



## COLORADO

Division of Reclamation,  
Mining and Safety

Department of Natural Resources

1313 Sherman Street, Room 215  
Denver, CO 80203

April 7, 2016

Mr. Brian Lorch  
Summit County Government and Town of Breckenridge  
P.O. Box 5660  
Frisco, CO 80443

**Re: Swan River Resource, Permit M-1993-035, Technical Revision Approval, Revision TR02**

Mr. Lorch:

On April 7, 2016 the Division of Reclamation, Mining and Safety approved the Technical Revision application submitted to the Division on April 4, 2016, addressing the following:

*Revise reclamation plan as specified in submittal as part of a multi-agency stream restoration project.*

The terms of the Technical Revision TR02 approved by the Division are hereby incorporated into Permit M-1993-035. All other conditions and requirements of Permit M-1993-035 remain in full force and effect.

The Division looks forward to the successful completion of the proposed stream restoration.

If you have any questions, please contact me.

Sincerely,

Eric C. Scott  
Environmental Protection Specialist





**COLORADO DIVISION OF RECLAMATION, MINING AND SAFETY**  
1313 Sherman Street, Room 215, Denver, Colorado 80203 ph(303) 866-3567

**REQUEST FOR TECHNICAL REVISION (TR) COVER SHEET**

File No.: M- 1993-035 Site Name: Swan River Resource

County Summit TR# \_\_\_\_\_ *(DRMS Use only)*

Permittee: Summit County Government

Operator (If Other than Permittee): Summit County and Town of Breckenridge

Permittee Representative: Summit County Government - Brian Lorch

Please provide a brief description of the proposed revision: \_\_\_\_\_

Revise reclamation approach to allow for reclamation to a pre dredge mining condition, i.e., restoration of a stream channel and riparian corridor. Please see the attached documents for additional information.

As defined by the Minerals Rules, a Technical Revision (TR) is: "a change in the permit or application which does not have more than a minor effect upon the approved or proposed Reclamation or Environmental Protection Plan." The Division is charged with determining if the revision as submitted meets this definition. If the Division determines that the proposed revision is beyond the scope of a TR, the Division may require the submittal of a permit amendment to make the required or desired changes to the permit.

The request for a TR is not considered "filed for review" until the appropriate fee is received by the Division (as listed below by permit type). Please submit the appropriate fee with your request to expedite the review process. After the TR is submitted with the appropriate fee, the Division will determine if it is approvable within 30 days. If the Division requires additional information to approve a TR, you will be notified of specific deficiencies that will need to be addressed. If at the end of the 30 day review period there are still outstanding deficiencies, the Division must deny the TR unless the permittee requests additional time, in writing, to provide the required information.

There is no pre-defined format for the submittal of a TR; however, it is up to the permittee to provide sufficient information to the Division to approve the TR request, including updated mining and reclamation plan maps that accurately depict the changes proposed in the requested TR.

Required Fees for Technical Revision by Permit Type - Please mark the correct fee and submit it with your request for a Technical Revision.

<u>Permit Type</u>	<u>Required TR Fee</u>	<u>Submitted</u> (mark only one)
110c, 111, 112 construction materials, and 112 quarries	\$216	<input checked="" type="checkbox"/>
112 hard rock (not DMO)	\$175	<input type="checkbox"/>
110d, 112d(1, 2 or 3)	\$1006	<input type="checkbox"/>



## OPEN SPACE & TRAILS DEPARTMENT

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March 18, 2016

Mr. Eric Scott  
Colorado Division of Reclamation, Mining and Safety  
1313 Sherman Street, Room 215  
Denver, CO 80203  
via email: [eric.scott@state.co.us](mailto:eric.scott@state.co.us)

RE: REQUEST FOR TECHNICAL REVISION  
Mine Name: Swan River Resource  
Mine ID# M-1993-035  
Location: Summit County

Dear Mr. Scott,

Please let this letter serve as an application for a Technical Revision (TR) under Rule 1.9.1 from Summit County Government for a modification to the post-mining reclamation plan for the Swan River Resource (Regular 112 operation permit no. M-1993-035). The approved post-mining land use of the Swan River Resource is wildlife habitat/rangeland. As referenced in Banks and Gesso's August 3, 2007 letter to the Division of Reclamation, Mining and Safety (DRMS), one of the primary objectives of the future reclamation plan is to modify the existing Swan River channel alignment to a more natural meandering course and to restore the adjacent riparian boundary. Over the last several years, since the Succession of Operators (SO) process was completed on November 25, 2008, Summit County and the Town of Breckenridge have worked to import clean topsoil for use in the reclamation process and solicit funding to implement the long term restoration reclamation goal of a restored stream channel and riparian corridor. We are now prepared to act on the documented DRMS requirement stated in an August 20, 2007 letter that such changes to the reclamation plan will need to be filed as a revision to the permit. Please accept this letter as a formal request to DRMS to revise the current reclamation approach for the Swan River Resource.

### **Existing Conditions within the Permit Boundary**

Much of the site comprising the Swan River Resource was heavily impacted by dredge boat mining in the early 1900's, which left the valley bottom virtually devoid of any natural resource function or value. Dredging was completed to an unknown depth (estimated to at least 30 feet) throughout the Swan River Valley as well as the nearby Blue River Valley. Dredge spoils remaining within the permit boundary typically consisting of cobble sized materials left in piles that extend approximately 25 feet above the surrounding valley floor. The Swan River Resource and upper valley are generally devoid of natural vegetation and ecological function as a result of past mining activities. Sporadic pockets of shrubs or young trees may exist near the existing Swan River channel or where groundwater surfaces. In recent years Summit County and the Town of Breckenridge have removed much of the dredge material from western end of the permit boundary for offsite commercial use.

Restoration of the entire valley bottom and new channel alignment within the Swan River Resource will require extensive earthwork and contouring. Heavy equipment will contour the existing landscape to reestablish appropriate valley shape, landforms and achieve appropriate elevations for groundwater interactions.

Large heavy equipment (track excavators, dozers, and 6-wheel off road articulated haul trucks) will be used to contour the valley bottom and excavate a new channel alignment. Onsite material will be stockpiled and processed (sorted/screened/crushed) to produce specific materials (fine mineral soils, gravel and cobbles) used for restoration features. Processed materials will then be hauled back and placed to form new restoration features. A majority of the surface grading and new channel excavation work will be completed with groundwater and stream flows directed around active earthwork areas. However localized drainage and minor flows are anticipated within the new channel work and will be discharged through Best Management Practices (BMPs). Once the new channel is completed, flows will be introduced and the existing channel abandoned and backfilled.

The new channel alignment will require installation of an open bottom culvert bridge for Tiger Road and re-alignment of a section of Muggins Gulch Road. Muggins Gulch Road will be shifted north providing adequate room for the new channel alignment. An arched open bottom culvert will be installed in Tiger Road to accommodate the new channel, replacing the current failing pipe culverts conveying stream flows through Tiger Road. Minor utilities within the existing Tiger and Muggins Gulch Road will be relocated, but remain within the road alignments. Large scale revegetation efforts will focus on developing a suitable growth medium to cap dredge spoils and the contoured land surface in order to establish native riparian and upland vegetation communities.

### **Reclamation Goals and Objectives**

Summit County has embarked on a detailed and progressive approach to management and restoration of the overall, Swan Valley, the County Open Space Property and specifically for the Swan River Resource. The County has coordinated with many agencies including Colorado Parks and Wildlife (CPW), US Forest Service (USFS) White River National Forest, Colorado Water Conservation Board (CWCB), Blue River Watershed Group (BRWG), Trout Unlimited (TU) and other local interested individuals. The proposed reclamation restoration plan has been developed based on this coordination. In addition, the current proposed restoration reclamation approach has undergone numerous iterations to develop the most appropriate restoration project that meets project goals and objectives within limitations of M-1993-035. This process has developed an overall valley restoration plan that incorporates numerous reaches and phases as dredge spoils are managed with significant stakeholder consideration. Reclamation of the Swan River is being broken into four phases (Reaches A – D). Reaches A and B coincide with the Swan River Resource permit boundary. Please refer to attached project location map for additional detail on the restoration reaches. The attached restoration reclamation design represents the first phase (Reach A) of the future restoration within the permit boundary, as well as areas upstream of the Swan River Resource.

From the planning efforts to date, the mine operators have developed generalized concept principles and guidelines for restoration activities of the entire valley and specifically the Swan River Resource. The primary project goal is to restore the channel and adjacent areas within the permit boundary, returning them to a natural and functional state. Generalized goals for the project included the following:

- Create a natural, stable channel based on existing and anticipated flows and sediment loads;
- Eliminate stream flow losses through the dredge spoils and maintain natural perennial stream flows;
- Establish instream aquatic habitat including pools, riffles, glides, spawning and rearing areas and
- promote aquatic macroinvertebrate populations;
- Restore riparian and floodplain function and habitat;

- Improve the aesthetics of the area by creating a naturally functioning ecosystem for public benefit;
- Remove, regrade and cap remaining dredge piles to reduce erosion and promote upland revegetation;
- And demonstrate stream restoration techniques as a model for on-going efforts to reclaim other stream reaches degraded by historic dredge mining.

### **Proposed Restoration Reclamation Plan**

A natural based restoration approach was taken for proposed reclamation approach. The guiding principle of the natural restoration reclamation approach was that the restored stream system should mimic a natural channel in appearance and function. Recreating the natural form and function within the stream system will allow lost ecological balance to be restored. Like a natural channel, restoration was approached with a design that will allow the stream to migrate in response to flow and sediment loads, but is intended to maintain its basic form without significant aggradation or degradation. This approach, rather than a structural approach to restoration, is of the utmost importance to this project so the restored resources function holistically with existing resources and fit with the overall characteristics of the Swan River Valley. As part of this approach, the restoration reclamation plan considered improvements to the channel and the connection between the stream and adjacent lands. Restoration focused on developing an appropriately sized channel to convey typical and bankfull flow events, promote floodplain interaction and establish native riparian and upland vegetation communities.

The proposed channel profile is designed to replicate a natural riffle-bend-pool system. Riffle-bend-pool systems are characterized by faster moving riffle sections leading to long pool sections around the apex of stream meanders. Stream restoration proposed in this restoration reclamation plan includes re-meandering a portion of the Swan River that has been channelized. The channel has been designed to mimic pre-disturbance conditions that may have existed within the permit boundary. The restored stream is intended to act as a natural channel and, like a natural channel, some amount of lateral migration is expected over time.

Geomorphologic values, standard principles and observations of regional healthy stream characteristics were used as the basis for the desired channel shape, widths and depths. Native vegetation communities were developed based on locally appropriate reference standard conditions.

#### **Channel Form**

A key element of the proposed channel design is creating a meandering pattern that is in balance with the natural hydrograph. These types of stream system naturally are dominated by repeating riffle-bend-pool complexes and point bars. Riffles are the steeper sections of the stream and generally located upstream from larger channel bends. Riffles are characterized by larger substrate material and swift flows. Pools are located downstream of riffles and are typically at or near the more pronounced bends in the stream. The higher flow velocity of the riffle sections provide energy required to continually scour the pools maintaining quality pool habitat. Glides are located between pools and riffles and generally have a mild adverse slope leading from the end of a pool up to the start of the next riffle. Glides have a well-defined thalweg that contain flow to a defined channel during low flow periods.

The natural channel form for this section of the Swan River would be characteristic of a Rosgen C Stream Type. These characteristics formed the basis for the developed Plan. The Table below provides a summary of the proposed channel characteristics per the Plan.

### Summary of Proposed Channel Characteristics

Category	Proposed Channel
Channel Length	5,131 feet
Channel Slope	1.27% (Avg.)
Bankfull Flow	103 cfs
Ave Bankfull Width*	21 feet
Ave Bankfull depth*	1.1 feet
Ave Pool Bankfull depth	3 feet
Pool Spacing	227 feet (9 x bankfull width)
Width/Depth Ratio*	19
Entrenchment Ratio*	>2.9
Sinuosity	1.7
*measured at riffle beginning	

#### Groundwater Intercept

As part of the restoration reclamation assessment piezometers were installed throughout the Swan River Valley in order to understand the location and seasonal variation of the local groundwater table. The restored channel was designed so that the stream thalweg was at, or lower than the current groundwater level. This was done to create a stream that would generally be gaining along its length. Having the stream at or below the existing groundwater level has the added benefit of near surface water to support the riparian vegetation along the length of the stream. Up to three years of data was available from some of the piezometers. Review of the piezometer data indicated that there was not significant changes in groundwater levels from year-to-year or from season-to-season. Despite this apparent low fluctuation, the design of the stream channel includes a low permeability layer below the active channel. This low permeability layer will help ensure that water remains at the surface in the event groundwater levels drop below anticipated elevations.

#### Low Permeability Layer

A low permeability layer will be utilized below the new channel and extend outward across the riparian zone. The intent of the layer is to minimize channel surface flow infiltration into the underlying cobble substrate while maintaining groundwater flow into the channel. The liner is also designed to allow groundwater inflow into the channel. The layer will consist of a mixture of onsite screened or processed native materials (fines and gravels), placed 1 foot thick and compacted. The maximum stone size will be 4 inches and there will be at least 25% fines content (percent passing the US Number 200 sieve).

#### Aquatic Habitat Restoration

The restoration reclamation plan focuses on creating a healthy, diverse and self-sustaining aquatic environment which includes specific habitat requirements for native cutthroat trout. While native cutthroat trout are not the dominant species present, this species serves as the target species providing the basic habitat requirements for all regional trout species.

One of the initial objectives of this restoration reclamation plan is to eliminate the existing fish barrier at Tiger Run and Muggins Gulch Road. Through discussions with the Forest Service, CPW and project proponents

throughout the development of this Plan, it was determined that the Tiger Road barrier should be removed and this section of the Swan River allow for upstream and downstream fish passage. Therefore the existing culverts through Tiger Road will be replaced with a free-span arch. The proposed channel has been re-aligned so that flows will not need to cross Muggins Gulch Road, eliminating this second crossing and barrier altogether. The restoration reclamation plan also incorporates two types of aquatic micro-habitats; (1) boulder clusters and (2) log spurs (large woody debris). These features will be placed in pool and/or glide sections where velocities are low and water is slightly deeper and are intended for habitat cover only and not intended for bank stability or grade control.

### Riparian Restoration

The restoration reclamation plan has developed a riparian corridor that is more than two times the stream bankfull width, inclusive of the channel itself. This width provides a flood prone area that is consistent with the intended channel type. Evaluation of aerial photographs, literature review and professional judgment of regional wetland/riparian habitats indicated that prior to significant land disturbance (i.e., dredge operations), the Swan River Resource likely contained suitable elevation, geomorphic setting and climate for montane willow riparian shrubland. These riparian systems, which are found throughout the region, are located along streams and drainages and typically occur as mosaic of vegetative communities. These systems consist of temporarily, seasonally and intermittently flooded shrublands comprised of broad-leaved deciduous willow dominated species in the midstory canopy and an understory of herbaceous species including a mix of grasses, forbs, sedges and rushes. These corridors are some of the most biologically diverse habitats having a consistent source of water and providing structural habitat diversity utilized by a wide variety of wildlife.

This restoration reclamation plan focuses first on establishing a deeply rooted and dense groundcover dominated by native riparian herbaceous species that are typical to the region. The intent is to quickly establish a groundcover to stabilize soil, minimize establishment of invasive species and promote long-term successional development. To facilitate complete ground coverage and seed bank development within the reclamation area, the entire riparian zone will be seeded with the specialized Riparian Seed Mix with locally native species that germinate rapidly and provide complete groundcover tolerant of a wide variety of hydrologic conditions.

Second, strategically placed riparian shrub plantings will occur primarily along outside bends of the new channel to provide not only bank stability but also increased biomass and structural habitat for the fishery and terrestrial wildlife. Additionally, the shrub plantings are intended to provide increased biomass to the stream (leaf-litter), overhead cover (shading) and increases bug life (terrestrial and aquatic, such as caddis).

The riparian habitat is designed to interact with local groundwater (within 1' to 2' of the surface) as well as seasonal overbank flooding. The channel has been designed so that the riparian fringe above the bankfull is situated between 1.1' to 3' above the bottom of the channel and lowest groundwater elevation. This provides near surface moist to the riparian fringe from groundwater and stream flows through much of the growing season. The riparian zone is anticipated to develop wetland characteristics however has not specifically designated as wetland creation.

### Upland Restoration

The Plan depicts upwards of 13-acres of upland area that will be reclaimed. Reclamation will include contouring existing dredge pile and project excavation spoils. These areas will be graded to varying and undulating natural landforms based on material quantities. The upland areas will be capped with three inches of unconsolidated soil

growth media. The initial focus of the Plan is to re-vegetate the upland areas with an appropriate native mountain big sagebrush community. Initial re-vegetation will need to quickly stabilize soils, increase soil biomass and prevent invasive weed establishment. Once the understory grassland community is well established future restoration efforts can focus on developing a more diverse vegetation community which includes shrubland and forest species based on final topography and landforms.

Road Modifications

The current channelized alignment of the Swan River through the Swan River Resource currently flows through two separate sets of culverts, the first through Tiger Road and the second through Muggins Gulch Road. Both of these sets of culverts are in disrepair, are undersized to adequately convey a full range of flows, disrupt sediment transport and create a fish movement barrier. In order to eliminate this condition, the proposed restoration reclamation plan will install a properly sized open bottom culvert bridge which will convey natural bankfull flows, sediment and provide fish passage. The new alignment of the channel is moved south of the existing crossing and eliminates the need for the Swan River to flow through the second set of culverts at Muggins Gulch Road. Muggins Gulch Road will need to be shifted and realigned slightly to the north to accommodate the new channel.

The following table provides a summary of the proposed restoration reclamation components within Reach A.

**Project Component Quantity Description**

Project Component		Quantity	Description
1	Mass grading-land Contouring	19.7 acres 130,000 CYDs	Mass grading and land contouring to natural valley form and reconnect groundwater interactions.
2	New Channel Creation	5,131 feet 2.7 acres	New channel excavated in approximate alignment of pre-disturbance channel. Average channel excavation is approximately 23 feet bankfull width and depths from 1.1 to 3 feet.
3	Low Permeability Layer	6.3 acres 4,467 CYDs	A low permeability liner constructed below the new channel and riparian zone to minimize infiltration/channel water loss. Formed from processed compacted native fines and gravel.
4	Aquatic Habitat Instream Riffle-Pool-Glide Sequences/Micro-Habitat	22/22	Within the new channel riffle-pool-glide sequence will be formed for aquatic habitat and instream bed form diversity along with non-structure micro habitat features.
5	Riparian Zone Reclamation	~ 3.4 acres	Streamside area above the bankfull elevation extending landward approximately 20 feet on either side of the channel.
6	Outside Bend Bank Stabilization	2,400 feet	As part of the Riparian Zone at critical outside bend areas along channel will require increased reinforcement to maintain channel form. Bank stabilization will include compacted gravels/cobbles, capped with growth medium, native seeding and shrub plantings.
7	Upland Reclamation	~12.7 acres	Recontoured valley bottom capped with growth medium and native seeding.
8	Tiger Road Bridge	1	A culvert bridge will be installed to accommodate the new

			channel and flows through Tiger Road and eliminate existing fish barrier.
9	Muggins Gulch Realignment	I	A 270 foot section of Muggins Gulch Road will be re-aligned to accommodate the new channel.

**Future Restoration Reclamation Work within the Permit Boundary**

A conceptual design for approximately 3,000 linear feet of upstream restoration (Reach B) has been created within the permit boundary for a subsequent project phase that follows a similar approach to Reach A. Final design details will be provided to DRMS in advance of commencing this upstream restoration reclamation work. The timing of restoration reclamation work on Reach B is not finalized and largely dependent upon funding. Following completion of the restoration reclamation on Reach A, the County will seek to release this acreage from the permit boundary.

**Water Rights**

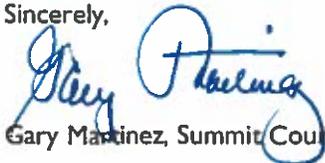
Reach A of the restoration reclamation design within the permit boundary indicates a net increase of approximately 0.96 acres of open water and 2.18 acres of riparian vegetation following project completion. The Summit County Board of County Commissioners has committed to offset consumptive use associated with restoration reclamation of the Swan River Resource utilizing the Summit County portfolio of water rights, some of which were adjudicated specifically for this purpose. Discussions are ongoing with the state Engineer's office to ensure these water rights are appropriated to support the reclamation post-mining use as a restored stream and riparian corridor.

**Other Permits**

Prior to implementing the restoration reclamation approach described herein, the mine operators will obtain all other additional necessary permits from the appropriate regulatory agencies including, but not limited to the U.S. Army Corps of Engineers, Colorado Department of Public Health and Environment, State Engineer's Office (Division of Water Resources), and Summit County.

Following Rule 1.9.1, if we do not hear from DRMS within 30 days, it will be assumed that this letter is sufficient to incorporate the proposed reclamation approach into the M-1993-03S permit. However, written confirmation of the acceptance of this notice would be greatly appreciated. If you have any questions, please contact us at your earliest convenience. Thank you in advance for your attention to this matter.

Sincerely,

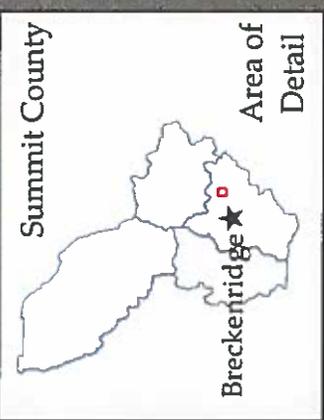


Gary Martinez, Summit County Manager

Cc. Brian Lorch, Open Space and Trails Director  
Thaddeus Noll, Summit County Assistant Manager

Encl. Swan River Resource (M-1993-035): Reclamation Restoration Reaches within Permit Boundary  
Proposed Swan River Restoration Reclamation Plan Set

# Swan River Resource (M-1993-035) Reclamation Restoration Reaches Within Permit Boundary



*White River National Forest*

Muggins Gulch

Tiger Road

Rock Island Road

Previously Reclaimed Area

Mining Permit M-993-035  
Boundary (162.00 acres)



**Restoration Reaches**

- Swan River Resource (M-1993-035)
- Reach A (Restoration Phase 1)
- Reach B
- Reach C
- Reach D

N

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