section 5 of the Implementation Guidance.

SEE ATTACHMENT A – SUPPLEMENTAL INFORMATION

Alternative	Feasible	Reason Not Feasible/Affordable
Alternative Treatment Options	☒ Yes ☐ No	
Higher Treatment Levels	☐ Yes ☒ No	Any possible treatment options are analyzed in Alternative A
Connection to Other Facilities	☐ Yes ☒ No	There are no treatment facilities adjacent to or capable of connecting to facility
Process Changes/Material Substitution	☐ Yes ☒ No	
Seasonal or Controlled Discharge	☐ Yes ☒ No	Mine operation is year round and requires ongoing discharge
Pollutant Trading	☒ Yes ☐ No	
Water Conservation	☐ Yes ☒ No	Mine operation requires ongoing discharge
Water Recycling/Reuse	☐ Yes ☒ No	Encountered groundwater exceeds needed water use
Alternative location or receiving water	☐ Yes ☒ No	There are no additional lands to accommodate new construction at the facility
Land Application	☒ Yes ☐ No	
Total Containment	☐ Yes ☒ No	There is not enough suitable land at or near facility for total containment
Improved O&M of Existing System	☐ Yes ☒ No	Existing systems are not capable of treatment

Part F. Public Notice

Level II ADRs require an opportunity for the public and interested parties to review and comment on the documentation. UDWQ conducts the mandatory Public Notice once the Level II ADR has been reviewed and is considered complete, which typically occurs with the environmental determination or the draft UPDES permit. Level II ADRs are public noticed for a minimum 30 day comment period. More information is available in Section 3.7.1 of the Implementation Guidance.

F1. Does the applicant want to conduct optional public review(s) of components of the Level II ADR in addition to the mandatory public review?

- ☐ **Statement of Social, Economic and Environmental Importance**
- ☐ **Parameters of Concern**
- ☐ **Alternatives Analysis**
- ☒ **No, Applicant does not want to conduct optional public review**

Part G. Certification of Antidegradation Review

G1. Applicant's Certification

The form must be signed by the same responsible person who signed the accompanying UPDES permit application per UAC R317-8-3.1(3) or 401 Certification.

Based on my inquiry of the person(s) who manage the system or who prepared the documentation, the information in this form and associated documents is, to the best of my knowledge and belief, true, accurate, and complete.

Print Name: Kirt Tatton

Signature: Signed by: Kirt Tatton 15780113947D497...

Date: 3/10/2026

G2. Professional Engineer's Certification

The Alternatives Analysis must be prepared under the supervision of and stamped by a Professional Engineer registered with the State of Utah. UDWQ may grant an exception from this requirement under certain circumstances, such as the alternatives considered potentially feasible do not include engineered treatment alternatives.

The Alternatives Analysis was prepared under my supervision and the information in this form and associated documents is, to the best of my knowledge and belief, true, accurate, and complete. Apply the Professional Engineer stamp below.

Print Name: Jacob Smith

Professional Engineer License Number: 9073281

Signature: DocuSigned by: 6923F69B590949C...

Date: 3/10/2026

ANTIDEGRADATION REVIEW: FOSSIL ROCK MINE

ATTACHMENT A

SUPPLEMENTAL INFORMATION

Introduction and Purpose

Fossil Rock Resources, LLC (FRR), owns the Fossil Rock Mine, located approximately 12 miles west of Orangeville, Utah in the Wasatch Plateau Coal Field. Historically, the mine operated in the late 1990's and was eventually idled and the mine sealed in 2001. FRR acquired the Fossil Rock Mine in 2015 from PacifiCorp. Active permits at the mine site, include Utah Pollution Discharge Elimination System (UPDES) Permit Number UT0023728, which was last renewed in 2024 and expires on April 30, 2029. The mine encompasses approximately 9,560 acres with a combination of fee, federal, and state leases. The estimated production rate for 2025 was approximately 600,000 tons with the anticipation of longwall mining to commence in 2026 and will produce around 3.5 million tons of coal annually.

Since 2015, FRR has been evaluating the feasibility of restarting the Fossil Rock Mine. In 2024 FRR initiated operations to restart the Fossil Rock Mine and coal production began in September of 2024. As mining operations continue to advance further into the coal reserve, a slight increase in groundwater in-flow has been observed. Based on historic measured inflows and personal accounts by employees from the adjacent Deer Creek Mine, FRR is anticipating a further increase in groundwater inflows as mining develops further into the mine.

This ADR is being prepared as part of an application for a new outfall location (Outfall 004) under UT0023728 to accommodate the anticipated increased groundwater inflows.

Project Description

UPDES permit UT0023728 currently authorizes discharge from three outfalls: Outfall 001 discharges surface water runoff from a sedimentation pond at the mine site into Cottonwood Canyon Creek drainage, Outfall 002 discharges groundwater from the mine into Cottonwood Canyon Creek drainage, and Outfall 003 discharges surface runoff from a sedimentation pond at a waste rock pile into Grimes Wash drainage. Both outfalls 001 and 002 at the mine site discharge to the Cottonwood Canyon Creek drainage upstream of its confluence with Cottonwood Creek. Cottonwood Canyon Creek above the mine outfalls is an ephemeral stream. FRR plans to install a new outfall downstream from the mine with an anticipated flow limit of 9.5 MGD for mine water discharge. This new Outfall 004 would discharge into Cottonwood Canyon Creek on lands owned by FRR where the classification of the receiving water transitions from a Category 1 to a Category 3 receiving water.

Based on past experiences at the Sufco and Skyline mines and historical accounts from the adjacent Deer Creek Mine, FRR anticipates single event inflows could reach upwards of 5,000 gallons per minute ("gpm"). While 5,000 gpm may not be a sustained inflow in any single location, it is reasonable that the Fossil Rock Mine could see a sustained combined inflow up to 6,000 gpm throughout the mine. Currently Outfalls 001 and 002 have a total combined limit of 0.5 MDG (350 gpm) and are grandfathered outfall locations within the Category 1 portion of Cottonwood Canyon Creek. FRR is requesting that Outfall 001 and Outfall 002 remain with their current approved parameters. New Outfall 004 is being added to accommodate the anticipated groundwater inflows and is requested to have flow limit of 9.5 MGD (6,597 gpm) for a total permit combined flow of 10.0 MGD.

Part C. Statement of Social, Environmental, and Economic Importance

This section determines whether the degradation from the project is necessary to accommodate important social and/or economic development in the area in which the waters are located. The applicant must provide as much detail as necessary for DWQ to concur that the project is socially and economically necessary when answering the questions in this section.

The requirement for applicants originates in the *Code of Federal Regulations*, Chapter 40, Part 131.12(a)(2) [40 CFR 40.131.12(a)(2)]. It requires applicants to demonstrate that allowing lower water quality is beneficial to accommodate social or economic development in the area. The State of Utah defines the minimum information that an applicant must provide includes the following:

- Impacts on employment
- Increases in production
- Improved community tax base
- Impacts on housing
- Correction of an environmental or public health problem

C1. Describe the proposed project or activity that requires a discharge of pollutants to waters of the State of Utah.

As mining develops further into the coal reserve, it is anticipated that a series of faults, fractures, and other complex geologic features will be encountered. When these features are mined into, they often contain a pressurized zone of groundwater that is released. Immediate inflows upon encountering these features is typically around 600 gpm to 3,000 gpm, with extremely rare cases up to 5,000 gpm. The rate of inflow typically peaks when first encountered and gradually slows down within 60 to 90 days.

In order to avoid any safety hazard or mine shutdown, it is necessary to install a system of piping and pumps that are sized adequately to handle this amount of groundwater inflow and send it away from the working sections of the mine. Currently, there is limited storage space in the mine where the encountered water can be safely stored, and it has been observed that long residency time of water in mined-out areas tends to increase the Total Dissolved Solids (TDS) of the water. In order to most economically and feasibly handle the encountered groundwater inflows, it is ideal to discharge encountered groundwater to a surface point. In the case of Fossil Rock Mine, it is Outfall 004 into Cottonwood Canyon Creek.

C2. Describe the social and economic benefits that would be realized through the proposed project, including the number and nature of jobs created and anticipated tax revenues.

The 2024 population of Emery County was 10,161 residents. The 2023 median household income was $68,823. In August 2025, the unemployment rate for Emery County was 4.4 percent which is 0.5% higher than the previous year. https://jobs.utah.gov/wi/data/library/index.html

Cottonwood Creek, is a major tributary from Joe's Valley Reservoir that supplies irrigation water to the community. Agriculture and mining are a large part of the local economy. Coal mining has occurred in this area for over 100 years and is a well-established industry in Carbon and Emery Counties. Several mine closures in the area have occurred over the past 10 years, including Dugout Canyon, Lila Canyon and Deer Creek mines. Given the recent mine closures and expected increase in employment at Fossil Rock Mine, it is not expected to require additional community services, additional infrastructure or require additional education demands on the community. The remaining anticipated future workforce requirements can be supported by Orangeville and other nearby communities in Carbon and Emery Counties, and is expected to be a large economic benefit to rural Utah

The Fossil Rock Mine had been idled since 2001 and no employees were located at the mine site from 2001 until 2024. Employment at the site grew from 12 to 175 in 2024 and is currently at 225 employees with plans to expand up to 350 total employees by May of 2026. The average yearly wage and benefits each FRR employee receives is approximately $125,000. In addition to the direct employment jobs FRR will require the coal being mined to be transported via truck to the local power plants. It is expected that FRR will require an additional 75 trucking jobs and the coal going to the power plants will support the 700 plus employees at the power plants. Based on a 2019 study by the Economic Policy Institute[1] for each direct employee of a coal mining operation, it creates 5 indirect jobs (i.e. schools, contractors, retail, etc.). Therefore, when FRR reaches full employment of 350 people, it would create an economic benefit to rural Utah of another 1,750 jobs.

FRR also pays property tax which historically was around $26,000 annually prior to the startup of the mine. Now, with the restart of the mine and added infrastructure being installed, the projected property tax is now expected to be over $1.0M annually. In addition to property taxes, FRR also has an economic impact to local suppliers and vendors of approximately $70M per year. FRR also pays production royalties to the State of Utah Trust Lands Administration or the Bureau of Land Management of approximately $12M per year, part of which returns back to the State and Local governments. The life of the mine is anticipated to be approximately 15 to 20 years.

C3. Describe any environmental benefits to be realized through implementation of the proposed project.

The additional flow through Outfall 004, will in turn restore constant flow to a currently intermittent stream. This will benefit the riparian areas along Cottonwood Canyon Creek. Given the long-term drought conditions in Utah, the additional flow into the Cottonwood Creek irrigation system will offset consumptive irrigation use downstream and allow additional storage to remain in Joe's Valley Reservoir. The reduced need to draw from Joe's Valley Reservoir will better support wildlife habitat and the overall water balance in Emery County, and ultimately the Colorado River drainage.

[1] Bivens, J. (2019). *Updated Employment Multipliers for the U.S. Economy.* Washington D.C.: Economic Policy Institute.

C4. Describe any social and economic losses that may result from the project, including impacts to recreation or commercial development.

No known social or economic losses would result from an increase in water flow downstream of the outfall.

C5. Summarize any supporting information from the affected communities on preserving assimilative capacity to support future growth and development.

The proposed total flow from all outfalls of 10.0 MGD is the equivalent of 15.47cfs. Discharges from Joe's Valley reservoir vary between 10cfs and 150cfs demonstrating that the Cottonwood Creek system can sufficiently handle this added flow. Maintaining the current quality parameters in the permit will allow the discharged water to be utilized downstream for authorized uses like irrigation.

C6. Describe any structures or equipment associated with the project that will be placed within or adjacent to the receiving water.

An upgraded discharge system will be required to move encountered groundwater from the mine into the receiving water. This will include installing a new pipe from the mine site and running approximately 2,400 feet downstream to the new Outfall 004 location. An engineered rip-rap apron will be installed at the discharge point to avoid the scouring of the natural channel.

Part D. Parameters of Concern

The existing Fossil Rock Mine UPDES permit contains limits for the following parameters at Outfall 001 and 002:

a) pH, total iron, oil & grease, total suspended solids (TSS), and total dissolved solids (TDS).

To FRR's knowledge, there are no parameters/pollutants that have been identified as "important" through public comment or other public input forums for discharges to Cottonwood Creek. TDS is a POC under the Colorado River Salinity Control Forum.

Based on past permit reviews and waste load analysis, TDS, TSS, pH and total iron have been identified as Parameters of Concern. The following list of preliminary parameters/pollutants was established as potential POCs for further consideration in the Fossil Rock Mine ADR analysis:

1. Total Suspended Solids
2. Totals Dissolved Solids
3. Oil & Grease
4. Iron
5. pH
6. Temperature
7. Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn)

Section 4.0 of the ADR Implementation Guidance indicates that "only parameters in the discharge effluent that exceed, or potentially exceed, ambient concentrations [in the receiving water body] should be considered".

The tables below provide a summary of the preliminary list of POCs that were considered and whether or not each potential POC was selected as a final POC for the Fossil Rock Mine ADR analysis.

D-1. Parameters of Concern:

Rank	Pollutant	Ambient Concentration*	Effluent Concentration #
1	Total suspended solids	97.35 mg/L	<5
2	Total dissolved solids	276.83 mg/L	666
3	Iron	30.8 mg/L Total	0.075
4	pH (Field)	8.52	8.13
5	Oil and grease	**	<5

D-2. Pollutants Evaluated That Are Not Considered Parameters of Concern:

Pollutant	Ambient Concentration*	Effluent Concentration #	Justification
Copper	1.19	**	
Cadmium	**	**	Not detected in historical monitoring
Chromium	**	**	Not detected in historical monitoring
Selenium	**	**	Not detected in historical monitoring
Arsenic	**	**	Not detected in historical monitoring
Lead	0.17	**	
Mercury	**	**	Not detected in historical monitoring
Zinc	13.2	0.073	
Nickel	**	**	Not detected in historical monitoring
Arsenic	**	**	Not detected in historical monitoring
Temperature	9.54	14	

* EPA Water Quality Portal (WQX) – Cottonwood Creek above Grimes Wash (Average)
** Effluent is non-detect or below ambient concentrations
# Outfall 001 data SGS Lab – 2025 (Average)

Cottonwood Canyon Creek is an intermittent stream that typically only flows during periods of runoff and precipitation events. Therefore, it is difficult to obtain a strong baseline of ambient concentrations for the immediate receiving water. The values for ambient concentrations provided in tables D.1 and D.2 above were obtained from data gathered intermittently over the past 20-years for Cottonwood Creek. A summary table of possible POC's from an antidegradation review for the Cottonwood/Wilberg Mine is also attached for reference as Appendix A. Several factors must be taken into consideration when reviewing the ambient levels. For the TDS, the ambient concentration is significantly low due to the source of the water being from Joe's Valley reservoir (Cottonwood Creek headwater) with little transportation time from the headwater to the sample points above Grime's wash. It is well known that with additional transportation time, the TDS increases substantially as it travels further downstream. The average ambient concentration of the TSS and Iron appear to be elevated and are likely related. The samples for the ambient parameter values may not have all been collected at one time, and as stated earlier, were intermittent over more than two decades. An assumption to explain these elevated concentrations for TSS and Iron may be due to samples being obtained during a precipitation event. As has been observed during a precipitation event, sediment in the water body is agitated and mixed, often with Iron being part of the constituents comprising the TSS.

Based on knowledge of groundwater encountered at other mine operations in the region, FRR believes effluent concentrations will be within the currently approved parameter limits. Since the new outfall is still within the same receiving water, but further downstream in the Category 3 receiving water, FRR requests that the currently established parameters remain as-is.

Part E. Alternative Analysis

The intent of this section is to evaluate whether there are any reasonable non-degrading or less degrading alternatives when compared with the discharge alternative for handling of water from the Mine. The section provides an initial screening of potential alternatives based on their feasibility followed by a detailed screening of those alternatives deemed feasible based on their total financial costs, pollution/POC reduction, and performance based on several criteria, including reliability, operability, maintainability, sustainability, and adaptability to future regulatory changes. The analysis is followed by identification of the preferred treatment alternative and the justification for selection of that treatment alternative.

The requirements found in UAC R317-2-3.5 stipulate the following alternatives should be considered, evaluated, and implemented to the extent feasible:

a) Innovative or alternative treatment options
b) More effective treatment options or higher treatment levels
c) Connection to other wastewater treatment facilities
d) Process changes or products or raw material substitution
e) Seasonal or controlled discharge options to minimize discharging during critical water quality periods
f) Pollutant trading
g) Water conservation
h) Water recycle and reuse
i) Alternative discharge locations or alternative receiving water bodies
j) Land application
k) Total containment
l) Improved operation and maintenance (O&M) of existing treatment systems
m) Other appropriate alternatives

Section 5.2 of the Implementation Guidance indicates that the feasibility of all treatment alternatives should be examined before the alternatives are included for further consideration as part of the ADR analysis. Based on this requirement, many of the alternatives listed in UAC R317-2-3.5 can be excluded from further consideration as part of this ADR analysis based on their impracticality or inability to be implemented at the Mine. The following are treatment alternatives from the above list that are excluded from further consideration along with the justifications for each exclusion:

- **Alternative B – Higher treatment levels**: Ion exchange and reverse osmosis are demonstrated treatment processes for removing TDS from effluent. However, these processes concentrate the salt ions into a reverse osmosis membrane reject stream or an ion exchange resin regeneration brine, and do not reduce the mass of TDS requiring discharge to surface or disposal by other methods. Due to the cost and complexity of managing reject and regeneration wastes, higher level treatment processes were not considered further.

- **Alternative C—Connection to other wastewater treatment facilities:** The Castle Valley Special Service District operates a sanitary wastewater treatment facility near Castle Dale, UT, which is the only wastewater treatment facility located in the proximity. The District's treatment system does not have the capacity or the treatment technology to effectively handle the increased wastewater flow.
- **Alternative D—Process changes or product or raw material substitution:** This is an underground coal mine. Outfall 004 is required and necessary to manage groundwater water discharges from the mine.
- **Alternative E—Seasonal or controlled discharge options:** Water cannot be stored within the mine area (limited). Year-round discharges are required to maintain the ability to continue underground mining operations.
- **Alternative G—Water conservation:** The discharges result from surface runoff and groundwater intercepted by the underground mine workings. Neither source of discharge is controllable. There are no practical options for further water conservation at the mine.
- **Alternative H-Water recycle and reuse:** The mine's footprint is small and additional undeveloped land would need to be purchased to develop a system to handle the new proposed flows. Based on the rugged topography surrounding the mine site, no land adjacent to the mine site would be available. Building a recycle system away from the mine site would require the water to be piped to a different location and then piped back to the mine site for reuse.
- **Alternative I—Use of alternative discharge locations or alternative receiving water bodies:** The only receiving water body in proximity to the Mine is Cottonwood Canyon Creek.
- **Alternative K—Total containment:** Options for total containment include an evaporation pond, deep well injection, and thermal evaporation using a mechanical concentrator and crystallizer. However, the construction of holding or evaporation ponds or other containment structures would require about 600 acres of suitable, undeveloped land to operate effectively to handle the new proposed flows. Based on the rugged topography surrounding the mine site and limited undeveloped areas with moderate slopes, total containment using evaporation ponds is not considered. Total containment using deep well injection is used at some locations to dispose of effluent streams. However, geology and hydrogeology are not well known at the depth and area of interest for the Mine site, and the risks associated with location, permitting, and drilling a successful well are high. Additionally, containment of 10,650 acre feet per year is not feasible for an injection well.
- **Alternative L—Improved operation and maintenance of existing treatment systems:** Not applicable. Outfall 004 will rely on in-mine sedimentation pools to remove TSS and iron, and does not have the capability to remove TDS. No other treatment system for groundwater discharge is currently existing at the site.

After excluding the preceding treatment alternatives deemed infeasible from further consideration, the following alternatives listed in UAC R317-2-3.5 are being carried forward for further analysis as part of this ADR:

Alternative A - Alternative Treatment Solutions

Option 1: In Mine Sedimentation

The existing in-mine sedimentation is the baseline alternative for comparison and evaluation of feasible treatment alternatives.

The table below is an excerpt from an Anti-Degradation Review at the Cottonwood/Wilberg Mine located adjacent to the Fossil Rock Mine. The data in the table presents an example of estimated POC removal by the sedimentation within the mine estimated by Energy West Mining through an Anti-Degradation Review submitted in 2012.

Example of Estimated Pollutant Removal by In-Mine Sedimentation
Energy West Cottonwood/Wilberg Mine

Parameter	Influent (mg/L)	Influent (lb/d)	Effluent (mg/L)	Effluent (lb/d)	Removal (lb/yr)	Removal
TSS	25	11	3	1.3	3,375	88%
TDS	749	315	749	315	0	0%
Iron	1	0.4	0.03	0.01	149	97%

NOTES:
Influent TSS = 25 mg/L and influent iron = 1 mg/L are engineering estimates.(In-mine influent has not been sampled for results listed). Mass loads are based on an average flow of 50,400 gallons per day.

Cost Analysis

Mine drainage flows by gravity and pumping through underground workings during mining activities. The primary operating cost of the in-mine sedimentation is routine monitoring, pump purchases, electricity for pumping costs, and labor for installing and maintaining the system. The estimated annualized cost of in-mine sedimentation is approximately $125,000/year.

The TSS and iron concentrations are lower than the permit limits and also lower than the effluent quality provided by media filtration and iron oxidation and filtration processes. Therefore, additional treatment for TSS and iron removal was not considered. TSS removal through in-mine sedimentation pools are the most cost-effective option for suspended solids.

Option 2: Enhanced Alumina Adsorption

Enhanced alumina adsorption is used in industrial wastewater treatment systems and is

effective for cadmium and other metals removal and meeting effluent limits. However, enhanced alumina will not remove TDS. With proper maintenance and operator training, the reliability of an adsorption system is high.

Cost Analysis

The estimated upfront capital costs for an effluent enhanced alumina adsorption system is $770,000. The treatment system is sized to a flow of 300 gpm. Table below presents the estimated annual Operation and Maintenance (O&M) costs and annualized capital cost for the adsorption alternative.

Total Annualized Cost for Alternative 2—Enhanced Alumina Adsorption

Item	Quantity	Cost
Labor	1056 hours/year	$79,200
Laboratory analysis	LS	$8,660
Electricity	10 kW	$5,400
Maintenance		$36,150
Media replacement and disposal	7,000 lb/yr	$43,200
Annual Total O&M Cost		**$172,610**
Cost of capital	$770,000 at 12 % over 20 years	$103,000
Total Annualized Cost		**$275,610**

Option 3: Reverse Osmosis

Applicant has consulted with several water treatment vendors in 2025 to analyze the feasibility of using reverse osmosis treatment system at large scale to handle 3,000 gpm of encountered groundwater in the mine. The reverse osmosis process is designed to reduce TDS by 95% and treatment capacity can be added to reach up to 10,000 gpm if needed. The downfall of a RO system is the waste stream generated during treatment requiring further treatment or disposal. At the newly proposed 6,600gpm flow rate, this could potentially create a waste stream of approximately 650gpm that would need to be trucked or piped offsite for total containment via evaporation or underground well injection (which is discussed as not feasible in the previous section under Alternative K). Based on estimates provided to Applicant for a 3,000gpm treatment system, upfront capital costs for a RO system are between $4,000,000 and $6,500,000 with annual O&M costs around $450,000. Utilizing the same calculations for cost of capital as Option 2 above, the total annualized cost for a RO system is approximately $1,150,000.

Alternative F - Pollutant Trading

The discharge is located within the Colorado River basin and is subject to the Colorado River Basin Salinity Control Forum's policies for TDS. The Forum policy allows permitting

authorities to allow industrial sources of salinity to conduct or to finance salinity offset projects. Purchasing salinity offset credits is a potential alternative to reduce salinity in the regional Utah watershed portion of the Colorado River Basin for TDS discharges from the facility that would exceed one (1) ton per day (tpd).

Alternative J - Land Application

The facility is located in a relatively narrow canyon and property suitable for an effluent storage pond is not available at the mine. However, Applicant does own agricultural land approximately 3.5 miles downstream where direct land application could be utilized. In order to utilize land application techniques, Applicant would need to apply the discharge to the agricultural lands without utilizing any storage. The land available for use consists of approximately 35 acres of irrigatable lands. According to a report by Utah State University[2], the watering rates for a typical alfalfa field in Castle Dale, are 4-acre feet per acre, with a consumptive use of 63%. The 35 acres could accommodate approximately 20-acre feet per month during the irrigation season, which equates to 150 gpm. This alternative would only be available for the months of April through October. Additionally, transporting the effluent would either require discharging it into Cottonwood Canyon Creek and then capturing the water before the confluence with Cottonwood Creek or piping the effluent from the mine site, approximately 3.5 miles to the property owned by Applicant, where it can then be applied to the land. Based on a feasibility study the Applicant performed in 2024, an 18" pipeline of this magnitude would cost approximately $7,000,000.

Summary of Alternatives

As demonstrated above, providing additional treatment to remove POCs provides limited improvement in the effluent quality while imposing a high incremental annual cost. The current in-mine sedimentation alternative more than meets the State's guidance for cost-effective treatment and is the recommended treatment.

An in-mine sedimentation system with proper O&M practices creates the highest reduction in TSS and Iron parameters and has a reasonable annual cost to the Applicant. The maintainability and operability of the in-mine sedimentation alternative is considered more favorable than the alternatives because it requires the least amount of capital investment, equipment, useable space and lowest amount of operator attention.

Sedimentation within the mine is used to remove iron and TSS from groundwater intercepted by the mine before being discharged via Outfall 004. Collected groundwater is typically retained in abandoned mine workings for at least 24 hours. This time frame allows suspended sediment to settle prior to discharging to the surface drainage. Due to the currently limited abandoned mine workings, there is limited storage to achieve a minimum retention time to allow for the settling of solids particles. This alternative has limitations at the present time but will improve as mining progresses.

[2] *Consumptive Use of Irrigated Crops in Utah*, Research Report 145. Utah Agricultural Experiment Station. Utah State University, Logan, Utah, October 1994.

Appendix A

Summary Table of Ambient POCs for the Cottonwood/Wilberg Mine ADR Analysis
(Energy West: Cottonwood/Wilberg Mine)

Potential POC Being Considered	Cottonwood Creek above Grimes Wash (average 2002 – 2008)[1]	Grimes Wash above Mine (average 2008—2012)[2]	Cottonwood Canyon Creek, 1 mile above Outfall 001 (Average 2007-2012)[2]
1. Total Suspended Solids (mg/L)	56[3]	34	19
2. Total Dissolved Solids (mg/L)	292	490	547
3. Oil & Grease (mg/L)	No data[4]	Non-detect	Non-detect
4. pH (s.u.)	6.6 – 8.8	8.3 – 8.5	7.6 – 8.5
5. Iron, Total (mg/L)	0.010[5]	0.52	0.31
6. Temperature (C)	9.8	17.7	12.3
7 Arsenic (mg/L)	Non-detect[6]	No data[4]	<0.01
8 Cadmium (mg/L)	Non-detect[6]	No data[4]	<0.001
9 Chromium (mg/L)	0.006	No data[4]	No data[4]
10 Copper (mg/L)	<0.0012[7]	No data[4]	<0.01
11 Lead (mg/L)	Non-detect[6]		<0.01
12 Mercury (mg/L)	Non-detect[6]	No data[4]	No data[4]
13 Nickel (mg/L)	Non-detect[6]	No data[4]	No data[4]
14 Selenium (mg/L)	Non-detect[6]	No data[4]	No data[4]
15 Zinc (mg/L)	<0.017[8]	No data[4]	0.004

1. Utah DWQ Station ID 4930950 (sampling location is at the Utah Highway 57 bridge and Cottonwood Creek.)
2. Energy West surface water monitoring location
3. Average of reported values for 7 samples and half of the estimated reporting limit (0.5 x 4 mg/L) for 9 samples.
4. No monitoring data within the last 10 years.
5. Results reported as dissolved iron. Average of reported values for 2 samples, and half of the estimated reporting limit (0.5 x 5 µg/L) for 4 samples.
6. Results reported as dissolved metals and no reporting limit was provided.
7. One result of 0.0012 mg/L dissolved copper and five non-detect samples with no reporting limit provided.
8. One result of 0.017 mg/L dissolved zinc and five non-detect samples with no reporting limit provided.