Montana DEQ

Final Environmental Assessment

Hard Rock Mine Operating Permit No. 00030- Montana Resources, LLP

Contents

COMPLIANCE WITH THE MONTANA ENVIRONMENTAL POLICY ACT 1
BACKGROUND 1
PURPOSE AND NEED 3
PROPOSED ACTION ALTERNATIVE 4
Table 1: Summary of activities proposed in Operating Permit No. 00030. 5
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE 10
2. WATER QUALITY, QUANTITY, AND DISTRIBUTION 17
3. AIR QUALITY 25
4. VEGETATION COVER, QUANTITY AND QUALITY 26
5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS 26
6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES 27
7. HISTORICAL AND ARCHAEOLOGICAL SITES 27
8. AESTHETICS 28
9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY 29
10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES 30
11. HUMAN HEALTH AND SAFETY 31
12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION 32
13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT 32
14. LOCAL AND STATE TAX BASE AND TAX REVENUES 32
15. DEMAND FOR GOVERNMENT SERVICES 33
16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS 33
17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES 35
18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING 35
19. SOCIAL STRUCTURES AND MORES 36
20. CULTURAL UNIQUENESS AND DIVERSITY 36
21. PRIVATE PROPERTY IMPACTS 36
22. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES 38
ALTERNATIVES CONSIDERED 38
PREFERRED ALTERNATIVE 39
PUBLIC INVOLVEMENT 39
OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION 39
CUMULATIVE IMPACTS 40
NEED FOR FURTHER ANALYSIS AND SIGNIFICANCE OF POTENTIAL IMPACTS 40

Figures

Figure 1. Hard Rock Mine Operating Permit No. 00030- Permit Boundary and Bonding Levels (Montana Resources, 2021 Permit Consolidation) 8
Figure 2. Proposed Horseshoe Bend Rock Disposal Site (Westech, 2022- MR Permit Modification Application) 9
Figure 3. Schematic of HSB Conceptual Geologic Model (Looking North) 13
Figure 4. Horseshoe Bend Area Water Management Facilities (KP, 2021a) 19
Figure 5. Time Series of HSB Weir Historical Flow Rates (2000-2020) 21
Figure 6. Phased Construction Sequence for Proposed Modification (KP, 2021a) 23
Figure 7. Looking north from Continental Drive (Google Street View, Image from August 2021) 29

Attachments

ATTACHMENT A: Montana Department of Justice. Private Property Assessment Act Checklist Flowchart (January 2011)

ATTACHMENT B: Montana Department of Justice. Private Property Assessment Act Checklist (January 2011)

ATTACHMENT C: References

ATTACHMENT D: Large Format Figures

Montana Department of Environmental Quality
Air, Energy, & Mining Division
Mining Bureau

ENVIRONMENTAL ASSESSMENT

COMPANY NAME: Montana Resources, LLC
EA DATE: July 14, 2022
PROJECT: Continental Mine Complex- Horseshoe Bend Rock Disposal Site- Stage 1
OPERATING PERMIT NO.: 00030
LOCATION: 46.026539°, -112.501941° **COUNTY:** Butte-Silver Bow (city-county)
PROPERTY OWNERSHIP: FEDERAL ___ STATE ____ PRIVATE X

COMPLIANCE WITH THE MONTANA ENVIRONMENTAL POLICY ACT

The Montana Environmental Policy Act (MEPA) requires preparation of an environmental impact statement for major actions taken by the State of Montana that may significantly affect the quality of the human environment. This environmental assessment (EA) is being prepared to determine whether the modification to Hard Rock Mine Operating Permit No. 00030 by the Department of Environmental Quality (DEQ) is a major state action significantly affecting the quality of the human environment. The EA will examine the proposed action and alternatives to the proposed action and disclose potential impacts that may result from the proposed and alternative actions. DEQ will determine the significance of impacts and the need to prepare an environmental impact statement based on consideration of the criteria set forth in the Administrative Rules of Montana (ARM) 17.4.608.

BACKGROUND

Mining Activity

Montana Resources, LLC (MR) operates the Continental Mine, which is an open pit copper-molybdenum mine adjacent to the city of Butte in Butte-Silver Bow County (consolidated city-county government; Figure 1). The land covered by Hard Rock Mine Operating Permit No. 00030 includes portions of: Section 1, T3N R8W, Section 6, T3N R7W, Section 36, T4N R8W, Section 31, T4N R7W, Section 30, T4N R7W, Section 29, T4N R7W, and Section 32, T4N R7W. The Continental Mine produces copper sulfide concentrate, molybdenum disulfide concentrate, and copper precipitate (cement copper) for sale in the United States and world markets.

The area surrounding Butte has been actively mined for generations. Gold placer mining was conducted in the Upper Clark Fork area in the 1860s and 1870s and included the development of mining camps along Silver Bow Creek. Hard rock mining for silver ore began in the 1870s, resulting in a more permanent settlement of the area. Early development activities in the Horseshoe Bend (HSB) area began pre-1900 with the construction of a so-called ‘horseshoe bend’ in the Northern Pacific Railway. A diversion channel was later constructed to divert and channelize Silver Bow Creek flow

around the historical mining and railroad assets and through the HSB area. The diversion channel is referred to as the historical Silver Bow Creek diversion. Historical mining within the Silver Bow Creek drainage included several underground operations. Tailings from these operations were washed down several natural drainages and accumulated in the general vicinity of Silver Bow Creek to the north and south of the bend in the Northern Pacific Railway.

Extensive polymetallic underground mines were developed beneath Butte through the first half of the 20th century and open pit mining began at the Berkeley Pit in 1955. The Anaconda Company (and later Atlantic Richfield Company) developed infrastructure in the HSB area in association with mining in the Berkeley Pit. Initial construction of rockfill dumps that bound the HSB area to the north and west began in the early 1960s. The Yankee Doodle Tailings Impoundment (YDTI) currently bounds the HSB area to the north, and construction of the primary embankment began in approximately 1960, overlying the historical Silver Bow Creek diversion channel. The YDTI comprises a valley-fill style impoundment created by continuous rockfill embankment. Historical maps indicate the diversion channel was replaced with a culvert (6 feet in diameter) prior to the construction of a rockfill dike, and an upstream drainage trench was constructed in 1963 to convey surface water and groundwater through the culvert (Dames and Moore, 1963; Knight Piesold Ltd.- KP, 2020). The upstream drainage trench is now buried beneath the embankment and these drainage features continue to convey flow to the HSB area. Additional embankment and leach dump construction was completed between the early 1960s and the mid-1970s on all sides of the HSB area. A large mine haul ramp ("7% Ramp") was constructed on the west side of the HSB area by the mid-1970s.

In 1977, Atlantic Richfield Company (AR) purchased the mine through a merger with the Anaconda Company. Mining activity in the Berkeley Pit was reduced in the early 1980s due to low metal prices, ultimately ending in April 1982. District dewatering pumps were turned off, allowing the underground mines and the Berkeley Pit to gradually fill with water from the bedrock, alluvial aquifers and site runoff once mining operations ceased. Montana Resources, Inc. (MRI) purchased the property from the Anaconda Company, a wholly owned subsidiary of Atlantic Richfield (AR), and began mining the East Berkeley (Continental) Pit in 1986. Mining permits were transferred from MRI to Montana Resources, LLP, a general partnership (MR) in 1989. Waste rock from the Continental Pit has been used to continue construction of the YDTI. MR suspended mining operations from 2000 to 2003 due to high electricity prices; however, mining and processing operations recommenced in 2003 (Montana Resources, 2018).

Major Amendment 010 to Hard Rock Mine Operating Permit No. 00030 was approved by DEQ following a Final Environmental Impact Statement and Record of Decision in August 2019, which allowed an expansion of the YDTI to support continued mining operations (i.e., embankment crests raised to 6,450 ft elevation). Mining in the Continental Pit occurs at a nominal concentrator throughput rate of approximately 45,000 tons per day, with all tailings stored in the YDTI. The current maximum embankment height for YDTI is approximately 750 feet along the southern end of the impoundment, directly upstream of the HSB area. The HSB area contains water management infrastructure related to YDTI seepage collection and mine rock leach operations and miscellaneous mine buildings, including the precipitation plant, truck maintenance workshop, and truck wash facilities.

Superfund Coordination

As a result of contamination associated with historical mining and industrial operations, a total of four contiguous areas in the upper Clark Fork River Basin have been designated as Superfund sites by the US Environmental Protection Agency (EPA), pursuant to the Comprehensive Environmental

Response, Compensation and Liability Act (CERCLA, 1980). In 1982, EPA proposed that Silver Bow Creek be added to the National Priority List (NPL), and it was listed as a Superfund site in 1983. The Butte Area was added to the Silver Bow Creek site in 1987 (EPA, 2018). The Silver Bow Creek/Butte Area Superfund Site is currently further separated into seven Operable Units (OUs). The two OUs that are most relevant to the proposed permit modification are:

- The Butte Mine Flooding OU (BMFOU) includes most of MR's mine permit area. The boundaries of the BMFOU are the Continental Divide to the east, Silver Bow Creek to the south, Missoula Gulch to the west, and the Yankee Doodle Creek and Moulton Reservoir watersheds to the north (EPA, 2018).
- The Butte Active Mine Area OU (BAMAOU) is contained within the BMFOU and the boundary is established to coincide with the operating permit area for the mine operations. EPA has deferred authority for mine permitting decisions, such as this permit modification to DEQ (EPA and DEQ, 2001).

A consent decree is a legal document, approved by a judge, that formalizes an agreement reached between EPA and Potentially Responsible Parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with EPA-initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. In 2002, a Consent Decree was finalized that clarified responsibilities for the water monitoring and management among the court-identified PRPs (AR and the MR Group) with oversight by EPA and DEQ (Consent Decree for the Butte Mine Flooding Site, 2002).

EPA and DEQ regulate how the PRPs manage waters that enter and may eventually leave the Berkeley Pit. EPA and DEQ also regulate how PRPs maintain ground water levels in and around the BMFOU to ensure that mine-affected waters are managed and treated, if necessary, to meet water quality standards before they are discharged. The monitoring and management of groundwater in the Continental Mine site is included under BMFOU remedy requirements, as well as long-term treatment of waters that leave the mine site, whether the water is sourced from the Berkeley Pit, Continental Pit, or the Horseshoe Bend.

EPA issued a decision document (EPA and DEQ, 2001) with the concurrence of DEQ which adjusted boundaries between EPA's BMFOU and the BAMAOU and announced EPA's intent to refrain from taking Superfund action at the BAMAOU and to defer to State mine permit actions (like this permit modification) for environmental cleanup of that area. EPA reserved the right to exercise CERCLA authority at the site should the reclamation plan not be implemented by MR and/or enforced by DEQ, or the bonding proves inadequate to cover the cost of reclamation required by the permit.

DEQ's Hard Rock Mining Bureau consults and coordinates with EPA, but the operating permit issued under the Metal Mine Reclamation Act (MMRA) and associated performance bond do not address water management that falls under Superfund activities. MR's proposed permit modification and the action alternatives will be evaluated for consistency with existing agreements and regulatory stipulations under Superfund and the Consent Decree.

PURPOSE AND NEED

DEQ's purpose and need in conducting this environmental review is to act on MR's application for a modification to Hard Rock Mine Operating Permit No. 00030 in accordance with the MMRA.

PROPOSED ACTION ALTERNATIVE

MR has applied for a modification to Hard Rock Mine Operating Permit No. 00030 to construct a Rock Disposal Site (RDS) within the Horseshoe Bend (HSB) area, at the southern toe of the YDTI. Long-range mine planning indicates that approximately 160 million tons of non-ore rockfill would be produced during mining between 2022 and 2031 following construction of the YDTI embankments to an elevation of 6,450 feet, as approved in Major Amendment 010. As part of a risk assessment of the YDTI conducted by Knight Piesold Ltd. (KP) in 2018, KP recommended that excess rockfill generated during mining of the Continental Pit be placed to enhance embankment stability. Based upon the potential benefits to the tailings facility, the HSB area was selected as a priority rock disposal site location because of the enhanced embankment stability and improved reclamation opportunities.

An underlying drainage system has been designed to manage runoff from the surrounding catchment areas, seepage from the YDTI, and drainage from the rockfill leaching areas. The foundation drainage system and overlying rock drains would be constructed prior to RDS development. The details and purpose for this permit modification are based on information excerpted from the "Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Report" (KP, 2021a). The HSB RDS-Stage 1 report was reviewed by the YDTI Independent Review Panel (IRP), who also participated in meetings with KP and MR regarding this proposal. The IRP issued a memorandum dated December 17, 2021, supporting placement of additional rockfill in the HSB area and concluded that the design concepts were reasonable and well-suited to site conditions.

MR notes that an additional stage (Stage 2) of the HSB RDS may be constructed in the future as an expansion to Stage 1, but detailed designs and analysis for Stage 2 were not included in the permit modification application. The Stage 2 footprint would likely cover the complete footprint of the HSB area and tie into the Stage 1 RDS along the downstream side of the East-West Embankment. However, this Environmental Assessment evaluates only the proposed permit modification for Stage 1 and future evaluation and permitting would be required for Stage 2. A summary of the activities that MR would conduct under the current Proposed Action is set forth in **Table 1**.

Table 1: Summary of activities proposed in Operating Permit No. 00030.

Summary of Proposed Activities in Operating Permit No. 00030	
General Overview	The proposed modification would occur within the current permit area (6,136 acres) and in a previously disturbed location, no boundary adjustments would be required (**Figure 1**). The total footprint for the foundation drainage system, rock drains, and HSB RDS is approximately 125 acres out of a total disturbed area of 5,533 acres. The current maximum embankment height for YDTI is approximately 750 feet along the southern end of the impoundment, directly upstream of the HSB area. The HSB area contains water management infrastructure related to YDTI seepage collection and mine rock leach operations and miscellaneous mine buildings, including the Copper Precipitation Plant, truck maintenance workshop, and truck wash facilities. The Copper Precipitation Plant is a pre-1971 processing facility that is exempt from the MMRA and reclamation bonding requirements (Attorney General Opinion, 1977). This feature is usually depicted inside an "exclusion area" footprint of 73 acres within the permit boundary. The proposed modification would require demolition of the Copper Precipitation Plant, thus eliminating the pre-1971 processing facility that retained the exempt status. The total footprint for the proposed modification would cover 125 acres of previously disturbed ground, with the RDS covering 48 acres of the previously exempt area. Construction of Stage 1 of the HSB RDS would be sequenced in five phases, with three phases related to the HSB footprint and foundation drainage system and two phases for the Rock Disposal Site (RDS): • Phase 1 - Decommissioning the Copper Precipitation Plant; demolition and removal of the plant and other infrastructure such as transmission lines and water management structures; and draining down of the Holding, Surge, and Houligan Ponds. • Phases 2 and 3 - Placement of foundation drainage layer and a network of engineered rock drains and surface water diversion ditches. The network would convey flows to the HSB Pond to tie in with the broader site water management systems. The purpose of the foundation drainage layer and rock drain system is to manage surface water runoff in the HSB area and groundwater within the foundation of the proposed RDS during mine operations and following closure. Rock drains would then be formed within and above the foundation drainage layer, using material from the Pipestone Quarry, similar in concept to the West Embankment Drain installed along the west side of YDTI. The drainage layer and rock drains would discharge into surface water ditches and ultimately the HSB Pond. Water that reaches the HSB Pond will be managed and treated consistent with the current methods approved under the BMFOU remedy. • Phases 4 and 5 - Placement of non-ore rockfill to construct the RDS on top of the foundation drainage layer and rock drains. The RDS footprint (Figure 2) would cover the current Copper Precipitation Plant location and would be directly adjacent to the YDTI East-West Embankment, leaching operations, and mine haul ramp (7% ramp). The proposed RDS design excludes rockfill placement within the central portion of the HSB area where the truck maintenance workshop, truck wash, water management facilities and other mine facilities will be preserved. The RDS would be constructed in two lifts, with the rockfill placed to elevations of 5,700 and 5,900 feet (Phases 4 and 5, respectively). The top elevation of the proposed RDS is limited by a high-voltage transmission line that extends along the Seep 10 bench. The designs presented in the HSB RDS Stage 1 Drainage System Report (KP, 2021a) are preliminary, hence, the project layout may be subject to minor modifications during construction, but in no circumstances would the total drain capacity be reduced. Reclamation of the HSB RDS is described below in this table.

Proposed Dimensions and Quantities of Disturbance in Operating Permit No. 00030	
Current Disturbance	Current permit area is 6,136 acres, current disturbance area is 5,533 acres. No boundary adjustments would be required for this proposed modification.
Total New Surface Disturbance	No new disturbance. The HSB area has been disturbed by mining activity for over 100 years, with 73 acres associated with the Copper Precipitation Plant (pre-1971, exempt processing facility). The total footprint for the proposed modification would cover 125 acres of previously disturbed ground, with the RDS covering 48 acres of the previously exempt area (**Figure 2**).
Proposed Actions in Operating Permit No. 00030	
Duration and Timing	• Phases 1 through 3 would begin prior to mid-October 2022 and would be completed prior to placement of rockfill. Rock placement in the RDS would begin following approval of the permit modification and would continue until the 5,900 lift is finished (likely multiple years). • The approval of Major Amendment 010 (YDTI expansion) allowed tailings storage capacity to support mining through 2031, and the mine life would not change as a result of this permit modification. • Reclamation of the HSB RDS will be completed within two years of final rock placement unless subsequent stages are permitted or in the permitting process, in which case reclamation will be completed following cessation of rock placement.
Location and Analysis Area	• The proposed modification would occur entirely on private land, in the central portion of Hard Rock Mine Operating Permit No. 00030. The mine area is located directly east and north of Butte and Walkerville, in Butte-Silver Bow County (consolidated city-county). • The area being analyzed for this environmental review includes the immediate project area (**Figure 2**), which connects the drainage from the YDTI (upstream) to water management infrastructure that supports mine operations and Superfund remedial activities (downstream).
Personnel Onsite	The proposed activity would have no effect on employment, which fluctuated seasonally between 390 and 405 employees in 2021.
Project Water Source	Water from the internal management circuit would be applied by water trucks to control fugitive dust emissions from hauling non-ore rock to the RDS, similar to the methods currently used in hauling rock to the YDTI or other disposal sites. Some water might also be used to control fugitive dust emissions during demolition and removal of the existing infrastructure. No other water use is required for the proposed modification. The foundation drainage layer and rock drain system underneath the HSB RDS would convey existing seepage that currently reports to the HSB area, there would be no new sources of flow reaching this drainage system.
Air Quality	• Activities would include demolition of the existing infrastructure, foundation preparation, and construction of the RDS. Dust particulate could be produced or become airborne during these activities, and mechanized equipment would produce some exhaust emissions. • MR has an existing DEQ Air Quality permit that covers both fugitive and point source emissions. Mitigations required for permit compliance include water and chemical suppressants to control fugitive emissions and fugitive dust, as well as engine controls to reduce particulate matter from engine exhaust.
Water Quality	• The management and treatment of contaminated groundwater, tailings impoundment seepage, and surface runoff is conducted under the requirements of the BMFOU remedy. • The construction of a foundation drainage layer and additional rock drains would allow for the continued capture and conveyance of seepage in the HSB area underneath the RDS. • Surface diversion channels would convey stormwater runoff and the seepage collected by the drains, eventually reaching downstream management and treatment systems. • The proposed drainage and conveyance systems would not adversely impact the water quantity or quality that must be managed and treated by downstream BMFOU facilities.
Erosion Control and Sediment Transport	• The existing runoff controls include berms, sediment basins, and capture systems would be maintained in the HSB area. • Additional diversion channels would be constructed to convey seepage from underneath the RDS and from surface runoff. The seepage and surface runoff would ultimately be managed

	by either the HSB Capture System or the Water Treatment Plant. • See Reclamation Plan details (below) for beneficial modifications for post-mining erosion and runoff controls.
Proposed Actions in Operating Permit No. 00030 (continued)	
Solid Waste	Refuse and debris would be removed from the HSB area and be placed within the solid waste disposal area onsite (east of HSB) or hauled offsite to an appropriate facility for disposal. Solid waste disposal sites within mine operating permit areas are exempt from Montana's Solid Waste Management Act (75-10-214(1)(b), MCA). MR and its predecessors have operated solid waste disposal sites within MR's mine permit area since its inception. Any designated solid waste management site in the mine permit area would operate in accordance with the substantive elements of relevant sections of ARM 17.50.509 (Operation and Maintenance Plan Requirements for a Solid Waste Management System) and the conditions described in the current Operations Plan (MR, 2021). MR also contracts with a local garbage collection contractor to collect office wastes from the main office, concentrator, garage, water treatment plant, and Precipitation Plant for disposal at a municipal landfill.
Cultural Resources	• Mine activities are proposed on privately owned surface and mineral rights. • No new disturbance is associated with this proposed modification. The HSB area has been disturbed by mining activity for over 100 years, with 73 acres associated with the Copper Precipitation Plant (pre-1971, exempt processing facility). • No cultural resources are expected to be impacted by the proposed modification.
Hazardous Substances	Hazardous substances would continue to be located onsite, but not in the footprint of the HSB RDS. These substances could include: fuel, motor oil, hydraulic oil, gear oil, lubricating grease, antifreeze (ethylene glycol and propylene glycol), power steering fluid, brake fluid, propane, and reagents associated with flotation processing facilities and water treatment.
Reclamation Plans	Reclamation of the HSB RDS is based on design components of Stage 1 and would include: • The faces of the RDS (angle of repose at placement) would be graded to an approximate angle of 3H:1V. Intervening benches would be dozed and resloped, except portions of one or two benches between the base at 5,650 feet and the top at 5,900 feet will be retained for erosion control. The slopes immediately above and below the retained benches may be slightly steeper than 3H:1V since the overall slope angle (angle of repose lift plus benches) is 3H:1V. • The regraded slope and benches of the RDS and sides of ditches (above rock armoring) will be covered by 20 inches of suitable alluvium, amended if necessary based on testing, and seeded with the currently approved seed mix. The alluvium would be derived from existing sites that have sufficient available volume, located within the permit area. • Conversion of pipelines to open ditches post-closure. Consistent with the operational phase drainage system design, post-closure drainage ditches and structures will be designed to handle a 200 year/24 hour storm event; a design capacity deemed " reasonable" in the IRP's Stage 1 Drainage System Report review memo. Although stormwater runoff rates are expected to decrease post-closure due to regrading, capping and revegetation of most mine features and disturbed areas, the 200-year/24-hour design criteria will be maintained to provide long-term functionality of the surface water drainage system. If stormwater runoff from the RDS is of suitable quality, it will be directed into the stormwater ditch system separate from the BMFOU system. • Reclamation of the HSB RDS will be completed within 2 years of final rock placement unless subsequent stages are permitted or in the permitting process, in which case reclamation will be completed following cessation of rock placement. • Post-closure topography and cross-sections incorporating this proposed permit modification are shown in Figures 3 through 6.

Figure 1. Hard Rock Mine Operating Permit No. 00030- Permit Boundary and Bonding Levels (Montana Resources, 2021 Permit Consolidation) A larger version of this figure is found in Attachment D.

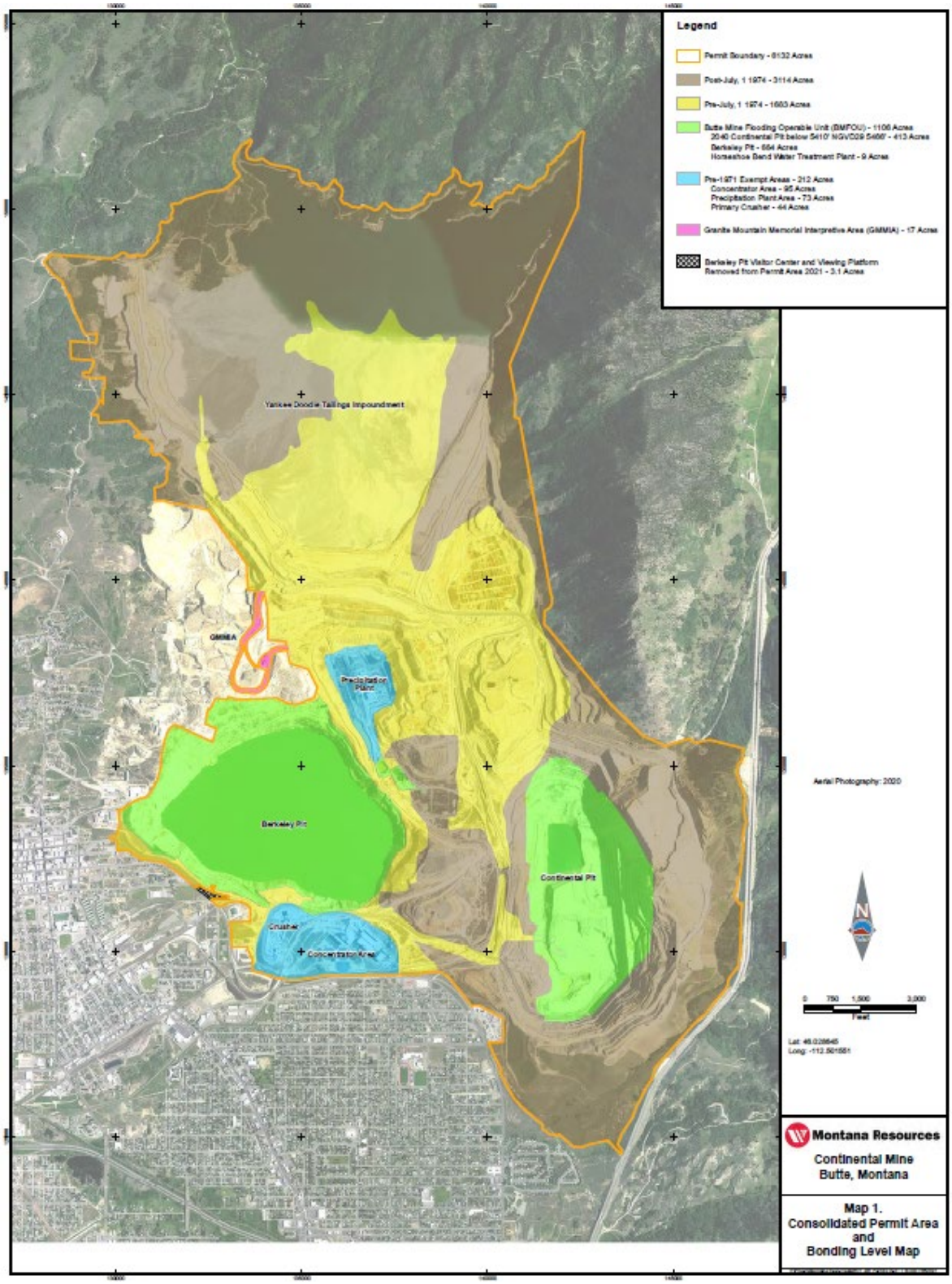
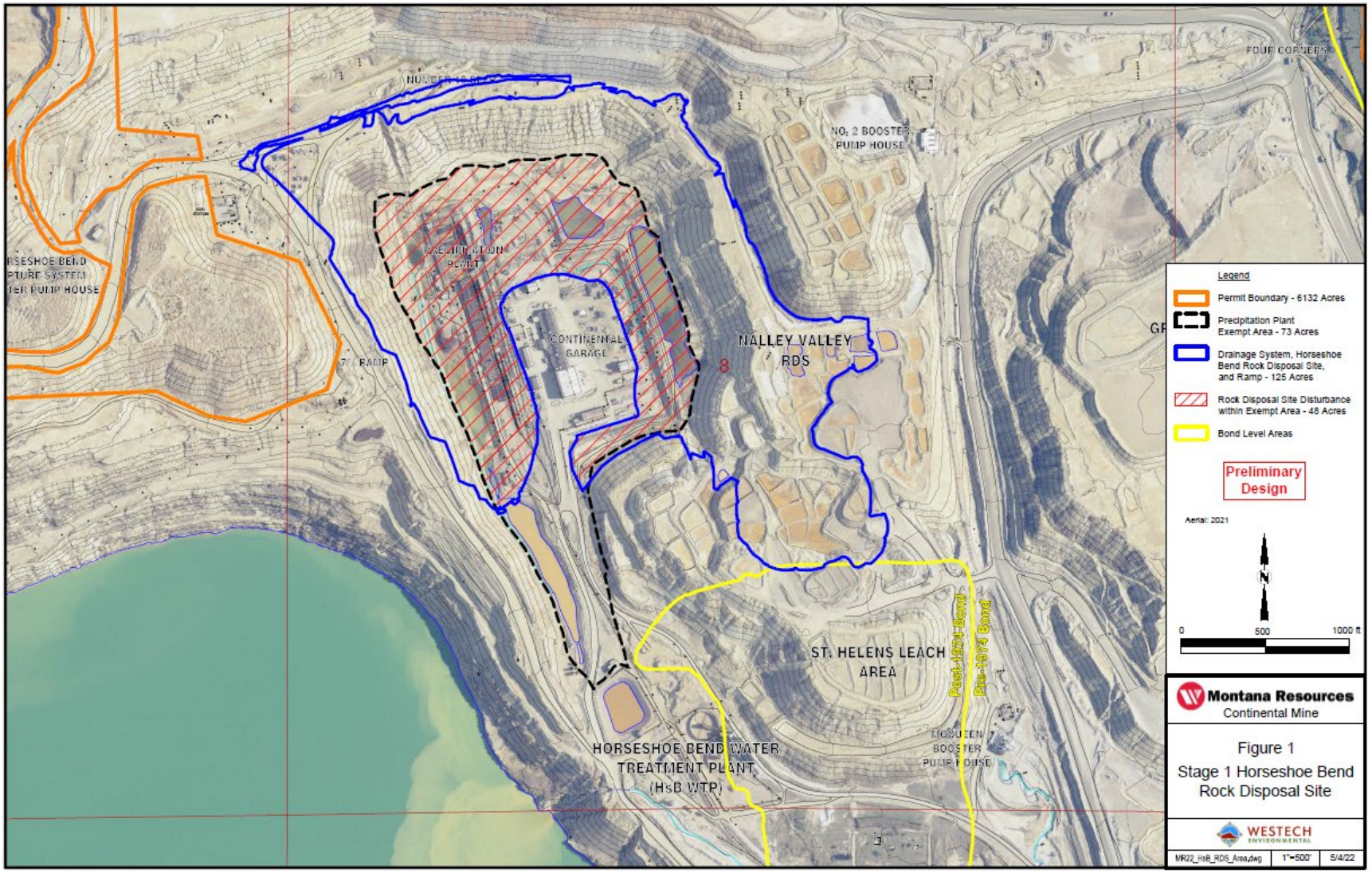


Figure 2. Proposed Horseshoe Bend Rock Disposal Site (Westech, 2022- MR Permit Modification Application). A larger version of this figure is found in Attachment D.



SUMMARY OF POTENTIAL PHYSICAL AND BIOLOGICAL IMPACTS

This impact analysis will identify and analyze direct and secondary impacts of the proposed operation on natural and social resources that are part of the human environment. Direct impacts occur at the same time and place as the action that causes the impact. Secondary impacts are a further impact to the human environment that may be stimulated, or induced by, or otherwise result from a direct impact of the action (ARM 17.4.603(18)). Where impacts would occur, the impacts analysis will estimate the duration and intensity of the impact.

The duration is quantified as follows:

- Short-term: Short-term impacts are defined as those impacts that would not last longer than the life of the project, including final reclamation.
- Long-term: Long-term impacts are impacts that would remain or occur following project completion.

The severity of the impacts is measured using the following:

- No impact: There would be no change from current conditions.
- Negligible: An adverse or beneficial effect would occur but would be at the lowest levels of detection.
- Minor: The effect would be noticeable but would be relatively small and would not affect the function or integrity of the resource.
- Moderate: The effect would be easily identifiable and would change the function or integrity of the resource.
- Major: The effect would alter the resource.

1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE

Are soils present, which are fragile, erosive, susceptible to compaction, or unstable? Are there unusual or unstable geologic features? Are there special reclamation considerations?

Geology

The geology of Butte has been described in numerous publications and is summarized in MR's Operations Plan (Montana Resources, 2021) and the YDTI Site Characterization Report (KP, 2017). Three primary geologic units are present within the mine permit area and include 1) granitic bedrock associated with the Boulder Batholith, 2) Lowland Creek Volcanics (LCV), and 3) unconsolidated valley fill deposits. A general description of the geologic units and structures in the vicinity of the YDTI is summarized below.

The local geology is dominated by the Butte Quartz Monzonite (BQM) phase of the Boulder Batholith. The BQM is a hard, crystalline granitic bedrock with very low primary porosity and permeability. It consists of medium grained hornblende-biotite-quartz monzonite, forming the oldest and most common rock type in the district (Houston, 2001). The Boulder Batholith bedrock is mechanically homogeneous where intact, but jointing has created dominant planes of weakness that control rock behavior near the surface. Although some other orientations exist, the dominant joint sets are vertical and north-south trending. A distinct zone of highly weathered and altered bedrock occupies the upper few feet to tens of feet of BQM through most of the mine permit area. The weathered bedrock typically consists of relatively fresh, quartz-rich BQM clasts within an

iron stained matrix of weathered and altered plagioclase and potassium feldspar minerals (KP, 2017).

Tertiary Lowland Creek Volcanics (LCV) unconformably overlie some portions of the BQM, particularly to the north and west of the YDTI. LCV units generally include the Basal Unit (Tlt) comprised of a basal ash tuff and detritus-rich conglomerate, and an overlying quartz-latite welded ash-flow tuff (Tlw) (Houston, 2001). The LCV typically are not considered to be significant water-bearing units due to their general lack of primary porosity.

Quaternary unconsolidated alluvium and colluvium material occurs within drainage bottoms (like the HSB area) and on some hillslopes between ridge outcrops of BQM. Alluvial deposits within Silver Bow and Yankee Doodle creeks upstream of the YDTI are thin and narrow in lateral extent and are not considered to be significant water-bearing units. Beneath the YDTI however, these unconsolidated deposits reach thicknesses of 40 feet or more along the east side of the impoundment beneath the tailings.

Numerous geologic faults are found throughout the county, some of which date back to Precambrian time, although most faults have seen little to no movement for hundreds of millions of years. However, a few faults have exhibited evidence of movement more recently and could be considered to have the potential for movement again. The faults demonstrating more recent movement generally trend northeast and displace Quaternary sediments (KP, 2017). These recent faults typically cut the north-south trending Rocker Fault and possibly the Continental Fault and are associated with the broad northeast-southwest belt of faults associated with the Great Falls Tectonic Zone (KP, 2017). The normal faults that created Rampart Mountain, Elk Park, and the East Ridge include the Continental Fault, Klepper Fault, and the East Ridge Fault and generally strike in a north-south direction (MBMG, 2009). The Continental Fault and Klepper Fault intersect the Continental Pit located south of the YDTI. The Continental Fault runs along the eastern edge of the YDTI below the North-South Embankment. These and other faults were included in the seismic hazard source models completed for the YDTI design documents (KP, 2018b).

Geochemistry

In the Continental Pit, 160 to 200 feet of leached capping and overburden overlie a massive copper-molybdenum orebody bounded on the west by the Continental Fault and on the east by the Klepper Fault. The deposit is a typical porphyry copper system except that the enriched zone is less pronounced than is commonly observed. Continental primary zone copper occurs as chalcopyrite in interlacing veinlet swarms and as disseminations in the BQM. Continental primary zone molybdenum occurs in younger subparallel veinlet swarms and slicks that offset the early copper veinlets. More recent mesothermal (moderate temperature and pressure) veins overprint the early mineralization, but these contain mostly iron, lead, and zinc. Primary zone copper immediately below the leached cap is weakly enriched by surface weathering where secondary chalcocite occurs as coatings on pyrite and chalcopyrite (Montana Resources, 2018).

Ore from the Continental Pit is geochemically different when compared to Berkeley Pit ore. Continental Pit ore consists of lower copper and higher molybdenum grades, lower pyrite content, and higher calcite content. Berkeley Pit deposit ore consisted of higher-grade metals, higher sulfide content, and lower carbonate content (Montana Resources, 2018). Owing to the neutralization and acidification potential of the different rock sources, rock from the Berkeley Pit is more reactive

and likely to release metals and acidity than the Continental Pit rock. The geochemical conditions in the proposed RDS material would be consistent with other rock currently being placed around YDTI and other rock disposal areas.

The rock aggregate which would be used in the construction of the foundation drainage layer and the rock drains must be durable and resistant to degradation when exposed to acid drainage. Historical water quality testing conducted on seepage water collected at the HSB Weir indicates a pH as low as 3 specific unit (s.u.). Aggregate material would be sourced from the Pipestone Quarry, approximately 13 miles southeast of the Continental Mine complex. This same material was used to construct the West Embankment Drain (WED) on the west side of YDTI. The rock consists of andesite, which is a durable igneous rock that is unlikely to degrade or react and release metals or acidity. Durability and mineralogical tests were performed prior to construction of the WED to assess the suitability of the Pipestone Quarry aggregates. Durability testing for the WED rock included both clean water and low pH, embankment seepage water from the HSB Pond. Durability testing included Los Angeles (LA) Abrasion testing on split samples of aggregates both before and after saturation of the samples in low pH seepage water. Testing was intended to model the worst-case chemical environment to assess the potential for degradation of the aggregates following long-term exposure to acidic conditions. X-Ray Diffraction (XRD) testing was also undertaken to assess the mineralogy of the aggregate sources. The results of the Pipestone Quarry material did not show significantly different losses depending on whether samples were exposed to the acidic seepage or not (KP, 2015; KP, 2021a).

The performance of the WED in relation to drain rock material properties and long-term performance is being continuously assessed during mine operations. Monitoring indicates the WED is continuing to operate as designed and the reported flow rates are well below its design capacity. The drain is operating in relatively anoxic conditions with minor precipitate build-up at the drain outlet where the rock material is exposed to the atmosphere (primarily iron oxy-hydroxide precipitates). This is not considered to be affecting the overall drain performance.

The materials sourced from the Pipestone Quarry are expected to be more resistant to wear than typical embankment rockfill and are expected to remain more free-draining than embankment rockfill in the long-term following cessation of mine operations. In the event that chemical precipitates partially decrease the porosity of the drains, the combined flow capacity of the six main drains is considerably higher than estimated flows rates reporting to the drains. Steady-state flow rates will further decline following the cessation of mine operations, as observed during the mine suspension period from 2000 to 2003, meaning that the drainage system will be sufficient to allow long-term water management following mine closure.

Soil and HSB Foundation Conditions

There are no undisturbed surfaces or soil resources within the HSB area. Early mining activity is described previously in this document and the cited references. As part of Berkeley Pit development, a truck maintenance workshop was constructed in 1956 on the hillslope east of the Silver Bow Creek diversion through HSB. The workshop pad was leveled using a cut-fill method, where alluvium and residual soil materials were cut from the hillslope at the eastern side of the pad and used as fill to construct the western part of the pad. Surplus material was disposed in a pile located north of the current Copper Precipitation Plant. The infrastructure surrounding the truck maintenance workshop (e.g. rockfill dumps, water management ponds) was periodically

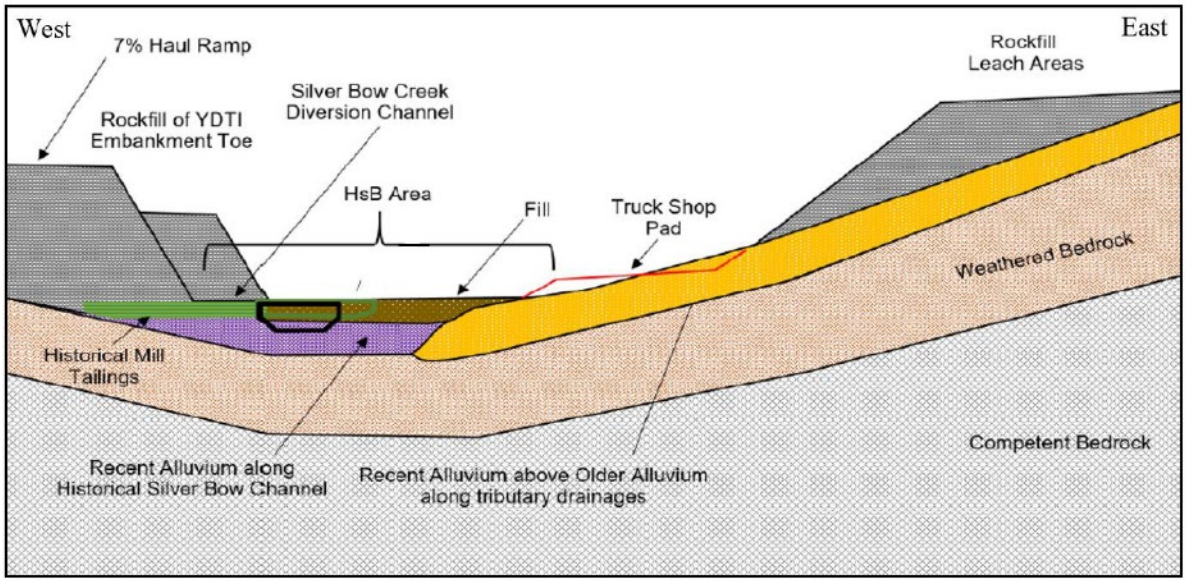
modified due to mine operations. The truck maintenance workshop and other miscellaneous buildings remain in the same location as when they were constructed in the 1950s.

There have been several site investigation programs completed in the general vicinity of the HSB area and within the adjacent YDTI embankments. These investigations span more than five decades (Site Characterization Report, KP, 2017); however, more recent reports have significantly expanded the knowledge base within and surrounding the HSB area (KP, 2018a; KP, 2019a; KP, 2019b; KP, 2020a; KP, 2020b; KP, 2021c). Two geotechnical site investigation (SI) programs were completed between 2018 and 2019 in order to characterize the nature and distribution of soil and bedrock materials within the HSB area. Detailed descriptions of the investigation methods (e.g. drilling and monitoring) and results are provided in the SI reports, while brief summaries are provided below.

Geologic materials encountered during the SI programs included miscellaneous fill materials derived from mine-run rockfill and natural soils (alluvium and residual soils), overlying alluvium soils (recent and older alluvium), and bedrock. The geotechnical conditions observed during the site investigation programs were generally consistent with preliminary expectations resulting from the review of the historical aerial images and photographs (KP, 2021a). A schematic of the conceptual geologic model for the HSB area is shown in Figure 3, which include the following material types:

- Fill
- Historical Mill tailings
- Recent alluvium
- Older alluvium
- Weathered BQM bedrock
- Altered BQM bedrock
- Competent BQM bedrock

Figure 3. Schematic of HSB Conceptual Geologic Model (Looking North)



(Figure 3.9 of Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Report; KP, 2021a)

The near surface fill materials around HSB consist primarily of mine-run rockfill and material derived from natural soil. These fill materials are associated with progressive development of infrastructure within the HSB area between the late 1940s and 1970s and from more recent embankment construction (see Background section above). The following is a high-level summary of material distribution, with additional details found in the SI reports (KP, 2019b; KP, 2020b):

- Fill materials were encountered throughout the HSB area to depths ranging from 4 to 58 feet below ground surface (fbgs). Rockfill was encountered within the toe of the YDTI embankment along the northern and western perimeter of the HSB area, while miscellaneous fill (e.g. from local roads, other infrastructure) was encountered elsewhere within HSB. Fill derived from unsuitable spoil material or slag from site grading prior to the mid-1950s is locally present to the north of the truck maintenance workshop pad, and it was used to infill topographic low points in the vicinity of the Houligan Pond (KP, 2019a). More degraded fill materials and natural soils are expected to be present in the vicinity of the existing ponds where water with low pH has likely accelerated weathering of the soils.
- Historical mill tailings were encountered along the western margin of HSB at depths of 30 to 51 ft below the toe of the 7% haul ramp. The tailings consist of sand, clay, and silt and correspond to the areas of historic mining and milling that occurred in the 1940s and 1950s. The tailings deposits encountered ranged in thickness from 4 to 11 feet.
- Alluvium typically underlies the fill material, with alluvium thicknesses ranging from 8 to 62 feet. The alluvium likely originated from two different sources: older Quaternary alluvial outwash from the topographic highs to the east of HSB, and more recent alluvial material localized to the historical Silver Bow Creek and its tributary channels. Older alluvium is present across much of the HSB area and generally contains higher gravel and coarse to medium sand than recent alluvial materials. Older alluvial materials generally also have a lower percentage (by weight) of fine sand and silt grain-sizes. Recent alluvium is present locally within the foundation along the western side of the Precipitation Plant approximately coincident with the location of the series of drainage channels and ponds that convey flows to the HSB Pond.
- The bedrock beneath fill materials is highly weathered near the surface beneath alluvial materials, then it grades with depth from moderately weathered to slightly weathered to fresh bedrock. Weathered bedrock was encountered at depths ranging from 18 to 105 fbgs. The bedrock generally becomes stronger with depth and weaker zones correspond with near surface weathering and deeper zones of alteration. Competent bedrock comprising light to medium grey, medium- to coarse-grained BQM is present throughout the HSB at depth.

<u>Geotechnical Considerations</u>

Section 82-4-337(c)(iii), Montana Code Annotated (MCA) requires that when an application submitted after October 1, 2015, includes a tailings storage facility, DEQ shall verify the receipt of the certified design document pursuant to 82-4-376, MCA, the panel report pursuant to 82-4-377, MCA, and the tailings operation, maintenance, and surveillance (TOMS) manual pursuant to 82-4-379, MCA. The primary requirements for the design and evaluation of tailings storage facilities are established in Sections 82-4-375 through 82-4-381, MCA.

These statutes require that any designs for new tailings storage facilities or expansions to existing

tailings storage facilities (as defined in 82-4-303, MCA) be completed by a designated Engineer of Record (EOR). The EOR must have at least 10 years of direct experience with the design and construction of tailings storage facilities. The design documents must also be reviewed by an Independent Review Panel (IRP), consisting of three independent review engineers who are experts in the design and construction of tailings storage facilities. The IRP is charged with reviewing the design document, underlying analysis, and assumptions including the practical application of current technology within the design. The detailed level of design and review required for tailings storage facilities is intended to provide for the design, operation, monitoring, and closure of tailings storage facilities such that they (a) meet state-of-practice engineering design standards, (b) use applicable, appropriate, and current technologies and techniques that are practicable given site-specific conditions and concerns, and (c) provide for the protection of human health and the environment.

As part of the previous YDTI expansion through Major Amendment 010 (see Final EIS; DEQ, 2019), the technical aspects of the YDTI design for geotechnical considerations under static and seismic loading conditions were reviewed and accepted by the IRP, with the results of their review documented within their final report (IRP, 2017) and updated report (IRP, 2018). As part of a risk assessment of the YDTI conducted by KP in 2018, the selective and strategic use of excess rockfill generated during mining of the Continental Pit was identified as an opportunity to enhance embankment stability. The Horseshoe Bend area was selected as a priority rock disposal site location, based upon potential benefits to the tailings facility by enhancing embankment stability and improving reclamation opportunities.

The proposed activities would involve the construction of an RDS at the toe of the YDTI, which would not constitute the construction of a new tailings storage facility nor an expansion of an existing facility, as defined by Section 82-4-303(11), MCA. Therefore, a new design document, panel report, and TOMS manual are not required for this permit modification. However, the EOR is required to review, certify, and seal designs or other documents pertaining to tailings storage facilities submitted to DEQ (Section 82-4-375(3)(b), MCA). The designs for the foundation drainage layer, the rock drains, and the HSB RDS at the toe of the YDTI were included within the application for this permit modification, see "Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Report" (KP, 2021a). The designs were reviewed, certified, and sealed by the designated EOR (Daniel Fontaine, P.E.).

In the absence of an expansion to the YDTI and the development of a new design document, there is no requirement for the IRP to provide a review report (Section 82-4-377, MCA) for this proposed modification. However, the IRP has still been involved with the development of the HSB RDS designs and has participated in meetings with MR, KP, and the EOR. In response to the "Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Report," the IRP issued a memorandum dated December 17, 2021, highlighting the following observations:

- “The IRP has previously expressed strong support of eventual placement of waste rock in the [HSB] area as a risk reduction measure to augment the stability of the YDTI embankment in the central pedestal area and to support eventual reclamation activities.”
- “Basal drains to control the elevation of the phreatic surface within the foundation of the RDS and to collect contaminated seepage in the area are an essential component of the RDS.”
- “Foundation conditions in the HSB area are known in sufficient detail to support the design

concept at this stage of the project."

- "Montana Resources has considerable experience in the construction of the proposed rock drains, as the drains are based on a very similar design implemented within the WED on the west side of YDTI. To date, the WED drains have functioned according to design."

Reclamation Considerations

Changes associated with this permit modification would alter prior commitments to reclamation. MR's Consolidated Operations and Reclamation Plans for the Continental Mine were preliminarily submitted to DEQ on December 10, 2021. These Plans would be revised to address changes associated with the HSB RDS.

The primary reclamation change would be converting a portion of the previously exempt area (Copper Precipitation Plant) to an RDS that ties into the toe of the YDTI East-West Embankment. The HSB RDS would be reclaimed according to procedures that are consistent with other RDS in the permit area. Reclamation of the HSB RDS will be completed within two years of final rock placement unless subsequent stages are permitted or in the permitting process. In the event of additional permitting, a revised reclamation plan would be prepared to address additional rock placement and reclamation would be completed following cessation of rock placement. Reclamation details are further described in Table 1.

Direct Impacts:

No unusual or unstable geologic features are present, and no fragile or particularly erosive or unstable soils are present. The geochemical conditions in the RDS material would be consistent with other non-ore rock currently being placed around YDTI and other rock disposal areas, and no additional impacts to the water quality of the HSB seepage are expected from this material. The legacy soil and fill materials that remain in the HSB area would be covered and become irretrievable through the construction of the foundation drainage layer, rock drains, and RDS. However, these materials are less suitable for supporting revegetation following reclamation than the alluvial material that would be placed on the RDS during reclamation.

The proposed activities would involve the construction of an RDS within the HSB area, at the southern toe of the YDTI. This location was selected as a priority rock disposal site location, based upon potential beneficial impacts to the tailings storage facility by enhancing embankment stability. Although the proposed RDS is not an expansion of the tailings storage facility, the designs for the foundation drainage system and the RDS were reviewed, certified, and stamped by the designated EOR. The IRP members also reviewed the designs and provided a clear statement of support for the modification.

In addition to enhancing YDTI embankment stability, the HSB RDS would also result in beneficial impacts for reclamation in the area, which include:

- A portion of the current steep embankment slope (2H:1V) would have been stabilized with rip-rap and remain unvegetated at closure, but this modification would result in the overlying surface being graded to a more stable angle (3H:1V), covered with suitable alluvium/soil, and revegetated.
- The flatter and revegetated slope would provide an aesthetic benefit in the post-mining time period compared to the current approved reclamation plan (No Action Alternative) for the lower portion of the YDTI Embankment.

- Provide improved erosion control on flatter slopes, potentially resulting in higher vegetative cover, thereby reducing meteoric infiltration and overall HSB-area drainage and water treatment requirements.

The beneficial impacts to embankment stability and reclamation opportunities would be minor to moderate, with noticeable changes to the reclaimed RDS slope along the embankment and improved geotechnical integrity for the YDTI. These beneficial impacts would be long-term, lasting beyond mine closure.

Secondary Impacts:
There are no expected adverse secondary impacts to the geology of the HSB area. Beneficial impacts to the stability of the YDTI embankment and the measures used for reclamation and erosion control on the RDS surfaces would extend beyond mine life. The aggregate material from Pipestone Quarry that would be used in the foundation drainage layer and rocks drains would be more resistant to long-term weathering than the non-ore rock produced by mining at the site. This would provide a beneficial secondary impact to the function of the layered drainage systems to convey seepage flow to downstream water management and treatment facilities, while maintaining stable, unsaturated conditions within the YTDI embankment after mine closure.

2. WATER QUALITY, QUANTITY, AND DISTRIBUTION

Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality?

Background- Superfund Water Management
The Berkeley Pit is filling with acidic, metals-contaminated water originating from: the surrounding bedrock aquifer, which includes several thousand miles of flooded underground mine workings; the surrounding alluvial aquifer; and additional surface runoff inflows. The HSB area receives runoff from the surrounding disturbed and undisturbed catchment areas, seepage from the toe of YDTI, and drainage from the adjacent rockfill leaching areas. The seepage daylights as multiple small seeps at various locations along the downstream toe of the embankment and leach dumps. The flows are collected in surface drainage ditches that convey the water to either the upper HSB area or the Houligan Pond on the west and east sides of the Precipitation Plant, respectively. The water emanating from the HSB area is acidic with elevated concentrations of metals, and the current HSB water management facilities are described below and shown on Figure 4 (KP, 2021a).

The HSB discharges historically flowed to the Berkeley Pit, but EPA ordered the capture and use of HSB flows in the mining operation from 1996 until 2000, when the mining operation was temporarily closed (EPA and DEQ, 2002). Following the suspension of mining, the HSB flow was no longer treated and integrated into the tailings circuit, so the contaminated HSB water was directed back to the Berkeley Pit. Under the requirements in the 1994 Record of Decision (ROD), this triggered the final design process for a Water Treatment Plant located south of HSB, which was approved by USEPA in 2002. The HSB Water Treatment Plant is a lime precipitation high density sludge (HDS) facility capable of treating average flows of 5 million gallons per day (MGD) and peak flows of 7 MGD. It was designed to be capable of treating Horseshoe Bend water, Continental Pit, and Berkeley Pit water when it becomes necessary after mining operations

cease.

As described in the 2002 Consent Decree, the BMFOU area consists of:

- The waters within the Berkeley Pit;
- The underground mine workings hydraulically connected to the Berkeley Pit;
- The alluvial aquifer near the Berkeley Pit which drains into the Berkeley Pit;
- The bedrock aquifers, including the bedrock aquifer water in and near the Continental Pit; and,
- Other contributing sources of inflow to the Berkeley Pit/East Camp system, including surface runoff, leach pad, and stormwater that enters the Berkeley Pit from the BPSOU; tailings slurry circuit overflows; and HSB surface water flows.

The East Camp is largely encompassed within the southern portion of the BMFOU and overlaps with the mine permit area, while the West Camp area is to the southwest of the Berkeley Pit, outside of the mine permit area. Presently, bedrock groundwater in the East Camp area flows toward the Berkeley Pit and the Travona removal action controls releases from the West Camp. However, if groundwater levels continue to rise beyond certain elevation levels, the hydraulic gradient could change, and contaminated water could flow out of the East and West Camps into the surrounding alluvial groundwater and eventually to Silver Bow Creek. To prevent this from occurring, EPA and DEQ determined that the water levels in the BMFOU boundary must not rise above the protective water level of 5,410 feet for the East Camp and 5,435 feet for the West Camp.

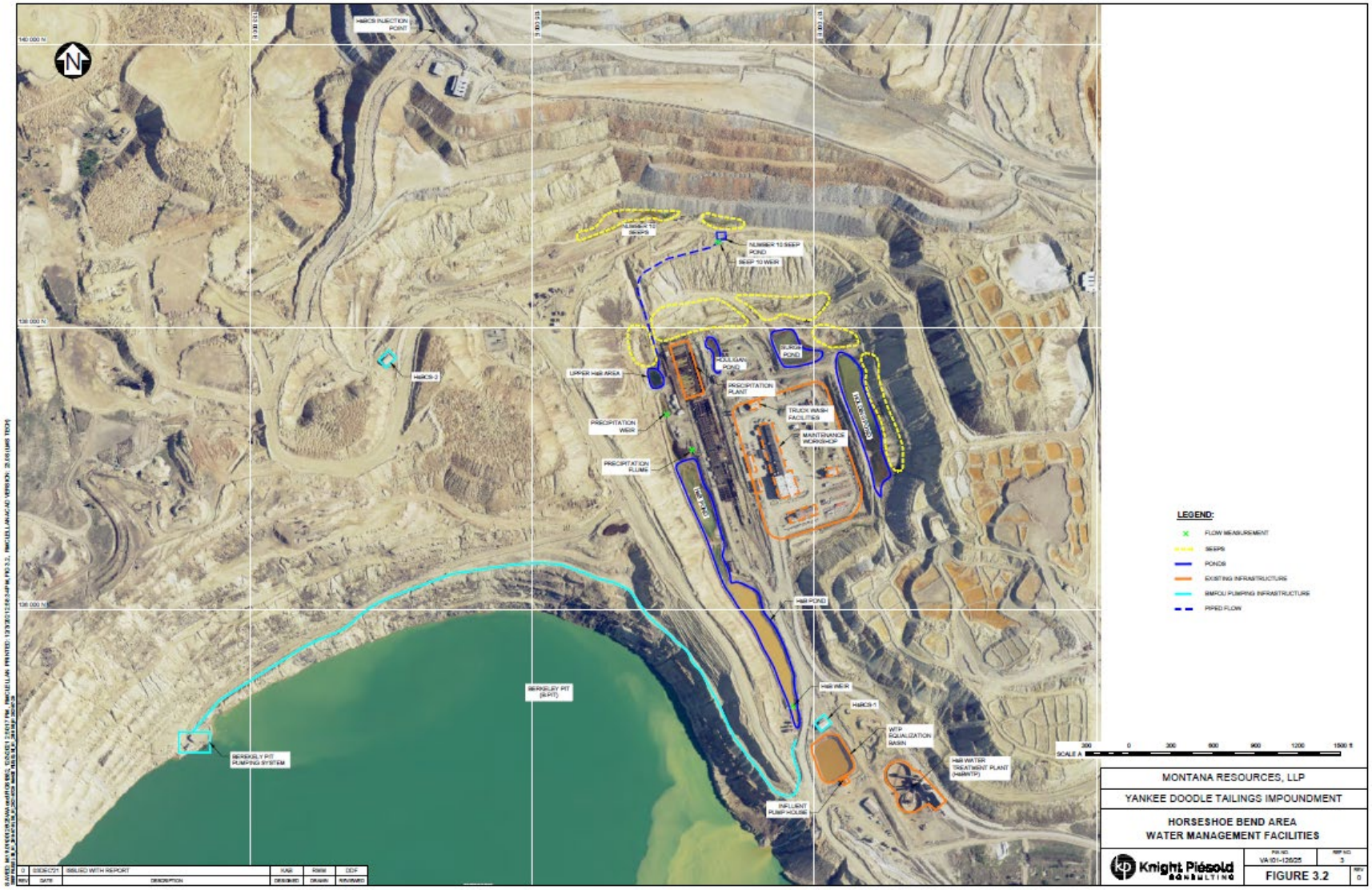
EPA and DEQ evaluated the actions prescribed in a 1994 ROD and established updates through an Explanation of Significant Differences (EPA and DEQ, 2002), based upon new standards, changes in existing permits, or transfers of responsibility among the Operable Units. The 2002 updates included the following components relevant to the HSB area:

- Control of inflow from HSB with exceptions for short-term flows to the Berkeley Pit;
- Routing of stormwater runoff from upper areas of BPSOU to the Berkeley Pit; and,
- Treatment of surface water and groundwater from HSB and Continental Pit at the HSB Water Treatment Plant and the potential use of water in the mining process or discharge to Silver Bow Creek (contingent on attaining applicable surface water discharge standards)

Current Water Management

A new water management strategy was implemented at the site in late September 2019 as part of a pilot project associated with the BMFOU. This strategy involves maintaining the current water surface elevation in the Berkeley Pit by introducing approximately 3 to 4 million gallons per day (MGD) of Berkeley Pit water to the site water management system. Berkeley Pit water is pumped to the Copper Precipitation Plant, then the flow is discharged from the Precipitation Plant in an HDPE pipeline along the west side of the HSB Pond to a small water transfer pond and pump located to the west of the HSB Weir. Flow is pumped from this pond to either the HSB Capture System (directed to the YDTI) or to the HSB Water Treatment Plant (via the equalization basin or influent pump house).

Figure 4. Horseshoe Bend Area Water Management Facilities (KP, 2021a). A larger version of this figure is found in Attachment D.



The YDTI is also an integral component of a current water treatment pilot project related to the BMFOU remedy. The YDTI supernatant pond provides residence time for some water treatment objectives to be achieved prior to the release of up to 10 MGD from the YDTI pond. The water is further treated at the Polishing Plant operated by AR and the effluent is released near the confluence of Blacktail and Silver Bow Creeks, to the southwest of the mine permit area. One goal of the pilot project is to progressively reduce the YDTI supernatant pond volume to approximately 15,000 to 20,000 acre-ft over the next several years.

Embankment runoff and seepage from the YDTI flows south through the HSB area and joins with the Copper Precipitation Plant discharge and localized surface water runoff in the HSB Pond. HSB Pond is a long, narrow basin approximately 100 feet wide and 2,000 feet long with a total footprint area of approximately 6 acres. Flow rates in the HSB area have been measured regularly since 1996 using a weir plate and level meter (HSB Weir) located at the southern end of the HSB Pond. The pond acts to attenuate incoming flows prior to discharging through the HSB Weir. A diversion structure at the south end of HSB Pond diverts water by gravity to either the HSB Capture system (pumped back into YDTI) or to the HSB Water Treatment Plant (treated for internal use in the processing and tailings circuit).

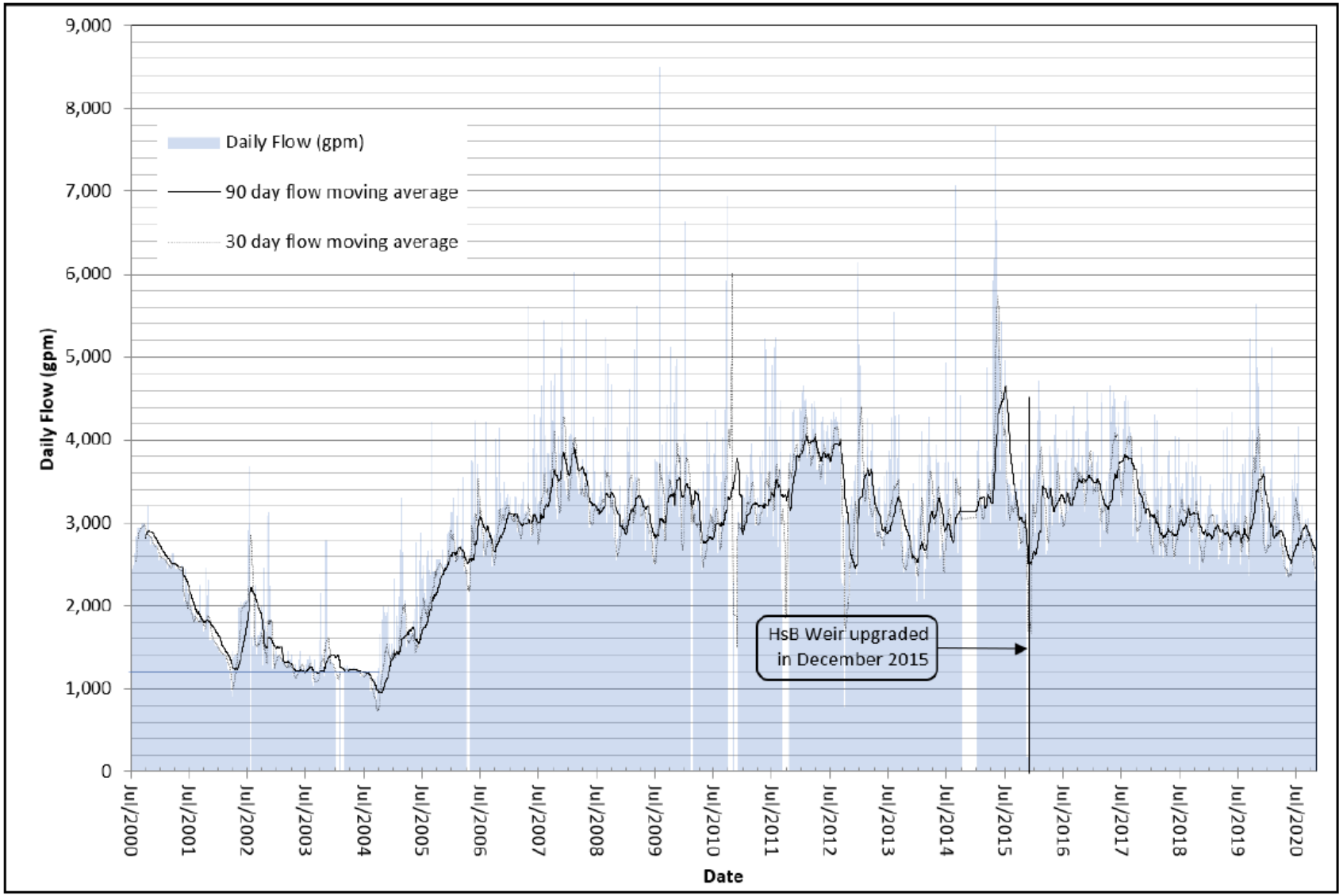
The HSB Weir records are representative of total flows within the HSB area, and a time series graph of historical daily flow rates is provided on Figure 5 for the period between 2000 and 2020. These data demonstrate the variations in observed daily flows as well as presenting the 30-day and 90-day moving averages. HSB flows reduced from approximately 3,000 gpm to approximately 1,200 gpm during a temporary period of suspended mine operations between years 2000 and 2003. The reduced flows are indicative of flow reductions that can be expected during early mine closure conditions in the future, as the system approaches steady-state conditions. The data indicates a gradual reduction in HSB flows since approximately 2016. The 2020 average annual flow rate was approximately 2,840 gpm (4.1 MGD), which is similar to the 2019 annual average flow rate excluding the data affected by the commissioning of the Berkeley Pit Pumping System.

Piezometric Conditions

Pore pressures within the YDTI embankments, foundation materials, and within the HSB area are actively monitored using an extensive network of monitoring instruments. Real-time piezometric data from these sites are available to MR and KP via a remote monitoring system that was implemented in 2018. Piezometric monitoring is performed within standpipes, monitoring wells, and vibrating wire piezometers (VWPs). Standpipe piezometers and monitoring wells were installed between the early 1990s and 2016 and were retrofitted with VWPs for continuous time-series monitoring beginning in 2018.

Piezometric conditions and trends within the HSB area are presented in the annual data analysis reports for the YDTI. The most recent analysis was completed with data through the end of 2020 (KP, 2021b). The recorded pore pressure elevations with the HSB area indicate a relatively shallow phreatic surface that resides within near-surface fill, natural soil and weathered bedrock. The piezometric conditions are inferred to be largely controlled by the conditions associated with water storage in the YDTI and at the Berkeley Pit, but are also affected by seasonal recharge, seepage from the YDTI, and leaching activities (which were discontinued in 2021). Flow gradients are predominantly horizontal with only slight vertical gradients observed.

Figure 5. Time Series of HSB Weir Historical Flow Rates (2000-2020; KP, 2021a)



Measured piezometric elevations are generally highest near the YDTI embankment toe, at the northern end of the HSB area and gradually decrease with distance towards the south. This trend indicates that the predominant groundwater flow direction in the HSB area is from north to south, towards the regional groundwater low point (Berkeley Pit). The natural topography underlying and surrounding the HSB area also drives groundwater flow from the rockfill and hillslopes around the HSB area, towards the historical alignment of Silver Bow Creek. Relatively high piezometric elevations are observed to the east and gradually decrease westward towards the historical Silver Bow Creek alignment and the present-day location of the HSB Pond.

Proposed Modification - Foundation Drainage Layer and Rock Drains

The principal design objectives for the drainage system described in the proposed modification include management of surface water runoff in the HSB area and groundwater discharge within the foundation of the RDS during mine operations and in the long-term following closure. Water would continue to be collected and conveyed to the HSB Pond in a manner that limits impacts to the existing water management infrastructure, including the HSB Weir and facilities downstream of the HSB Pond, consistent with the BMFOU remedy.

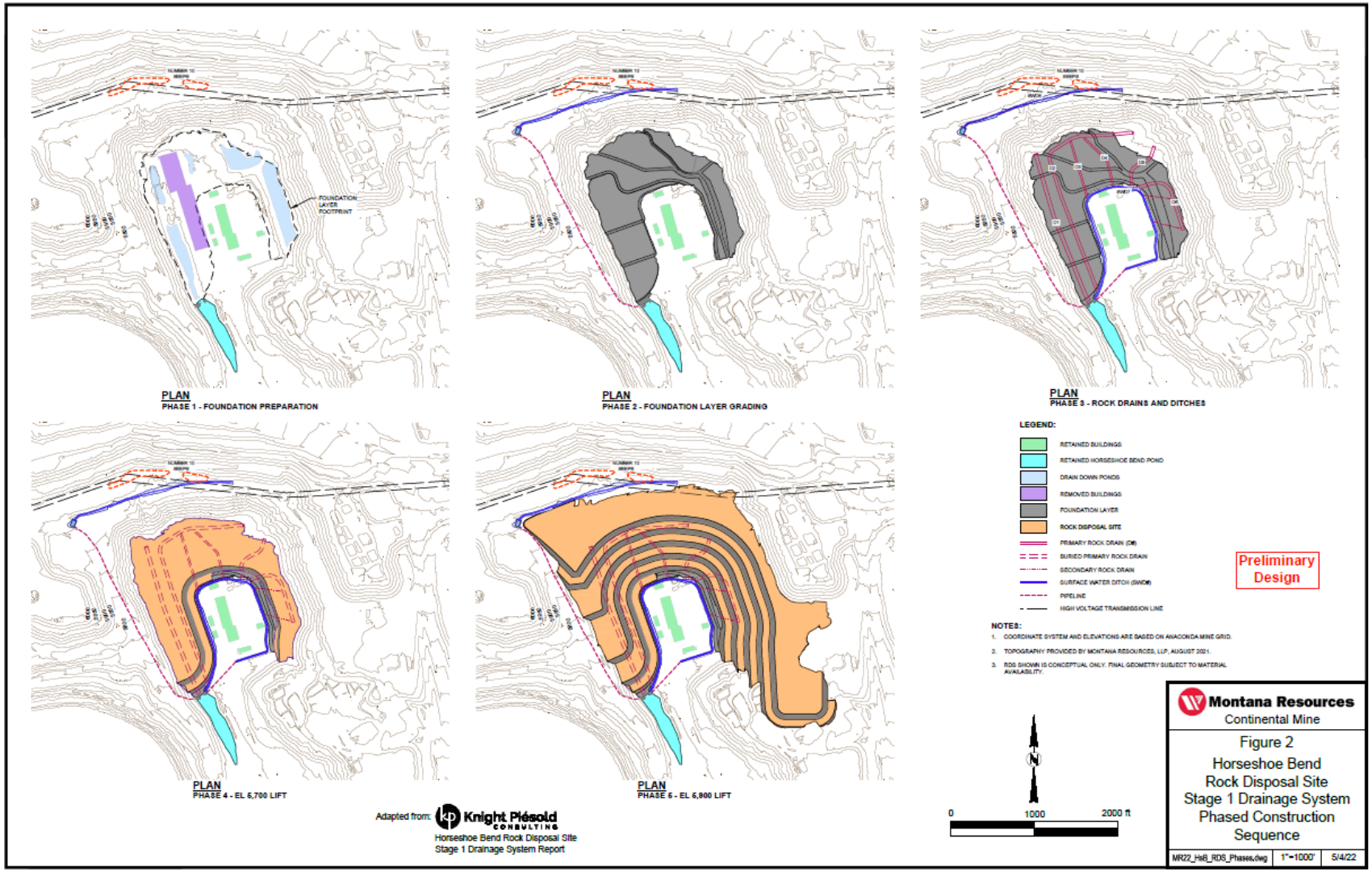
The five primary phases of the proposed modification are shown in Figure 6. Activities within Phase 1 involve the decommissioning of the Precipitation Plant; demolition and removal of the plant and other infrastructure such as transmission lines and water management structures; and draining down of the Holding, Surge, and Houligan Ponds. Phases 2 and 3 include a foundation drainage layer and a network of engineered rock drains and surface water diversion ditches. The network would convey flows to the HSB Pond, which ties in with the sitewide water management systems. The foundation drainage layer would be formed across the ground surface once existing infrastructure has been removed and the ponds have been drained down. The rock drains would then be formed within and above the foundation drainage layer and would discharge into surface water ditches and ultimately the HSB Pond.

The design assumes that the foundation base layer (blanket drain) conveys no flow, however, MR has proposed to place Pipestone Quarry rock in selected areas of the blanket drain to provide additional redundancy to the design and excess drainage capacity in the foundation of the RDS. The inclusion of multiple independent drainage systems improves the HSB area water management system in consideration of the long-term design life. Placement of 150-feet of rockfill in the HSB area will greatly attenuate peak flows that have not previously been attenuated.

The drainage system would incorporate six independent rock drains within the HSB RDS footprint. Drain locations and alignments were selected based on the existing surface topography, foundation layer grading plan, and the understanding of the existing drainage pathways in the HSB area. Additional drains were included in critical areas of the drainage system to provide some drainage capacity overlap in consideration of the long-term design life. These installed redundancies include:

- Rock drain D1 and the portion of D2 running parallel approximately north to south on the western side of HSB; and,
- Rock drains D3 and D4 running parallel approximately north to south in the central part of the HSB area from the downstream toe of the East-West Embankment.

Figure 6. Phased Construction Sequence for Proposed Modification (KP, 2021a). A larger version of this figure is found in Attachment D.



Estimated infiltration rates through the overlying RDS rockfill were developed for a 1-in-200-year, 24-hour storm event, using a runoff coefficient that is consistent with the YDTI water balance model. Conveyance of the infiltration and groundwater discharge will occur within the foundation drainage layer and rock drains. Estimates of infiltration into rock drains were made using the catchment areas for each of the proposed rock drains and estimated infiltration lag times. The time for precipitation to report to the rock drains will depend on the heterogenous flow paths through the overlying rockfill material that will range in thickness up to approximately 250 feet thick.

The infiltration flow estimates were compared with historical average daily flow rates recorded in the HSB area and used to select design flow rates for the rock drains. The selected design basis flow rates for each drain are: Drain 1 = 4,500 gpm; Drains 2, 5, and 6 = 3,500 gpm; Drains 3 and 4 = 1,000 gpm. The total design flow capacity for all six drains is approximately 17,000 gpm, which is more than five times greater than the current HSB area flow rates and over three times greater than the 98th-percentile flow rate over the past 20 years (refer to Figure 5.4). These flow capacity estimates also conservatively ignore the available flow capacity within the foundation drainage layer, which will be constructed with relatively permeable mine-run rockfill and aggregate from the Pipestone Quarry. The inclusion of these multiple, independent drainage systems and use of conservative design flow rates provides significant redundancy and improves reliability in consideration of the long-term design life of the basal drainage system for the HSB RDS.

In response to the "Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Report," the IRP issued a memorandum dated December 17, 2021, highlighting the following observations:

- “The layout and design capacity of the surface water diversion ditches to direct flow around the RDS is considered reasonable.”
- “The estimates of flow volumes that will enter the HSB area following construction of the RDS are based on sound assumptions, and the values reported appear reasonable.”
- “The overall design concept, incorporating six independent rock drains within the Stage 1 footprint, and the proposed construction sequence presented by KP, are considered by the IRP to be well suited to site conditions.”
- “A reasonable basis has been adopted for determination of the drain flow capacity requirement. The design is considered appropriately conservative. Redundancy has been incorporated in the design, given the long-term performance requirement following mine closure. The impact of a potential decline in drain conductance has been considered.”

The 2018 HSB SI program included installation of 30 VWPs, installed in ten drillholes throughout the area to monitor pore pressures. There are also several additional VWPs installed in drillholes completed in 2015 and used to retrofit historical standpipes initially installed in the early 1990s. All of these monitoring sites will be covered or impacted by the Stage 1 HSB RDS. Cables from these monitoring sites will initially be trenched and extended beyond the drainage system features to allow for continual monitoring during and after construction. Performance of the rock drains will be monitored using the existing VWPs and new monitoring instrumentation. New VWPs will be installed in or adjacent to the drains to complement the monitoring instrumentation available in the foundation materials and to assess piezometric conditions within the RDS.

Direct Impacts:
Construction of the foundation drainage layer, rock drains, and HSB RDS would cover the existing

seeps and ponds within the HSB area. The main sources of water to the RDS drainage system will include infiltration of meteoric water, surface water runoff from upgradient slopes, seepage from the YDTI, and groundwater discharge within the HSB area. Some groundwater recharge may occur as slight vertical downward gradients are present in the foundation materials, but the overall regime of groundwater flow beneath the RDS is not expected to be significantly altered in the long-term after construction of the RDS.

As described above, the aggregate material from Pipestone Quarry in the foundation drainage layer and rocks drains would be more resistant to long-term weathering than the non-ore rock produced by mining at the site. The geochemical conditions in the RDS material would be consistent with other non-ore rock currently being placed around YDTI and other rock disposal areas, and no additional impacts to the water quality of the HSB seepage are expected from this material. Similar to observations in the WED, anoxic conditions would be maintained within the foundation of the HSB and the potential formation of chemical precipitates is unlikely to compromise the functionality of the HSB drainage systems.

This means that the current management and treatment systems being operated under BMFOU requirements would continue to function as designed, without significant changes to water quality or quantity. The drainage and conveyance systems associated with the HSB RDS provide a beneficial change by centralizing the collection of water from ponds and seeps which are currently dispersed around the HSB footprint. These benefits would be long-term, extending beyond mine closure.

Secondary Impacts:
There are no expected adverse secondary impacts to the water quality, quantity and distribution around the HSB area. The durable aggregate material from the Pipestone Quarry would provide a beneficial secondary impact to the function of the layered drainage systems to convey HSB flows to downstream water management and treatment facilities, while maintaining stable, unsaturated conditions within the YTDI embankment after mine closure.

3. AIR QUALITY

Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)?

The proposed action would include demolition of existing infrastructure at the site, removal of debris and waste, foundation preparation, construction of rock drains and other water conveyance structures, and placement of rockfill in the HSB RDS. Some pollutants or particulate would be produced during these activities.

The mine site has an air quality permit through DEQ (MAQP #1749-12). The permit covers fugitive emissions, those which could not reasonably pass through a stack, chimney vent, or other functionally equivalent opening (40 CFR Sections 70.2 and 71.2), and point source emissions, those that are released from a single point. Fugitive emissions evaluated for the air quality permit include: drilling, blasting, travel (transport) of ore trucks, front end loader, loading, unloading, wind erosion, crushing, and drying. Specific mitigations are required for permit compliance and include water and chemical suppressants to control fugitive emissions to ensure compliance with opacity standards. MR must also implement engine controls to reduce particulate matter from

engine exhaust. For fugitive dust, the permit includes conditions limiting the facility's emissions (see Final EIS; DEQ, 2019).

Direct Impacts:
Dust particulate could be produced or become airborne during demolition of the existing infrastructure, foundation preparation, and construction of the RDS. Mechanized equipment would produce some exhaust emissions.

Short-term negligible airborne emissions would be generated from this project from dust particulate and emissions from mechanized equipment produced from proposed activities. Airborne emissions from the proposed project would fall under the existing air quality permit. The proposed project would have minor short-term impacts on air quality.

Secondary Impacts:
No secondary impacts to air quality are expected from this proposed modification.

4. VEGETATION COVER, QUANTITY AND QUALITY

Will vegetative communities be significantly impacted? Are any rare plants or cover types present?

The proposed modification would occur in an area that has been previously disturbed by mining activities.

Direct Impacts:
As proposed in this modification, the final reclamation of the HSB RDS surface would involve grading the slope to a stable angle (3H:1V), covering the slope with soil, and revegetation. This approach would provide benefits in the post-mining time period compared to the current approved reclamation plan (No Action Alternative) for the lower portion of the YDTI Embankment above HSB, which would remain at a steeper angle (2H:1V) and be covered with rip-rap and no vegetation. Flatter slopes proposed in the RDS reclamation provide improved erosion control, potentially resulting in higher vegetative cover. The seed mixes and planting described in the reclamation portions of the current operations plan include locally prevalent and native plants with a predominance of herbaceous (grassland) plants and some forbs and shrubs (Final EIS; DEQ, 2019).

Impacts to vegetative cover, quantity or quality resulting from this project would be beneficial. The beneficial impacts would be long-term and minor.

Secondary Impacts:
No secondary impacts to vegetation cover, quantity and quality are expected.

5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS

Is there substantial use of the area by important wildlife, birds or fish?

The proposed project would occur in an area that has been previously disturbed by mining activities. The HSB area is currently used for mining activities and is not substantially used by wildlife.

Direct Impacts:
The reclamation plan states that the post-closure land uses for the area to be reclaimed is wildlife habitat. The proposed action would add to reclaimed wildlife habitat by increasing vegetated areas on a slope of the YDTI that was previously proposed to be stabilized by rip-rap. No impacts to aquatic life would be expected from this project. Impacts to terrestrial and avian life and habitats resulting from this project would be beneficial. The beneficial impacts would be long-term and minor.

Secondary Impacts:
No secondary impacts to terrestrial, avian, and aquatic life and habitats stimulated or induced by the direct impacts analyzed above are expected.

6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES

Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Species of special concern?

The proposed project would occur in an area that has been previously disturbed by mining activities. The HSB area is currently used for mining activities and does not have any federally listed threatened or endangered species, species of special concern, or identified habitat present. There are no wetlands present.

Direct Impacts:
No impacts to unique, endangered, fragile, or limited environmental resources would be expected from the proposed action.

Secondary Impacts:
No secondary impacts to unique, endangered, fragile, or limited environmental resources that could be stimulated or induced by the direct impacts analyzed above are expected.

7. HISTORICAL AND ARCHAEOLOGICAL SITES

Are any historical, archaeological or paleontological resources present?

The Continental Mine complex, including the HSB area, occurs on private land that overlaps with areas that have been disturbed by mining activity for over 100 years. The Montana Cultural Resource Database under the State Historic Preservation Office (SHPO) indicates that historic sites and inventoried areas are present throughout the Butte Mining District, but specific sites were not identified in the HSB area. Portions of the historic mining landscape have been preserved in a disturbed (unreclaimed) status as part of the Granite Mountain Memorial Interpretive Area (GMMIA), which was established directly west of the active mine permit.

Direct Impacts:
The proposed modification is within an active mine permit on private land, within a historic mining district, and no new disturbance is associated with the proposed activity. Certain areas of the legacy mining landscape that are outside of the permit area are being preserved as disturbed surfaces. Although the HSB RDS would ultimately be reclaimed, this feature would be located to the east

of the GMMIA and would not impact the unique quality of the historic mining landscape. The current Copper Precipitation Plant has been operated since approximately 1970 and the facility has undergone regular maintenance, repairs, and replacement of equipment and infrastructure, thus it does not retain unique historical value. No direct impacts to historical, archaeological or paleontological resources are expected from this proposed modification.

Secondary Impacts:
No secondary impacts to historical, archaeological or paleontological resources are expected from this proposed modification.

8. AESTHETICS

Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light?

The current facilities in the HSB area are not visible from the public roadways or residences that are near the mine permit area. The stream gage that is monitored by the Montana Bureau of Mines and Geology (MBMG) within the HSB channel is installed at an elevation of 5,560 feet. The facilities within the HSB area are in a topographic low point, bounded on the east and west by leach pads, non-ore rock disposal, and access roads and ramps with elevations that range from 5,800 to 6,000 feet. The YDTI embankment directly to the north (upstream) from the HSB area has been constructed with sequential rockfill lifts, with benches that rise gradually to a maximum crest elevation of 6,450 feet.

The nearest public roadway where the HSB area may be visible is Continental Drive, along the south side of the mine permit area. Residential areas are located south of Continental Drive, some are less than 300 feet from the mine permit boundary. The concentrator, crusher, and related processing facilities are located along the southern portion of the mine permit area, partially obscuring the public's view of the HSB area in the central portion of the mine.

Direct Impacts:
The proposed modification is in the central portion of an active mine permit on private land. As described in Table 1, Stage 1 of the HSB RDS would be developed in multiple phases. These phases include the removal of existing infrastructure, management of seepage, placement of a foundation drainage layer, and the placement of the initial lift of rockfill to an approximate elevation of 5,700 feet to cover the drainage systems and to form an initial RDS area. The top elevation of the conceptual Stage 1 RDS is approximately 5,900 feet, which is currently limited by a high-voltage transmission lines that extends along the Seep 10 bench at this elevation.

The current perspective from a public roadway is shown in Figure 7, with the YDTI embankment above the HSB area and the proposed RDS area outlined with a black polygon. The RDS would be visible to the public from vantage points at higher elevation (e.g. the East Ridge), although the limited size and appearance of the RDS would make it difficult for the public to distinguish from the adjacent slopes and YDTI embankment. The RDS would occur near the base of the dominant topographic feature at the site (YDTI) and because the same non-ore rock has been used to construct the YDTI embankments, the RDS would not create a significant visual contrast along the embankment slope. The visual contrast will be further reduced through reclamation, as the RDS would be graded to a stable angle (3H:1V), covered with soil, and vegetated to blend with

the reclaimed YDTI embankment.

There would be no facilities with potential lights constructed on top of the RDS. Sources of noise associated with foundation preparation and the construction of the RDS would be heavy equipment and haul trucks, similar to the noise generated across the mine. However, the HSB area is located further away from roadways and residences than areas of active mining (Continental Pit) and processing facilities. Therefore, the direct impacts to aesthetics from the proposed modification would be short-term and negligible.

Figure 7. Looking north from Continental Drive (Google Street View, Image from August 2021).

The primary processing facilities are shown in the foreground, while the facilities in the HSB are not visible from public roadways or residences. The black polygon outlines the current YDTI embankment slope above the HSB area, where the lower portion of embankment and HSB facilities would be covered by rockfill in the proposed RDS. The top of the black polygon roughly corresponds with the upper extent of the proposed RDS, at an elevation of 5,900 feet.

Secondary Impacts:
No adverse secondary impacts to area aesthetics are expected because of the proposed work. As part of the reclamation of the YDTI embankment and HSB RDS surface, the slope would be graded to a stable angle (3H:1V), covered with soil, and vegetated. This approach would provide an aesthetic benefit in the post-mining time period compared the current approved reclamation plan (No Action Alternative) for the lower portion of the YDTI Embankment above HSB, which would remain at a steeper angle (2H:1V) and be covered with rip-rap and no vegetation.

9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY

Will the project use resources that are limited in the area? Are there other activities nearby that

will affect the project?

The HSB RDS itself would not occupy undisturbed land or require energy, as a static rockfill feature. Haul trucks and heavy equipment (and thus fuel) would be used in the proposed activities, but the haul trucks would be moving the non-ore rock to one place or another (whether the YDTI or alternative rock disposal site). Water used to control fugitive emissions from hauling non-ore rock would similarly be used in hauling the rock to the YDTI or another disposal site, if not used during hauling to the RDS. Some water might also be used to control fugitive emissions during demolition and removal of the existing infrastructure. Pipestone rock would be needed for the foundation drain material and would be transported approximately 20 miles to the site before use. No other local resources would be used for this project.

A search was completed for DEQ regulated commercial activities or projects demanding the use of the limited environmental resources of land, water, air, or energy that would be impacted by the proposed project (internal DEQ ArcGIS layers).

DEQ regulated projects located near the proposed project site include:

- Five Hard Rock Mining Exploration License projects are located within five miles of the proposed project site. Three of these sites are exploration sites near or within the MR permit boundary and are part of the Exploration License held by MR.
- Two Hard Rock Small Mine Exclusion (SME) sites are located about four miles from the proposed project site.
- Three Opencut Mining sites are located within five miles of the proposed project site.
- Two sites for Air Quality registered portable facilities are located within five miles of the proposed project site.
- Several State Superfund (Water Quality Act/Voluntary Cleanup and Redevelopment Act / Comprehensive Environmental Cleanup and Responsibility Act) facilities are located within five miles of the proposed project site.

As noted in the cumulative impacts analysis below, this project would contribute to the continuation of impacts from mining in the broader permit area, although it would not extend the timeframe that mining occurs. All disturbance related to this project would be reclaimed at the conclusion of the project. Air quality impacts would be regulated through Air Quality regulations. No energy transmission infrastructure would be required by the projects in the area.

Direct Impacts:
Any impacts on the demand on environmental resources of land, water, air or energy would be short-term and negligible as a result of this project.

Secondary Impacts:
No secondary impacts to environmental resources of land, water, air, or energy are expected.

10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES

Are there other activities nearby that will affect the project?

DEQ searched the websites and databases offered by the following entities to identify nearby

activities that may affect, or be affected by, the proposed modification:

- Montana Department of Natural Resource and Conservation (DNRC);
- Montana Department of Transportation;
- Butte-Silver Bow County (consolidated city-county government);
- United States Department of Interior, Bureau of Land Management (BLM); and,
- United States Forest Service (USFS).

No other projects were identified when searching the above information resources.

Direct Impacts:
Based on the location of the HSB area within the current mine area, no direct impacts to other environmental resources are expected because of the proposed modification, nor are there other nearby projects that could result in direct impacts on the proposed activities.

Secondary Impacts:
No secondary impacts to other environmental resources are expected because of the proposed modification, nor are there other nearby projects that could result in secondary impacts on the proposed activities.

11. HUMAN HEALTH AND SAFETY

Will this project add to health and safety risks in the area?

The applicant would be required to adhere to all applicable state and federal safety laws. Industrial work such as the work proposed by the applicant is inherently dangerous. The Mine Safety and Health Administration (MSHA) has developed rules and guidelines to reduce the risks associated with this type of labor. No members of the general public would be in the HSB area during the proposed activities and during continued mine operations due to site access controls.

Regarding the health and safety of the nearby community, a potential failure of the YDTI and release of impounded solids and/or water is a low-likelihood, high-consequence event. As such, the stability of the YDTI embankments is a primary focus for the designs and ongoing monitoring implemented by the mine operator, with oversight from the EOR and IRP.

Direct Impacts:
No direct adverse impacts to human health and safety would result from the proposed modification, assuming that best practices and MSHA guidelines are followed during the proposed activities. Placing additional rockfill along the toe of YDTI would enhance embankment stability and provide a feature that can be reclaimed to a stable slope (3H:1V), thus reducing the likelihood of future embankment failure.

Secondary Impacts:
No secondary adverse impacts to human health and safety are expected because of the proposed project. Placing additional rockfill along the toe of YDTI would enhance embankment stability and provide a feature that can be reclaimed to a stable slope (3H:1V), thus reducing the likelihood of future embankment failure.

12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION

Will the project add to or alter these activities?

Direct Impacts:
As noted in the cumulative impacts analysis below, this proposed modification would allow an additional location for non-ore rock disposal, while enhancing the embankment stability of the upgradient TSF. This activity consists of selective rockfill placement that aligns with currently approved mining and reclamation methods, but the duration of mining production is not contingent upon placement of rockfill in the HSB area. Reclamation of the HSB RDS will be completed within two years of final rock placement unless subsequent stages are permitted or in the permitting process, in which case reclamation will be completed following cessation of rock placement. Given the central location of the HSB area within the active mine operation, there would be no direct impacts on other industrial, commercial, and agricultural activities and production in the area.

Secondary Impacts:
No secondary impacts to industrial, commercial, and agricultural activities and production are expected because of the proposed modification.

13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT

Will the project create, move or eliminate jobs? If so, estimated number.

Mining and reclamation activities would continue in accordance with the approved operating permit and the proposed rock disposal site would have no positive or negative impacts on the quantity and distribution of employment.

Direct Impacts:
The proposed activity would allow an additional location for non-ore rock disposal, while enhancing the embankment stability of the upgradient TSF. This activity consists of selective rockfill placement that aligns with currently approved mining and reclamation methods, but the duration of mining production is not contingent upon placement of rockfill in the HSB area. The proposed activity would have no effect on employment, which fluctuated seasonally between 390 and 405 employees in 2021. Although MR's workforce may fluctuate on a seasonal and annual basis, the operation has typically employed between 350 and 400 employees and on-site contractors since 2010.

Secondary Impacts:
No secondary impacts to the quantity and distribution of employment are expected because of the proposed activity.

14. LOCAL AND STATE TAX BASE AND TAX REVENUES

Will the project create or eliminate tax revenue?

Mining and reclamation activities would continue in accordance with the approved operating permit and the proposed rock disposal site would not result in changes to potential tax revenue from the current levels.

Direct Impacts:
The proposed activity would allow an additional location for waste rock disposal, while enhancing the embankment stability of the upgradient TSF. This activity consists of selective rockfill placement that aligns with currently approved mining and reclamation methods, but the duration of mining production is not contingent upon placement of rockfill in the HSB area. The proposed activity would not change the potential tax revenue from current levels, which includes property taxes, metal mine license taxes, employment, and the purchase of goods and services.

Secondary Impacts:
No secondary impacts to the local and state tax base and tax revenues would be expected because of the proposed activity.

15. DEMAND FOR GOVERNMENT SERVICES

Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc.) be needed?

Mining and reclamation activities would continue in accordance with the approved operating permit. The proposed rock disposal site is centrally located within the permit area on previously disturbed ground and there would be no effect on traffic or existing roads, nor would the proposed rock disposal affect the need for government services beyond the current levels.

Direct Impacts:
The proposed activity would occur on private land and it would allow an additional location for waste rock disposal, while enhancing the embankment stability of the upgradient TSF. This activity consists of selective rockfill placement in the HSB area, which is centrally located within the permit area on previously disturbed ground. Internal haul truck and equipment traffic would increase in this area during drain construction and rockfill placement. There would be a short-term increase in traffic on publicly accessible roads from the trucks bringing rock from the Pipestone Quarry to the mine permit area, similar to the activities that took place in 2019-2020 for the rock used to construct the WED. The impacts from additional truck traffic would be minor and short-term. There would be no other changes to road conditions on the nearest publicly accessible roads (Continental Drive/Shields Avenue), which are located outside the permit area.

As noted elsewhere, the proposed activity would result in no changes to the quantity and distribution of employment, no expansion of the permit area, nor extension to the duration of mine production. Therefore, no impacts would occur to the current needs for government services that are provided in Butte-Silver Bow County (BSB), like emergency response, law enforcement, or education.

Secondary Impacts:
No secondary impacts to traffic, roads, or the demand for government services are expected because of the proposed activity.

16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS

Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?

BSB updated their Growth Policy in 2008, providing a set of goals, objectives, and implementation strategies that address land use and growth trends. Most of the objectives for natural and cultural resources are regulated by other agencies through their statutes and regulatory programs. MR has addressed noxious weed management by developing a weed management plan that has been approved by BSB. (Montana Resources, 2021)

As part of the land use growth policy, BSB prepared a map of land uses. Active mine areas are designated as "industrial." Areas peripheral to the mine are mapped as:

- residential, open space, and transportation (I-15) east of the mine;
- commercial and residential south the of the mine;
- commercial, residential, and open space west of the mine; and
- open space and residential north of the mine.

The Growth Policy states that reclamation plans for mining operations reflect a land use compatible with adjoining land uses. The Growth Policy makes it clear that "a growth policy is not a regulatory document" and BSB must rely on implementing instruments such as zoning ordinances to achieve goals and objectives. Mining operations permitted by the State are not regulated by BSB's zoning ordinance at Title 17 (Code of Ordinances).

The most relevant management plan that applies to the HSB area is the Consent Decree for the BMFOU. EPA and DEQ regulate how the PRPs manage waters that enter and may eventually leave the Berkeley Pit and maintaining ground water levels in and around the BMFOU to ensure that mine-affected waters are managed and treated, if necessary, to meet water quality standards before they are discharged. The monitoring and management of groundwater in the BMFOU includes the Continental Mine site, and long-term treatment of waters that leave the mine site, whether from the Berkeley Pit, Continental Pit, or the Horseshoe Bend.

As explained earlier, EPA issued a decision document in 2001 which adjusted boundaries between the BMFOU and the BAMAOU and announced EPA's intent to refrain from taking Superfund action at the BAMAOU and to defer to State mine permit actions for environmental cleanup of that area. DEQ's Mining Bureau consults and coordinates with EPA, but the operating permit issued under the Metal Mine Reclamation Act (MMRA) and associated performance bond do not address water management that falls under Superfund activities.

MR's proposed permit modification and the action alternatives will be evaluated for consistency with existing agreements and regulatory stipulations under Superfund and the Consent Decree.

Direct Impacts:
There would be no direct impacts to aspects of the BSB Growth Policy or existing zoning requirements. As described earlier, the construction of the underlying drainage system and the HSB RDS would not adversely impact the quantity or quality of water that is collected in the HSB area. There would therefore be no direct impacts on the management and treatment of water that is required under the existing agreements and regulatory stipulations for the BMFOU Consent Decree.

Secondary Impacts:

No secondary impacts to locally adopted environmental plans and goals are expected because of the proposed modification. The drainage system that would be constructed under the RDS would continue to convey seepage beyond mine life, allowing the long-term management and treatment of water to continue under the requirements of the BMFOU Consent Decree.

17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES

Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract?

The proposed activity would occur entirely on private land, within the central portion of the active mine permit. There is no public access through the mine permit or the HSB area, and there are no designated wilderness areas or recreational opportunities in the vicinity of the HSB area. The nearest public land accessible for recreation is the Beaverhead-Deerlodge National Forest, located approximately 3.5 miles to the north of the HSB area.

Direct Impacts:
Based on the location of the proposed modification and the lack of public roads or trails, no impacts to the access or quality of recreational and wilderness activities would result from the proposed modification.

Secondary Impacts:
No secondary impacts to access and quality of recreational and wilderness activities are expected because of the proposed modification.

18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING

Will the project add to the population and require additional housing?

Mining and reclamation activities would continue in accordance with the approved operating permit and the proposed rock disposal site would have no positive or negative impacts on the density and distribution of population and housing.

Direct Impacts:
The county had a population of 35,133 at the 2020 census. The proposed activity would occur on private land and it would allow an additional location for waste rock disposal, while enhancing the embankment stability of the upgradient TSF. This activity consists of selective rockfill placement in the Horseshoe Bend area, which is centrally located within the permit area on previously disturbed ground. As noted elsewhere, the proposed activity would result in no changes to the quantity and distribution of employment, no expansion of the permit area, nor extension to the duration of mine production. Therefore, no changes would occur to the density and distribution of population and housing beyond current levels.

Secondary Impacts:
No secondary impacts to density and distribution of population or housing are expected because of the proposed modification.

19. SOCIAL STRUCTURES AND MORES

Is some disruption of native or traditional lifestyles or communities possible?

Approximately 2.4% of the population in the county identified as Native American in the 2020 census. There are no native or traditional communities in the vicinity of the proposed modification in the HSB area.

Direct Impacts:
The proposed modification would occur entirely on private land, within the central portion of the active mine permit. No impact to native or traditional communities are expected from this project, and no impacts to native or traditional lifestyles are expected from this project, beyond what has already occurred through over a century of historic mining.

Secondary Impacts:
No secondary impacts to native or traditional lifestyles, communities, social structures, and mores are expected because of the proposed modification.

20. CULTURAL UNIQUENESS AND DIVERSITY

Will the action cause a shift in some unique quality of the area?

The Continental Mine complex, including the HSB area, overlaps with areas that have been disturbed by mining activity for over 100 years. Portions of the historic mining landscape have been preserved in a disturbed (unreclaimed) status as part of the GMMIA, which was established directly west of the active mine permit.

Direct Impacts:
The proposed modification is within an active mine permit, within a historic mining district. Certain areas of the legacy mining landscape are being preserved as disturbed surfaces. Although the HSB RDS would ultimately be reclaimed, this feature would be located to the east of the GMMIA and would not impact the unique quality of the historic mining landscape. No direct impacts to cultural uniqueness and diversity are expected from this proposed modification.

Secondary Impacts:
No secondary impacts to cultural uniqueness and diversity are expected as a result of the proposed modification.

21. PRIVATE PROPERTY IMPACTS

Are we regulating the use of private property under a regulatory statute adopted pursuant to the police power of the state? (Property management, grants of financial assistance, and the exercise of the power of eminent domain are not within this category.) If not, no further analysis is required. Does the proposed regulatory action restrict the use of the regulated person's private property? If not, no further analysis is required. Does the agency have legal discretion to impose or not impose the proposed restriction or discretion as to how the restriction will be imposed? If not, no further analysis is required. If so, the agency must determine if there are alternatives that would reduce, minimize or eliminate the restriction on the use of private property, and analyze such alternatives.

The proposed project would take place on private land owned by the applicant. DEQ's approval of the proposed modification would affect the applicant's real property. DEQ has determined, however, that the permit conditions are reasonably necessary to ensure compliance with applicable requirements under the MMRA and demonstrate compliance with those requirements or have been agreed to by the applicant. Therefore, DEQ's approval of this permit modification would not have private property-taking or damaging implications.

Montana's Private Property Assessment Act, Section 2-10-101, et seq., MCA establishes an orderly and consistent internal management process for state agencies to evaluate their proposed actions under the "Takings Clauses" of the United States and Montana Constitutions, as those clauses are interpreted and applied by the United States and Montana Supreme Courts.

Section 2-10-104, MCA required Montana's Attorney General to develop guidelines, including a checklist, to assist state agencies in identifying and evaluating proposed agency actions that may result in the taking or damaging of private property. In turn, Section 2-10-105(1) and (2), MCA set out a process for each State Agency to evaluate whether a State action may result in an unconstitutional taking of private property. Those provisions direct that:

> (1) Each state agency shall assign a qualified person or persons in the state agency the duty and authority to ensure that the state agency complies with this part. Each state agency action with taking or damaging implications must be submitted to that person or persons for review and completion of an impact assessment. The state agency may not take the action unless the review and impact assessment have been completed, except that the action with taking or damaging implications may be taken before the review and impact assessment are completed if necessary to avoid an immediate threat to public health or safety.
> (2) Using the attorney general's guidelines and checklist, the person shall prepare a taking or damaging impact assessment for each state agency action with taking or damaging implications that includes an analysis of at least the following:
> (a) the likelihood that a state or federal court would hold that the action is a taking or damaging;
> (b) alternatives to the action that would fulfill the agency's statutory obligations and at the same time reduce the risk for a taking or damaging; and,
> (c) the estimated cost of any financial compensation by the state agency to one or more persons that might be caused by the action and the source for payment of the compensation.

DEQ has utilized the Montana Attorney General's Checklist and analytical Flowchart revised in January 2011 to evaluate the legal impact to property rights resulting from the proposed modification (Attachments A and B). These flowchart questions have been applied by DEQ to the proposed project area, which takes place on private real property owned by the Permittee, MR, as follows:

(1) Does the action pertain to land or water management or environmental regulation affecting private real property or water rights? Answer: Yes.
(2) Does the action result in either a permanent or indefinite physical occupation of private property? Answer: No.

(3) Does the action deprive the owner of all economically beneficial use of the property? Answer: No.
(4) Does the action require a property owner to dedicate a portion of property or to grant an easement? Answer: No.
(5) Does the action deny a fundamental attribute of ownership? Answer: No.
(6) Does the action have a severe impact on the value of the property? Answer: No.
(7) Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally? Answer: No.

Given the results from the legal flowchart questions, DEQ has determined that the permit conditions are reasonably necessary to ensure and demonstrate compliance with applicable requirements of the MMRA, Section 82-4-301, *et seq.*, MCA, and have been sought by the Applicant and private property Owner. Therefore, no taking or damaging of private property rights will occur because of DEQ's approval of the modification proposed by the private property Owner, MR.

22. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES

Due to the location and nature of the proposed modification, the limited spatial extent, and the limited project duration, no further direct or secondary impacts are anticipated from this proposed modification.

ALTERNATIVES CONSIDERED

In addition to the proposed action, DEQ also considered a No Action Alternative, under which DEQ would deny the approval of the proposed modification to Hard Rock Mine Operating Permit No. 00030. The no action alternative forms the baseline from which the impacts of the Proposed Action can be measured.

Under the No Action Alternative, MR would lack the authority to construct the HSB RDS, but other mining activities would be authorized to continue under the current permit conditions. This means that any non-ore rock would be disposed in alternate locations, which may include the North RDS and Great Northern RDS, as approved in Major Amendment 010. Although the North RDS would be located adjacent to the North-South Embankment of YDTI, it would not provide enhanced stability along the segment of the impoundment with the maximum embankment height (East-West Embankment), directly upgradient from the HSB area. The Great Northern RDS is located to the southeast of YDTI and additional rock added to the RDS would not enhance YDTI stability.

Under the No Action Alternative, the slope directly above the HSB area would remain at a steep angle (2H:1V) and would be covered with rip-rap during reclamation. This contrasts to the Proposed Action, where the RDS and embankment slope would be graded to 3H:1V, covered with soil, and revegetated. As a result, the No Action Alternative would include greater visual contrasts on this segment of the impoundment through using rocks without vegetation, and it would have a greater potential for erosion and meteoric infiltration along the rip-rap slope.

In the absence of the foundation drainage layer and rock drains in the Proposed Action, seepage within the HSB area would still be collected for management and treatment under Superfund requirements under the No Action Alternative. However, the flow sources would be more diffuse

and emanate through a variety of geologic materials throughout the HSB area. Over long time periods, these materials would weather and degrade, with a potential decrease in hydrologic transmissivity. The Proposed Action would allow the flows to be captured through a centralized conveyance system, constructed from offsite materials that are more durable and less likely to degrade with time.

In addition to the Proposed Action Alternative and the No Action Alternative, DEQ would usually consider an additional action alternative that incorporates mitigation measures identified by DEQ during preparation of the draft EA. However, in this instance DEQ engaged in a lengthy and in-depth evaluations of the Proposed Action with the applicant, EOR, and IRP prior to the initiation of the environmental review for the permit modification. DEQ issued review comments on the HSB RDS Stage 1 Drainage Design Report, which were addressed in the permit modification application and supplemental documents, thus being incorporated into the Proposed Action Alternative.

PREFERRED ALTERNATIVE

ARM 17.4.617(9) requires DEQ to identify in a draft environmental assessment the agency's preferred alternative, if any, and the reasons for the preference. DEQ identifies the Proposed Action as the preferred alternative. Approval of the Proposed Action would be consistent with Montana's Air and Water Quality Acts and provide reclamation that is acceptable under the MMRA. The Proposed Action would not result in significant environmental impacts.

PUBLIC INVOLVEMENT

For a minor amendment, DEQ shall not implement the application, notice and hearing requirements for new permits or major amendments, pursuant to Sections 82-4-337 and 82-4-353, MCA. The department shall provide the permittee with a notice of decision on the adequacy of the minor amendment application within 30 days of receipt of the application (ARM 17.24.119(4)). The decision notice and Final EA will be available to the public through the DEQ website, although there will not be a comment period associated with the Final EA.

Internal review of the environmental assessment document was completed by DEQ staff. The internal review included queries to the following websites/databases/personnel:

- Montana State Historic Preservation Office (SHPO);
- Montana Department of Natural Resource and Conservation (DNRC);
- Montana Department of Environmental Quality (DEQ);
- Montana Department of Transportation;
- Butte-Silver Bow County (BSB);
- US Geological Society – Stream Stats;
- Montana Natural Heritage Program;
- Montana Cadastral Mapping Program;
- Montana Groundwater Information Center (GWIC);
- Montana Bureau of Mines and Geology; and,
- United States Forest Service (USFS).

OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION

The proposed project would be fully located on private land. All applicable state and federal rules

must be adhered to, which may also include other state, federal, or tribal agency jurisdiction. The Consent Decree for the BMFOU and the roles of EPA and DEQ to oversee the requirements established under Superfund are described elsewhere in this document.

CUMULATIVE IMPACTS

Cumulative impacts are the collective impacts on the human environment within the borders of Montana when considered in conjunction with other past and present actions related to the Proposed Action by location and generic type. Related future actions must also be considered when these actions are under concurrent consideration by any state agency through pre-impact statement studies, separate impact statement evaluation, or permit processing procedures. DEQ identified other current mining or exploration projects in the area. DEQ-regulated projects located near the proposed project site include:

- Five Hard Rock Mining Exploration License projects are located within five miles of the proposed project site. Three of these sites are exploration sites near or within the MR permit boundary that are part of the Exploration License held by MR, and all associated disturbances have been reclaimed except for access roads to the north of YDTI.
- Two Hard Rock Small Mine Exclusion (SME) sites are located about four miles from the proposed project site.
- Three Opencut Mining sites are located within five miles of the proposed project site.
- Two sites for Air Quality registered portable facilities are located within five miles of the proposed project site.
- Several State Superfund (Water Quality Act/Voluntary Cleanup and Redevelopment Act / Comprehensive Environmental Cleanup and Responsibility Act) facilities are located within five miles of the proposed project site.
- Many state-designated abandoned mine locations are located within five miles of the project site.

No DNRC, BLM, or USFS regulated projects were identified in the project vicinity. There are no known future projects that are under concurrent consideration by any state agency through pre-impact statement studies, separate impact statement evaluation, or permit processing procedures. Although MR may develop future expansions to the HSB RDS and YDTI facility, those designs have not been developed or submitted to the DEQ regulatory program, and further evaluation of potential environmental impacts would be conducted at that time.

This environmental review analyzes the proposed project submitted by the applicant. Impacts from the proposed modification would be primarily beneficial, disturbances would be reclaimed at the conclusion of the project, and the limited extent of the HSB RDS would not contribute to the long-term cumulative effects of other mining or remedial activities in the area. Final reclamation of the HSB RDS would be required within two years of final rock placement unless subsequent stages are permitted or in the permitting process, in which case reclamation would be completed following cessation of rock placement. The foundation drainage layer and rock drain system would convey future seepage from flow sources that already exist in the HSB area, without impacting the downstream water management and treatment activities required under Superfund.

NEED FOR FURTHER ANALYSIS AND SIGNIFICANCE OF POTENTIAL IMPACTS

When determining whether the preparation of an environmental impact statement is needed, DEQ

is required to consider the seven significance criteria set forth in ARM 17.4.608, which are as follows:

1. The severity, duration, geographic extent, and frequency of the occurrence of the impact;
2. The probability that the impact will occur if the proposed action occurs; or conversely, reasonable assurance in keeping with the potential severity of an impact that the impact will not occur;
3. Growth-inducing or growth-inhibiting aspects of the impact, including the relationship or contribution of the impact to cumulative impacts;
4. The quantity and quality of each environmental resource or value that would be affected, including the uniqueness and fragility of those resources and values;
5. The importance to the state and to society of each environmental resource or value that would be affected;
6. Any precedent that would be set as a result of an impact of the proposed action that would commit the department to future actions with significant impacts or a decision in principle about such future actions; and,
7. Potential conflict with local, state, or federal laws, requirements, or formal plan.

DEQ has not identified any significant impacts associated with the proposed activities on the environmental resources discussed above. Approval of Minor Amendment 011 to Operating Permit No. 00030 does not set any precedent that commits DEQ to future actions with significant impacts or a decision in principle about such future actions. If the applicant submits another license or an operating permit or amendment application, DEQ is not committed to issuing those authorizations. DEQ would conduct an environmental review for any subsequent authorizations sought by the applicant that require environmental review. DEQ would make a permitting decision based on the criteria set forth in the Metal Mine Reclamation Act. Approval of this Minor Amendment 011 to Operating Permit No. 00030 does not set a precedent for DEQ's review of other applications for operating permits or operating permit amendments, including the level of environmental review. The level of environmental review decision is made based on a case-specific consideration of the criteria set forth in ARM 17.4.608.

Finally, DEQ does not believe that the proposed mine activities by the applicant have any growth-inducing or growth-inhibiting aspects or conflict with any local, state, or federal laws, requirements, or formal plans.

Based on a consideration of the criteria set forth in ARM 17.4.608, the proposed mine activities are not predicted to significantly impact the quality of the human environment. Therefore, preparation of an environmental assessment is determined to be the appropriate level of environmental review under MEPA.

Environmental Review Prepared By:
Garrett Smith, Mining Environmental Scientist- Geochemist
Millie Olsen, Reclamation Specialist
Hard Rock Mining Section
Mining Bureau

Environmental Assessment Reviewed By:
Craig Jones, MEPA-MFSA Coordinator

Tommy Butler, Attorney
Mining Bureau

Approved by:

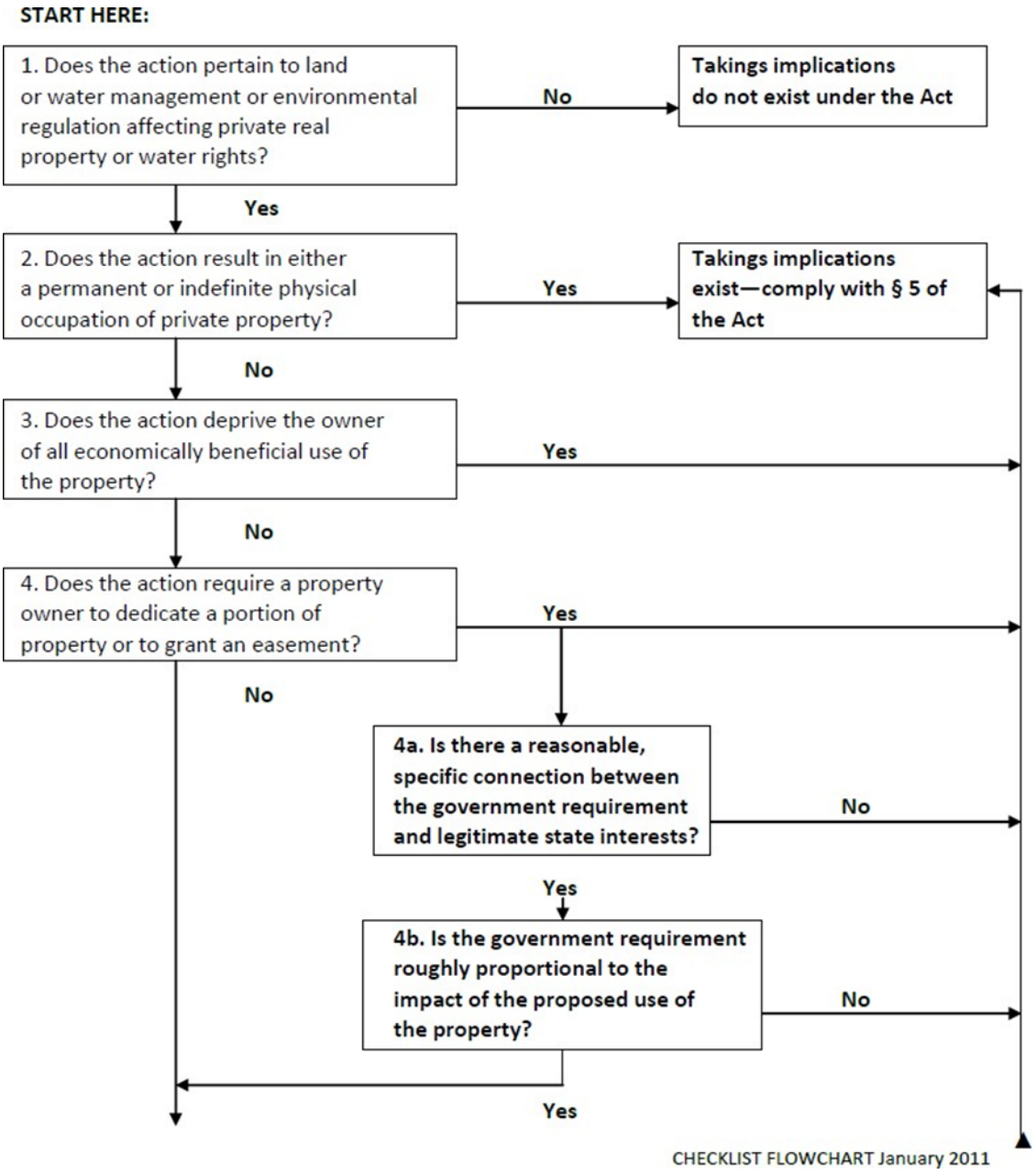
7/14/2022

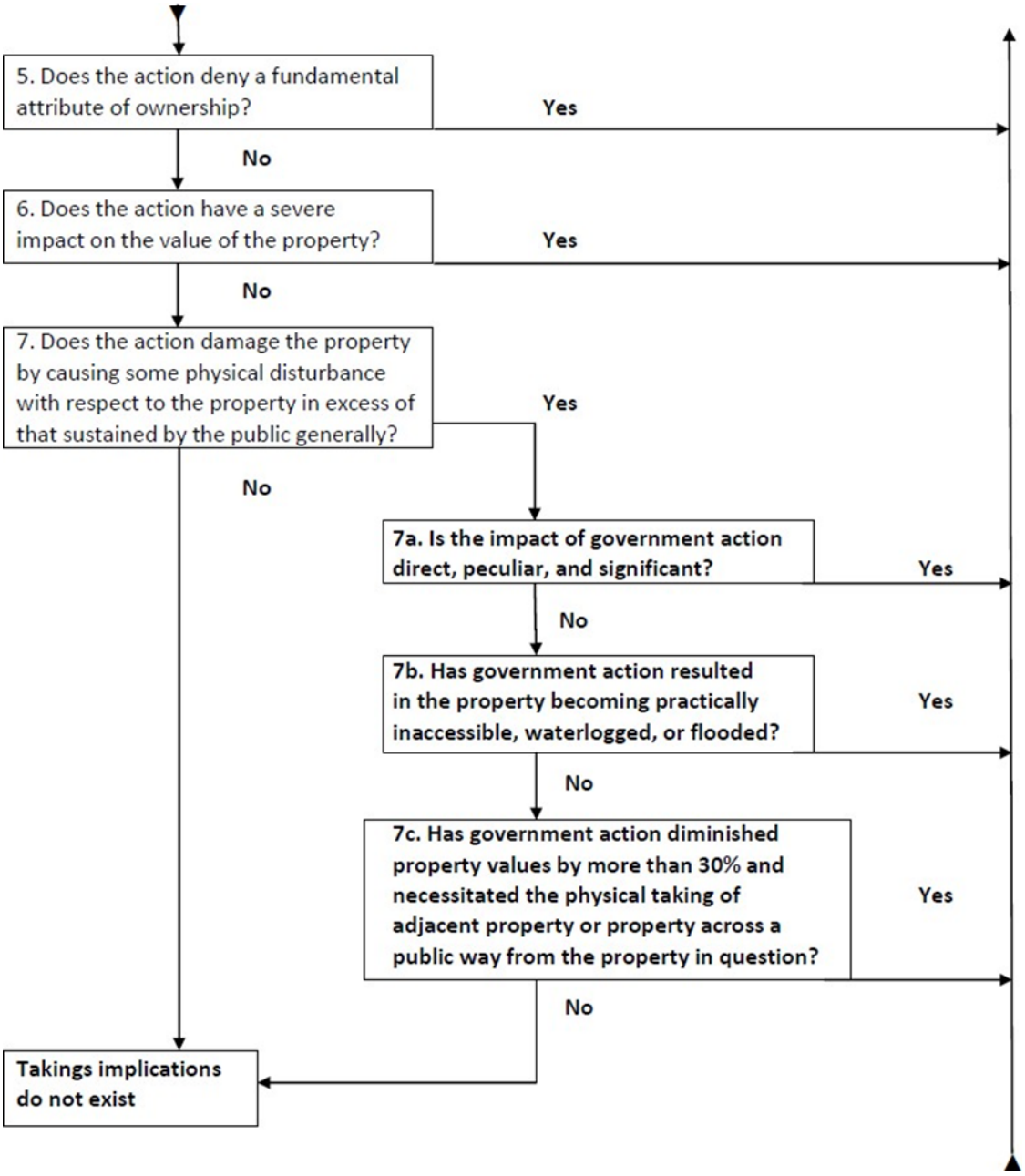
Signature
Date

Eric Dahlgren, Hard Rock Mining Section Supervisor
Mining Bureau

ATTACHMENT A
Montana Department of Justice
PRIVATE PROPERTY ASSESSMENT ACT CHECKLIST FLOWCHART
(January 2011)

Does the proposed agency action have takings implications under the Private Property Assessment Act?




5. Does the action deny a fundamental attribute of ownership?
Yes
No
6. Does the action have a severe impact on the value of the property?
Yes
No
7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
Yes
No
7a. Is the impact of government action direct, peculiar, and significant?
Yes
No
7b. Has government action resulted in the property becoming practically inaccessible, waterlogged, or flooded?
Yes
No
7c. Has government action diminished property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
Yes
No
Takings implications do not exist

ATTACHMENT B

Montana Department of Justice

PRIVATE PROPERTY ASSESSMENT ACT CHECKLIST

(January 2011)

Does the proposed agency action have takings implications under the private propertyassessment act?

YES	NO	
_____	_____	1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
_____	_____	2. Does the action result in either a permanent or indefinite physical occupation of private property?
_____	_____	3. Does the action deprive the owner of all economically beneficial use of the property?
_____	_____	4. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If the answer is **NO**, skip questions 4a and 4b and continue with question 5.]
_____	_____	4a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
_____	_____	4b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
_____	_____	5. Does the action deny a fundamental attribute of ownership?
_____	_____	6. Does the action have a severe impact on the value of the property?
_____	_____	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally? [If the answer is **NO**, do not answer questions 7a-7c.]

_____ _____ 7a. Is the impact of government action direct, peculiar, and significant?

_____ _____ 7b. Has government action resulted in the property becoming practically inaccessible, waterlogged, or flooded?

_____ _____ 7c. Has government action diminished property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?

Taking or damaging implications exist if **YES** is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 5, 6, 7a, 7b, 7c; or if **NO** is checked in response to questions 4a or 4b.

If taking or damaging implications exist, the agency must comply with Section 5 of the Private Property Assessment Act, Mont. Code Ann. § 2-10-105, to include the preparation of a taking or damaging impact assessment. Normally, the preparation of an impact assessment will require consultation with agency legal staff.

ATTACHMENT C
REFERENCES

Attorney General (Montana), 1977. Opinions of the Attorney General, Volume No. 37 Opinion No.27. Hard Rock Mining Act - Grandfather Clause, Facilities Constructed Prior To Effective Date Of The Act. Dated May 24, 1977

Dames and Moore, 1963. Report of Development of Design and Construction Criteria – Proposed Tailings Pond: Butte, Montana. Prepared for the Anaconda Company. Salt Lake City, Utah. Dated January 7, 1963.

DEQ, 2019. Final EIS. Final Environmental Impact Statement for the Proposed Amendment to Permits 00030 and 00030A for the Continental Mine: Expansion of the Yankee Doodle Tailings Impoundment and Associated Facilities. August 13, 2019

Consent Decree for the Butte Mine Flooding Site, 2002. US District Court, District of Montana, Butte Division.

EPA, 2018. Superfund Site: Silver Bow Creek Butte Area, Butte, Montana. October 12. https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup &id=0800416#bkground.

EPA and DEQ, 2001. Decision document regarding deferral by EPA to State authority for the Butte Active Mining Area Operable Unit, Silver Bow Creek/ Butte area (Butte portion) NPL site. Decision Document, Helena, Montana: US Environmental Protection Agency.

EPA and DEQ, 2002. Explanation of significant differences: Butte mine flooding operable unit Silver Bow Creek/ Butte area NPL site. Butte-Silver Bow County, Montana. Helena: US Environmental Protection Agency.

Houston, R., 2001. Geology and structural history of the Butte district, Montana. unpublished Masters thesis, Corvallis, Oregon; Oregon State University.

Independent Review Panel (IRP), 2017. Report of the Independent Review Panel, Design Document for Expansion of Yankee Doodle Tailings Impoundment. Dated November 20, 2017.

Independent Review Panel (IRP), 2018. Report of the Independent Review Panel, Design Document for Expansion of Yankee Doodle Tailings Impoundment, Update Number 1. Dated June 16, 2018.

Independent Review Panel (IRP), 2021. Memo Responding to Horseshoe Bend Rock Disposal Site: Stage 1 Drainage System Report (Knight Piesold, December 6, 2021). Dated December 17, 2021

Knight Piésold Ltd (KP), 2015. West Embankment Drain External Borrow Sources, YDTI Site Characterization Report, KP Ref. No. VA15-03359, dated November 2015.

Knight Piésold Ltd. (KP) 2017, Yankee Doodle Tailings Impoundment – Site Characterization Report, KP Ref. No. VA101-126/14-2 Rev. 2, dated August 11, 2017.

Knight Piésold Ltd. (KP), 2018a. Yankee Doodle Tailings Impoundment – 2017 Geotechnical Site Investigation Report, KP Ref. No. VA101-126/16-2 Rev. 0, dated May 2, 2018.

Knight Piésold Ltd. (KP), 2018b. Yankee Doodle Tailings Impoundment –Construction Management Plan, KP Ref . No. VA101-126/12-5 Rev. 3, dated May 1, 2018.

Knight Piésold Ltd. (KP), 2019a. Yankee Doodle Tailings Impoundment – 2018 Embankment Geotechnical Site Investigation, KP Ref. No. VA101-126/19-1 Rev. 0, dated May 22, 2019.

Knight Piésold Ltd. (KP), 2019b. Yankee Doodle Tailings Impoundment – 2018 Horseshoe Bend Geotechnical Site Investigation, KP Ref. No. VA101-126/20-1 Rev. 0, dated May 27, 2019.

Knight Piésold Ltd. (KP), 2020a. Yankee Doodle Tailings Impoundment – 2019 Embankment Geotechnical Site Investigation, KP Ref. No. VA101-126/21-1 Rev. 0, dated July 16, 2020.

Knight Piésold Ltd. (KP), 2020b. Yankee Doodle Tailings Impoundment – 2019 Horseshoe Bend Geotechnical Site Investigation, KP Ref. No. VA101-126/22-1 Rev. 0, dated December 1, 2020.

Knight Piésold Ltd. (KP), 2021a. Horseshoe Bend Rock Disposal Site, Stage 1 Drainage System Report. KP Ref. No. VA101-126/25-3 Rev. 0, Dated December 6, 2021.

Knight Piésold Ltd. (KP), 2021b. Yankee Doodle Tailings Impoundment – 2020 Data Analysis Report, KP Ref . No. VA101-126/23-5 Rev. 0, dated June 30, 2021.

Knight Piésold Ltd. (KP), 2021c. Yankee Doodle Tailings Impoundment – 2020 Embankment Geotechnical Site Investigation, KP Ref. No. VA101-126/23-4 Rev. 0, dated October 22, 2021.

Montana Resources, 2018. Montana Resources Continental Mine Operations Plan. February 2017; Revised February 2018. Butte: Montana Resources, LLP.

Montana Resources, 2021. Montana Resources Continental Mine Operations Plan. December 2021. Butte: Montana Resources, LLP.

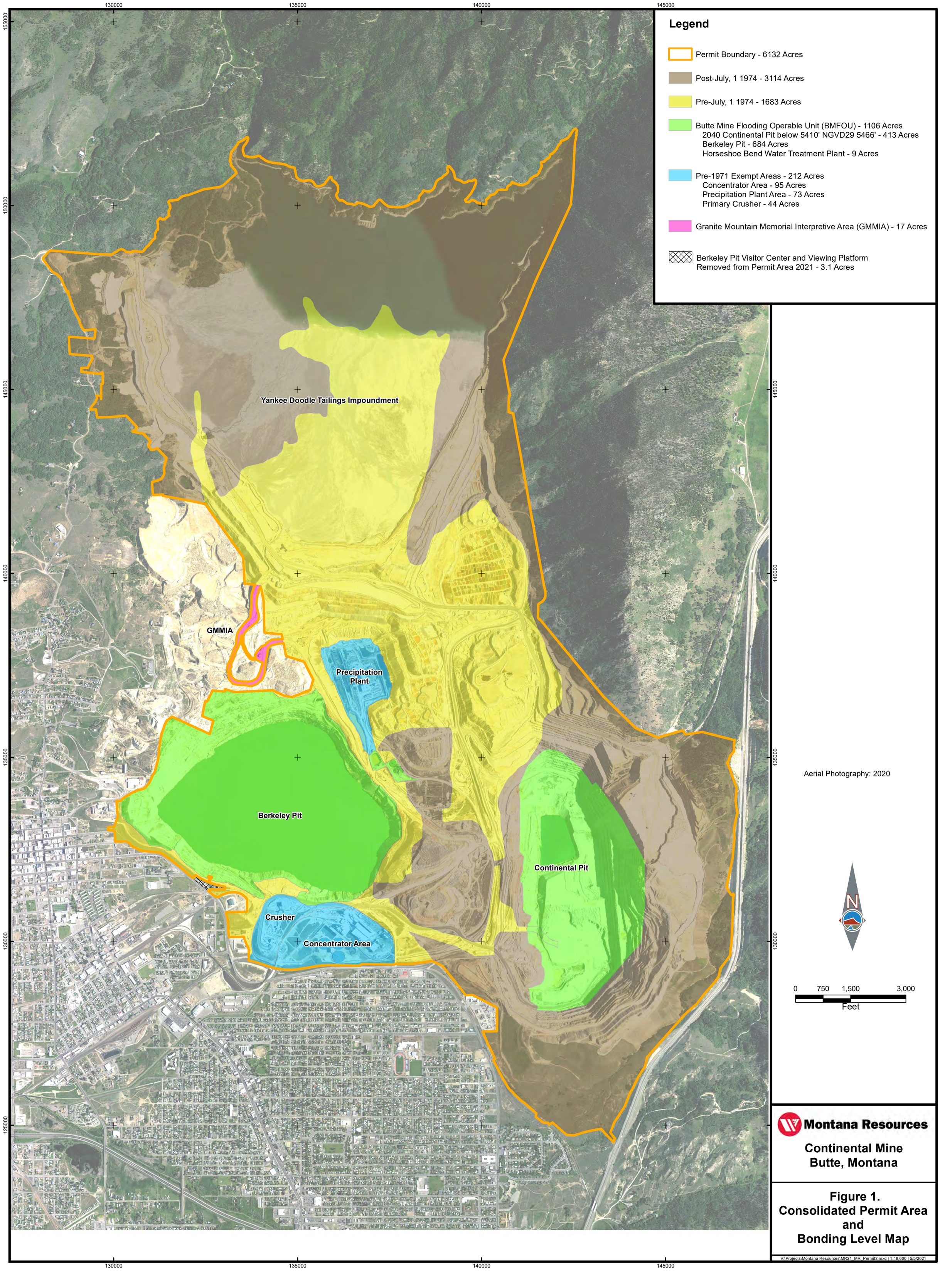
ATTACHMENT D
LARGE FORMAT FIGURES

Figure 1. Hard Rock Mine Operating Permit No. 00030- Permit Boundary and Bonding Levels (Montana Resources, 2021 Permit Consolidation).

Figure 2. Proposed Horseshoe Bend Rock Disposal Site (Westech, 2022- MR Permit Modification Application)

Figure 4. Horseshoe Bend Area Water Management Facilities (KP, 2021a)

Figure 6. Phased Construction Sequence for Proposed Modification (KP, 2021a)

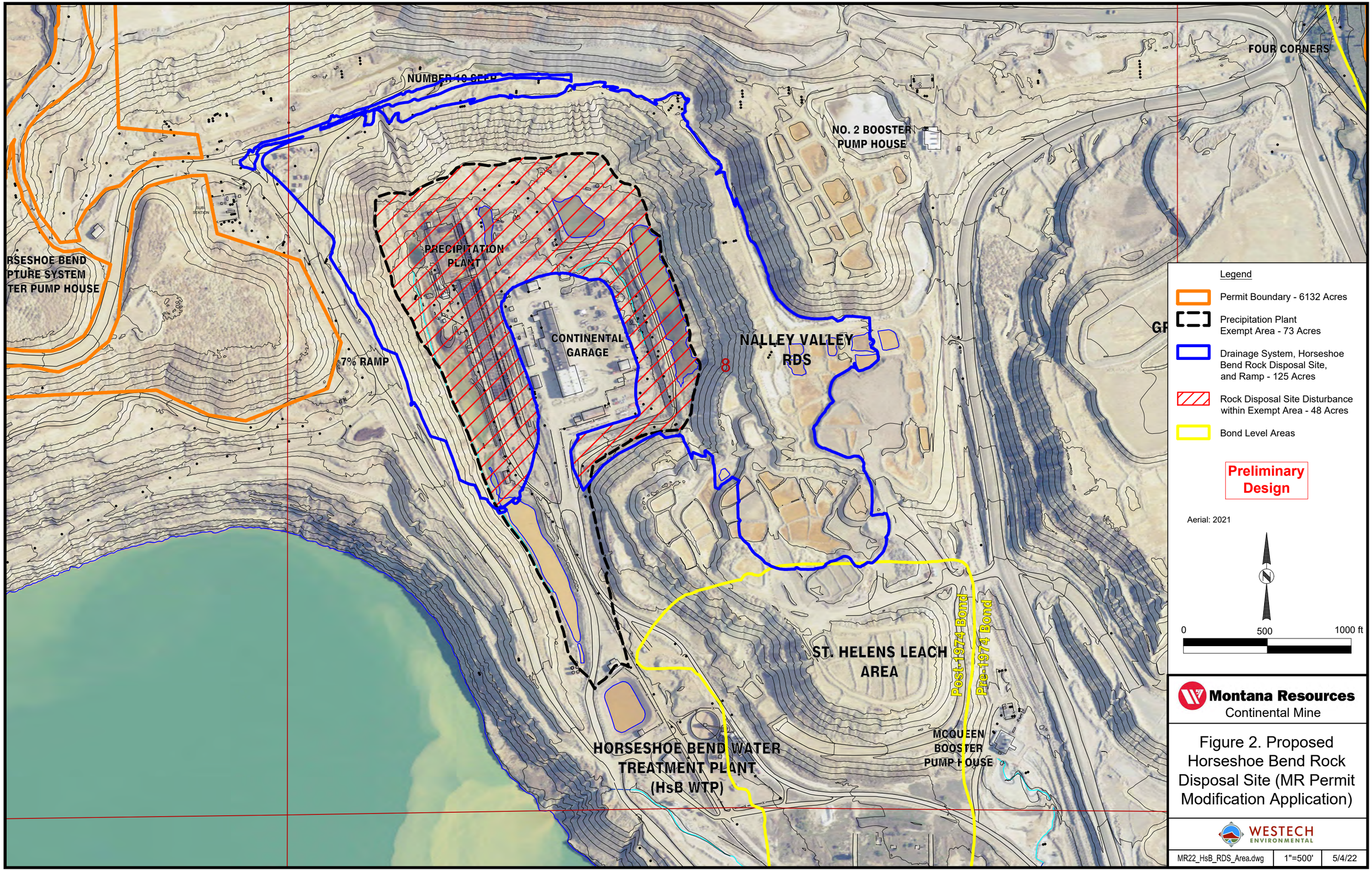


Montana Resources

Continental Mine
Butte, Montana

Figure 1.
Consolidated Permit Area and Bonding Level Map

V:\Projects\Montana Resources\MR21_MR_Permit2.mxd | 1:18,000 | 5/5/2021



Legend

- Permit Boundary - 6132 Acres
- Precipitation Plant Exempt Area - 73 Acres
- Drainage System, Horseshoe Bend Rock Disposal Site, and Ramp - 125 Acres
- Rock Disposal Site Disturbance within Exempt Area - 48 Acres
- Bond Level Areas

Preliminary Design

Aerial: 2021

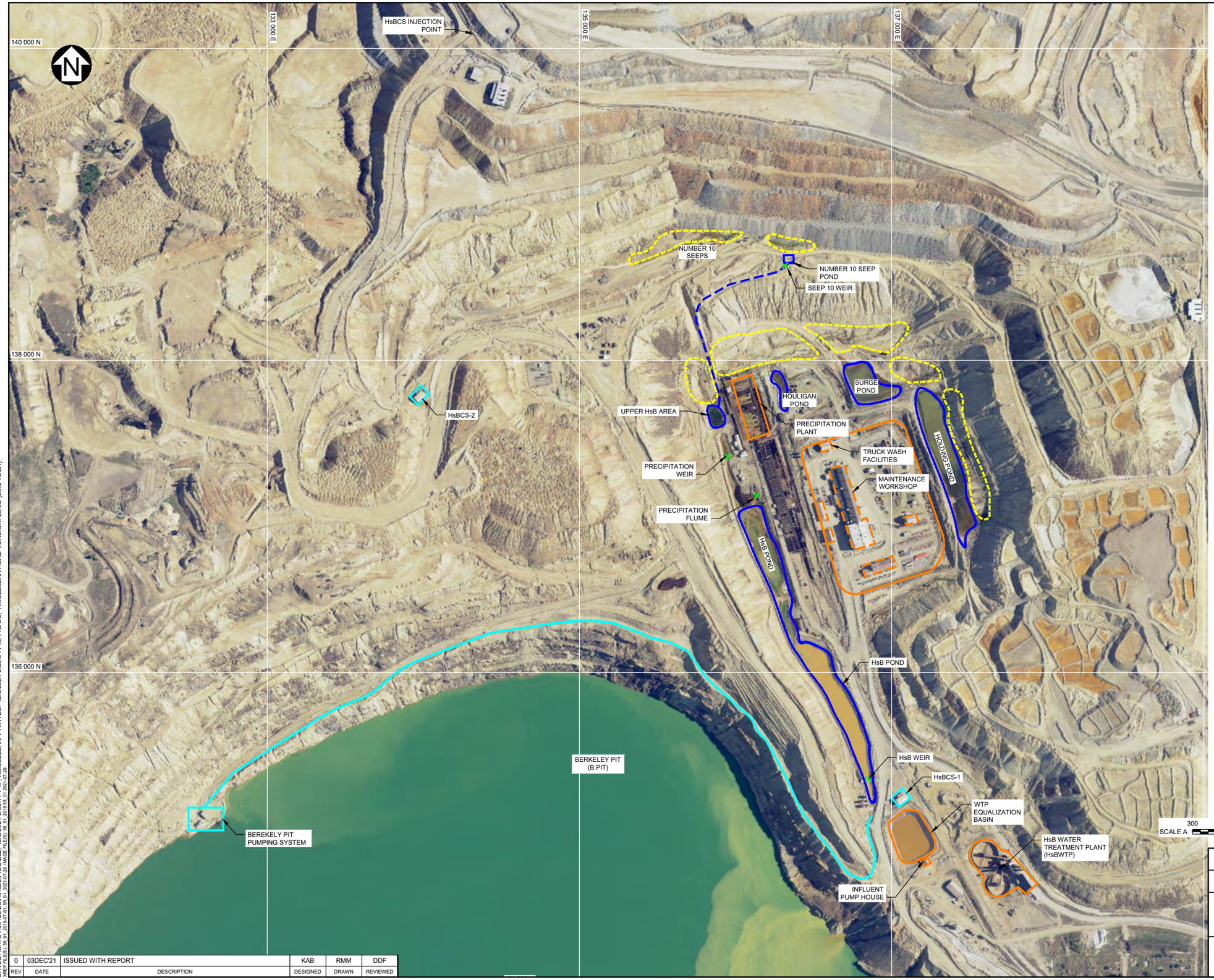
0 500 1000 ft

Montana Resources
Continental Mine

Figure 2. Proposed Horseshoe Bend Rock Disposal Site (MR Permit Modification Application)

WESTECH ENVIRONMENTAL

MR22_HsB_RDS_Area.dwg	1"=500'	5/4/22



REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	03DEC'21	ISSUED WITH REPORT	KAB	RMM	DDF

MONTANA RESOURCES, LLP

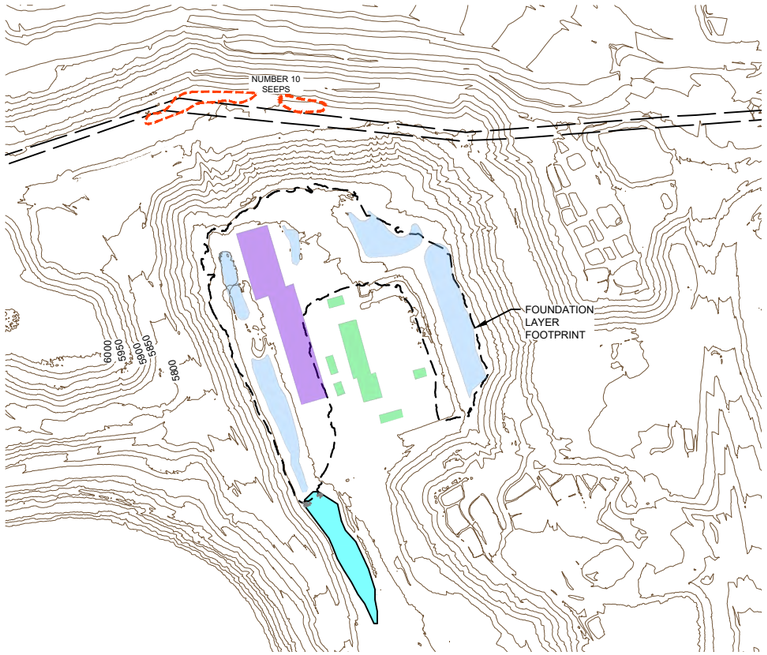
YANKEE DOODLE TAILINGS IMPOUNDMENT

FIGURE 4- HORSESHOE BEND AREA WATER MANAGEMENT FACILITIES

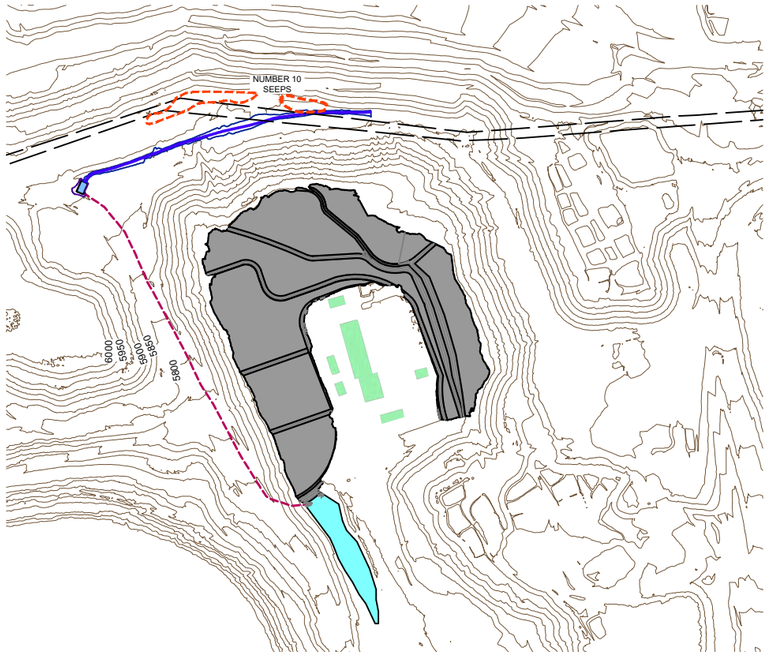
Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-126/25	3

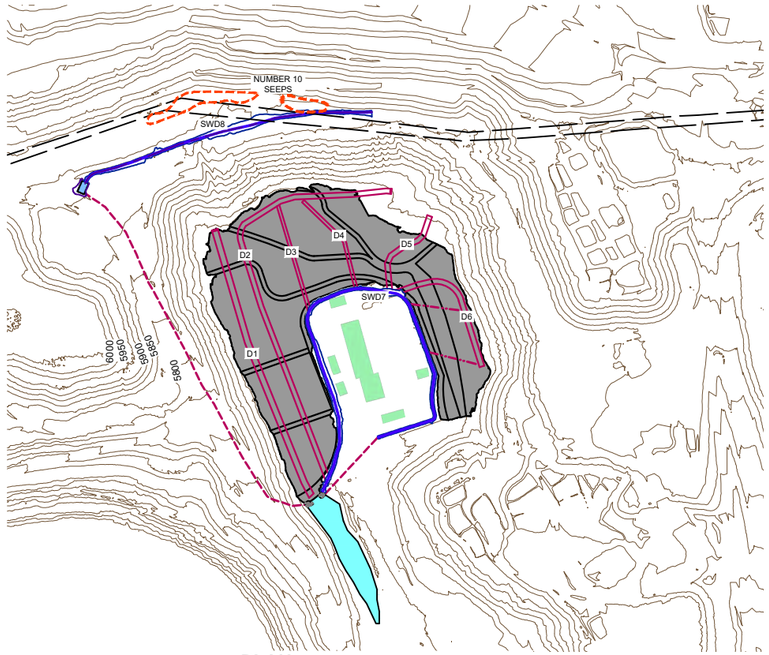
FIGURE 4 REV 0



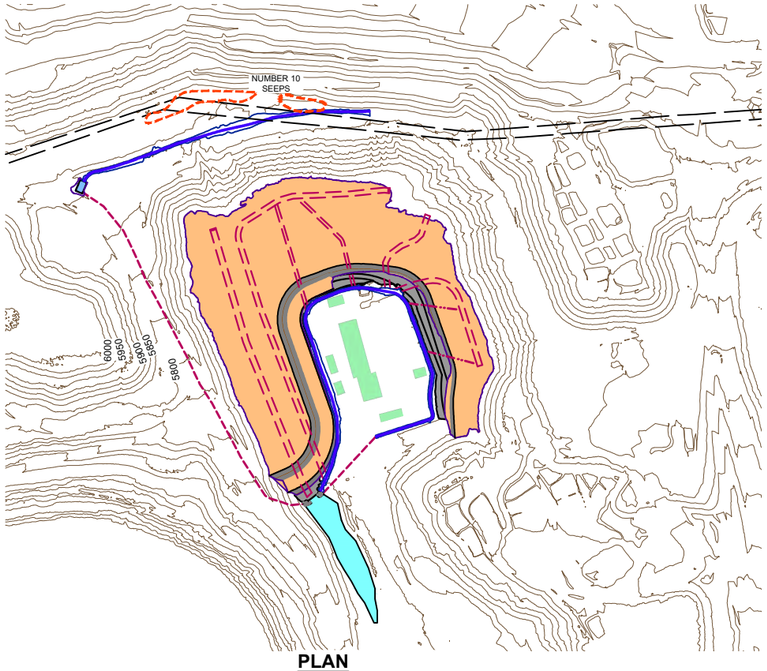
PLAN
PHASE 1 - FOUNDATION PREPARATION



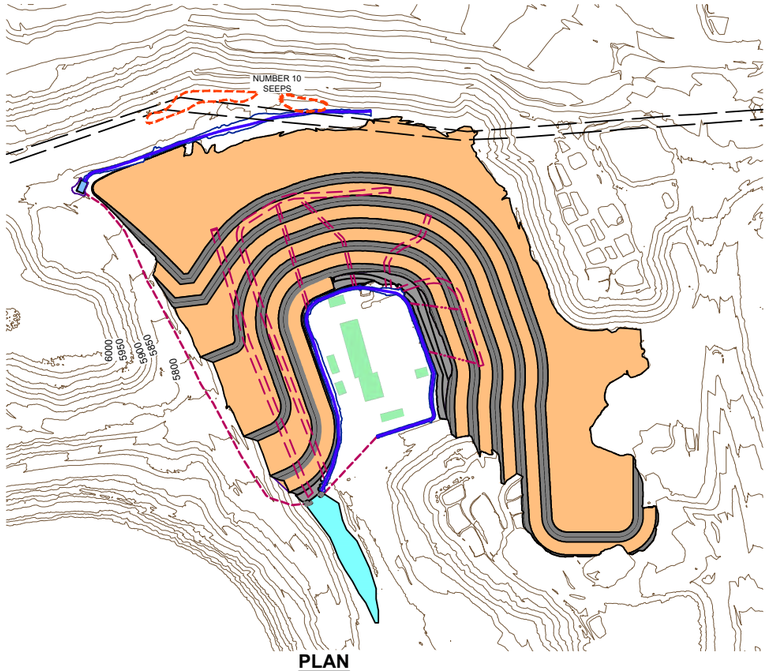
PLAN
PHASE 2 - FOUNDATION LAYER GRADING



PLAN
PHASE 3 - ROCK DRAINS AND DITCHES



PLAN
PHASE 4 - EL 5,700 LIFT



PLAN
PHASE 5 - EL 5,900 LIFT

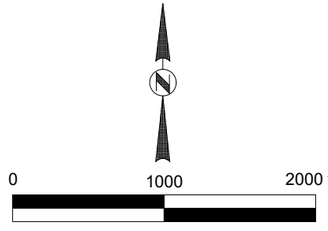
LEGEND:

- RETAINED BUILDINGS
- RETAINED HORSESHOE BEND POND
- DRAIN DOWN PONDS
- REMOVED BUILDINGS
- FOUNDATION LAYER
- ROCK DISPOSAL SITE
- PRIMARY ROCK DRAIN (D#)
- BURIED PRIMARY ROCK DRAIN
- SECONDARY ROCK DRAIN
- SURFACE WATER DITCH (SWD#)
- PIPELINE
- HIGH VOLTAGE TRANSMISSION LINE

Preliminary Design

NOTES:

1. COORDINATE SYSTEM AND ELEVATIONS ARE BASED ON ANACONDA MINE GRID.
2. TOPOGRAPHY PROVIDED BY MONTANA RESOURCES, LLP, AUGUST 2021.
3. RDS SHOWN IS CONCEPTUAL ONLY. FINAL GEOMETRY SUBJECT TO MATERIAL AVAILABILITY.



Adapted from: Knight Piésold CONSULTING
Horseshoe Bend Rock Disposal Site
Stage 1 Drainage System Report

Montana Resources
Continental Mine

Figure 6
Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Phased Construction Sequence

MR22_HsB_RDS_Phases.dwg	1"=1000'	5/4/22