DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

CHAPTER 2

2.0 Description of Alternatives Including the Proposed Action

2.1 Introduction and Background Action

This chapter describes the Proposed Action as set forth by BGMI in the Amendment to the POO (NVN-70708) and Reclamation Permit (0026) for Expansion of the Betze Pit, the Goldstrike No. 3 Tailings Facility, and the Clydesdale Waste Rock Facility (BGMI and Consulting [SRK] 2007) and supporting plans. Chapter 2.0 also presents other alternatives, including the No Action Alternative, that are analyzed in the SEIS, and other potential alternatives that were considered but eliminated from detailed analysis. A comparative analysis of project alternatives is presented in Chapter 2.0, Section 2.6. The BLM's preferred alternative is identified in Chapter 2.0, Section 2.7, BLM-preferred Alternative.

BGMI acquired the interest of Western States Minerals JV-1 in the Goldstrike Mine in December 1986. Since that time, BGMI has continued mining exploration and development activities. In December 1987, the BLM approved a BGMI POO amendment to construct a mill and tailings impoundment at the Goldstrike Mine. In April 1989, BGMI prepared a POO to expand existing facilities. The 1991 Betze Project Environmental Impact Statement (EIS) (BLM 1991a,b) addressed the environmental impacts and mitigation associated with the proposed expansion of the gold mining and processing operations at the Goldstrike Mine. The principal components of the Proposed Action included expansion of the existing Post Pit into the Betze Pit (to mine deeper, sulfide ores), an extension of the South waste rock disposal area, expanded dewatering facilities, addition of the North Block heap leach facility, mill expansion, addition of the North Block tailings impoundment, two ore stockpiles, topsoil stockpiles, and haul roads and pipeline corridors (BLM 1991a,b). The mine expansion was approved by the BLM (1991c).

In 1994, BGMI received patents under the General Mining Law to 1,793 acres of land on which the Betze-Post Mine, the Meikle Mine, and most of BGMI's milling and beneficiation operations are situated. BGMI has completed additional land exchanges with the BLM since 1991 when the Betze Project Final EIS and ROD were released. In December 1994, the BLM issued a Finding of No Significant Impact and decision record to approve the Millsite Land Exchange (BLM 1994b). In this land exchange, BGMI acquired title to 1,827.5 acres of public lands that were subject to BGMI's unpatented millsite claims within or adjacent to BGMI's mining and milling operation. In return, the BLM acquired title to 403.3 acres of private land along the South Fork of the Humboldt River that had important resource values. The land exchange resulted in consolidation of land ownership for both BLM and BGMI (BLM 1994c).

A second land exchange to consolidate land ownership occurred between BGMI and the BLM in 1995. The Section 31 land exchange (BLM 1995) resulted in BGMI acquiring title to 1,279 acres of public land that was subject to BGMI's unpatented mining claims within or adjacent to BGMI's mining and milling operations. The BLM acquired title to 690 acres along the South Fork of the Humboldt River in return (BLM 1995).

On May 3, 1999, Newmont Gold Company and BGMI completed a transaction known as the asset exchange. The purpose of the asset exchange was to rationalize the ownership and control of both the surface and subsurface estates that were jointly owned by the parties and to reduce the number of complex agreements that were needed to permit efficient operation and development of properties owned by both companies.

Prior to the exchange, BGMI's land position consisted of three "islands." These islands were the millsite block, where the autoclaves, shops, offices and other support facilities are located; the south block, which hosts the Betze-Post open pit mine and the Deep Post underground deposit; and the north block, where the Meikle, Rodeo, and Gold Bug deposits, the roaster, and the main tailings facility are located. BGMI also owned an interest in what is now known as the Leeville underground mine several miles to the south. At that time, Newmont owned the corridors between the three "islands," and most of the surrounding land. Newmont's ownership included a portion of the Betze-Post open pit mine, the Deep Post underground deposit, the Leeville deposit, and the Gold Bug deposit as well as several satellite deposits, some of which were shared with BGMI.

The transaction was structured as a like-kind land exchange. In the exchange, BGMI transferred to Newmont: 1) BGMI's share of the Deep Post underground deposit along with a 200-acre corridor of subsurface land that connects the Deep Post underground deposit with Newmont's Deep Star deposit, and 2) its 40 percent interest in the Leeville deposit. In return, Newmont transferred to BGMI: 1) the land in the corridors between the three BGMI islands and some adjacent surface land, 2) Newmont's share of the Goldbug deposit and Barrel resource, and 3) its share of the ore body in the Betze-Post open pit.

As a result of these exchanges, BGMI obtained: 1) the land needed for the development of the west end of the Betze-Post open pit; 2) control of the open pit, including the right to backfill the pit; 3) control of other lands important to its security that were needed for waste rock facilities; and 4) the underground deposits adjacent to its Meikle and Rodeo ore bodies. Current land ownership is described in **Figure 1-2**. In addition to receiving the above described underground deposits, Newmont was provided access to the bottom of the Betze-Post open pit that permitted early development of the Deep Post deposit, the synergy attributable to mining the Deep Post deposit through its infrastructure, consolidation of the High Desert properties with its adjacent properties, and the resource and exploration potential associated with the 200-acre corridor and the High Desert properties.

A SEIS for the Betze Project (BLM 2000a, 2003a) was prepared to evaluate new information relating to Goldstrike Mine groundwater pumping and water management operations as a result of new monitoring data obtained since the ROD for the 1991 EIS. The SEIS updated the potential water management operations impacts and mitigation from the 1991 EIS for the Betze Project. The SEIS also addressed the environmental impacts of a proposed buried water line that was proposed by the applicants, BGMI and Elko Land and Livestock Company (ELLCO). The proposal for the water line was subsequently withdrawn.

In association with the SEIS (BLM 2000a, 2003a), a report was prepared entitled Cumulative Impact Analysis (CIA) of Dewatering and Water Management Operations for the Betze Project, South Operations Area Project, and Leeville Project (BLM 2000b). This report addressed potential cumulative impacts to groundwater and surface water and associated water-dependent resources as a result of the three mining operations.

BGMI currently proposes to expand their existing operations to facilitate further mining of the Betze ore deposit. The proposed expansion, known as the Betze Pit Expansion Project, would combine existing and proposed mining facilities and accelerate reclamation of the Bazza Waste Rock Facility at the Goldstrike Mine.

2.1.1 Current Mining Disturbance

The Goldstrike Mine operations area is composed of approximately 10,370 acres of which approximately 1,845 acres are public lands administered by the BLM and 8,525 acres are owned by BGMI (**Figure 1-2**). A total disturbance of 7,882 acres is currently authorized for the mine. The majority (89 percent) of the total authorized disturbance would occur on private lands owned by BGMI. The remainder (11 percent) of the authorized disturbance would occur on public lands administered by the BLM Elko District Office. The present public and private authorized surface disturbance is listed in **Table 2-1**.

2.2 No Action Alternative

The No Action Alternative is to continue mining and processing operations at the existing Goldstrike Mine under the terms of current permits and approvals as authorized by the BLM and the State of Nevada. **Appendix A** provides a summary list of permits and authorizations currently in place at the Goldstrike Mine. **Table 1-1** lists the required permits or approvals that are already in place or would be obtained and the responsible regulatory agencies.

Table 2-1 Currently Authorized Goldstrike Mine Disturbance

Facility	Public (acres)	Private (acres)	Total
Waste rock disposal areas	288	2,555	2,843
Heap leach pads	0	256	256
Tailings facilities	100	1,204	1,304
Surface facilities	0	99	99
Yards and access	371	561	932
Post Mill 4	9	202	211
Ponds	0	43	43
Haul and access roads	55	166	221
Sediment control	0	274	274
Water treatment facilities	5	152	157
Sand Dune Springs recirculation system	0	11	11
Boulder Valley discharge facility	0	8	8
Pit	19	1,393	1,412
Brush Creek diversions	0	68	68
Buttress for North Block Tailings Facility	0	43	43
Total	**847**	**7,035**	**7,882**

Source: NDEP 2007a.

Existing facilities and activities at the Goldstrike Mine include an open pit (Betze Pit) and underground mining (Meikle and Rodeo mines); processing with associated tailings disposal facilities; mill, roaster, and autoclave facilities with associated support facilities; and ancillary facilities (**Figure 2-1**). The Goldstrike Mine facilities are located on private land controlled by BGMI, with the exception of a small parcel on the North Block tailings storage facility embankment and the roaster ore stockpile, and two parcels located within the Bazza waste rock facility. These parcels are located on public lands administered by the BLM Elko District Office. The Goldstrike Mine is currently authorized to disturb up to 7,035 acres of private land and 847 acres of public land.

Existing primary facilities associated with the Goldstrike Mine are shown in **Figure 2-1,** and summarized below.

- Betze Pit;
- Bazza Waste Rock Facility;
- AA Heap Leach Facility (reclaimed);
- Mill Facility, inclusive of crushing and grinding facilities, a roaster, autoclaves, a carbon-in-leach (CIL) circuit, and chemical reagent storage area;
- Underground mines (Meikle and Rodeo);
- Ore stockpiles;
- Tailings facilities (North Block, AA, and Mill #4);

- Blasting materials storage area; and
- Ancillary support facilities (offices, assay lab, shop/warehouse, maintenance, water management, power, fuel storage, and haul roads).

2.2.1 Current Mining Operations or Facilities that will Continue Unchanged

Some existing operations or facilities would not change as a result of the Proposed Action or alternatives considered in detail. This section describes current operations or facilities at the Goldstrike Mine that would not be affected by the Proposed Action or an alternative selected for detailed analysis. These operations are not affected by the Proposed Action or the alternatives because there would be no changes to currently authorized operations as a result of the Proposed Action or alternatives, and there would be no impacts not already anticipated from continued authorized operations.

Mining operations or facilities not affected by the Proposed Action or alternatives include the following:

- Meikle Mine;
- Rodeo Mine;
- Drilling and blasting techniques;
- Ore and waste rock loading and hauling procedures;
- Ore stockpiling and processing methods (crushing and grinding facilities, autoclaves, roasters, CIL gold recovery circuits, chemical reagent storage area);
- Heap leach facilities (in reclamation);
- Some of the existing infrastructure such as roads, utilities, water supply, sanitary and solid waste disposal, and fencing and site security;
- Ancillary support facilities (e.g., offices, laboratories, shops/warehouses); sanitary and solid waste treatment/disposal facilities; fencing; and site security;
- Exploration;
- Hazardous materials and waste management;
- Safety and fire protection; and
- Water management operations.

A brief description of each existing operation or facility follows. Current applicant-committed environmental protection measures will continue to be implemented as discussed in Section 2.2.1.13.

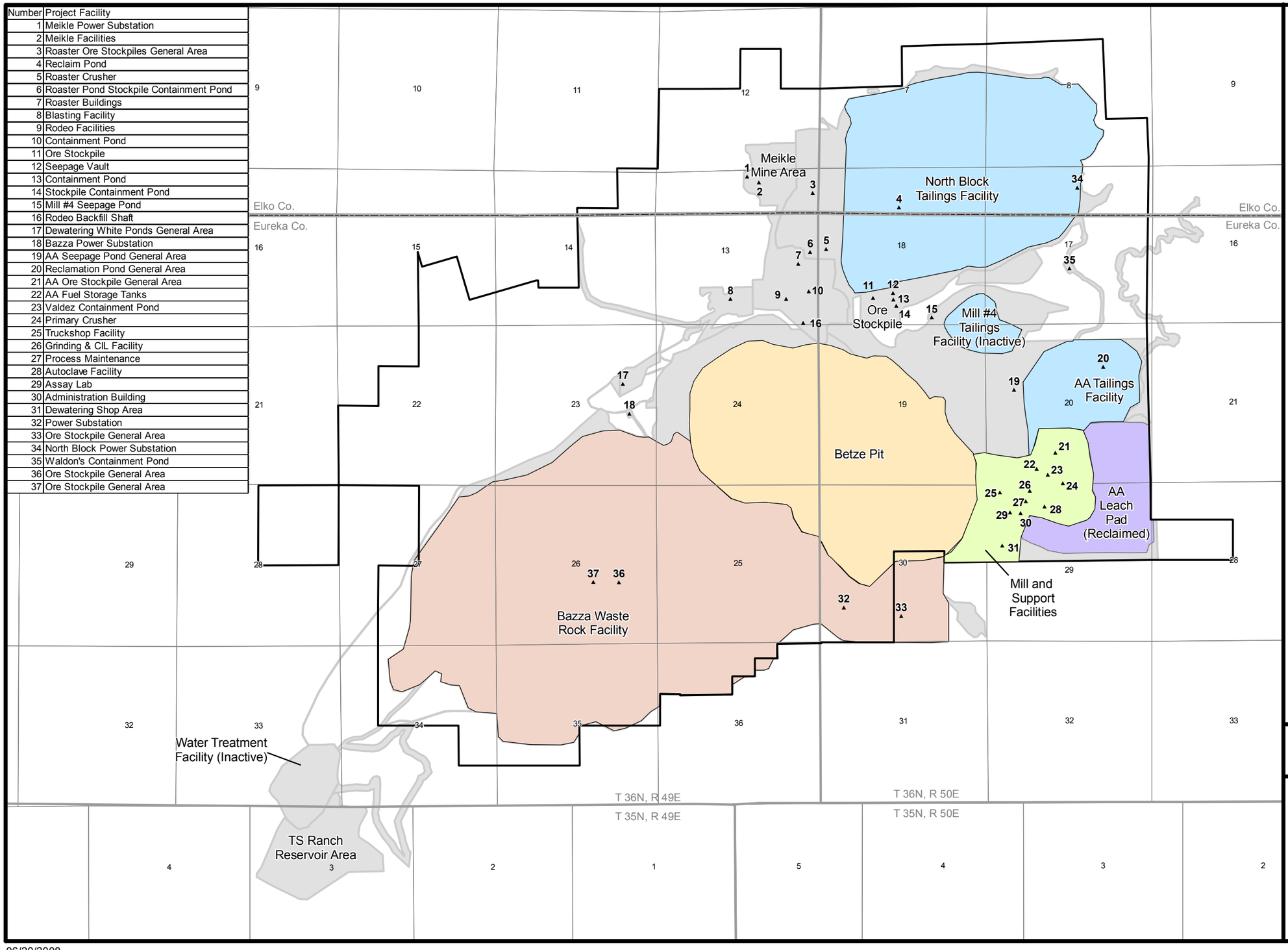
2.2.1.1 Meikle Mine

BGMI began production from the Meikle Mine in 1996. The location of the Meikle Mine is shown in **Figure 2-1**. BGMI initiated production from the upper levels of the Meikle deposit using transverse longhole stoping and underhand drift and fill mining methods. During 1999, BGMI extended the production shaft to a depth of 1,800 feet to provide access to the lower levels of the Meikle deposit. The ventilation shaft has been completed to a depth of 1,320 feet. Current production rates from this mine average 1,800 tons of ore per day. Production from the Meikle Mine is scheduled to continue through 2016. A more complete description of the Meikle Mine is provided in the Meikle Mine Development Environmental Assessment (EA) (BLM 1993).

2.2.1.2 Rodeo Mine

BGMI developed an exploration shaft at the Rodeo deposit, just south of the Meikle Mine, in 1998. The location of the Rodeo exploration shaft is shown in **Figure 2-1.** This shaft provided BGMI with underground access to explore the Griffin deposit, located between the Rodeo shaft and the Meikle Mine, as well as the

Number	Project Facility
1	Meikle Power Substation
2	Meikle Facilities
3	Roaster Ore Stockpiles General Area
4	Reclaim Pond
5	Roaster Crusher
6	Roaster Pond Stockpile Containment Pond
7	Roaster Buildings
8	Blasting Facility
9	Rodeo Facilities
10	Containment Pond
11	Ore Stockpile
12	Seepage Vault
13	Containment Pond
14	Stockpile Containment Pond
15	Mill #4 Seepage Pond
16	Rodeo Backfill Shaft
17	Dewatering White Ponds General Area
18	Bazza Power Substation
19	AA Seepage Pond General Area
20	Reclamation Pond General Area
21	AA Ore Stockpile General Area
22	AA Fuel Storage Tanks
23	Valdez Containment Pond
24	Primary Crusher
25	Truckshop Facility
26	Grinding & CIL Facility
27	Process Maintenance
28	Autoclave Facility
29	Assay Lab
30	Administration Building
31	Dewatering Shop Area
32	Power Substation
33	Ore Stockpile General Area
34	North Block Power Substation
35	Waldon's Containment Pond
36	Ore Stockpile General Area
37	Ore Stockpile General Area



LEGEND

- Goldstrike Mine Operations Boundary
- Tailings Facilities
- Waste Rock Facility
- Open Pit
- Leach Pad
- Mill and Support Facilities
- Previous Disturbance

Note: Disturbed Areas Shown Outside the BGMI Mine Operations Boundary are Newmont Mining Corporation Disturbances.

Source: BGMI and SRK 2007; BGMI 2007a.

N W E S

0 0.5 1 Miles

Betze Pit Expansion Project

Figure 2-1

Detail of Existing Goldstrike Mine Facilities

Rodeo deposit. As part of an asset exchange with Newmont that was completed in May 1999, BGMI acquired the Goldbug deposit, located south of the Rodeo shaft. BGMI initiated underground drift development from the Rodeo shaft to the Goldbug deposit in mid-1999. The Goldbug and Griffin deposits are currently being mined. The Rodeo mine is active and produces an average of 2,300 tons of ore per day. Production from the Rodeo Mine is scheduled to continue through 2016.

2.2.1.3 Drilling and Blasting Techniques

Current mining operations use conventional drilling and blasting techniques. Ore and waste rock is first drilled using large diameter blasthole drilling rigs. The holes are then charged with ammonium nitrate and fuel oil or blasting slurry during wet conditions and blasted. Blasting is performed only during daylight hours and under strict safety procedures as required by the Department of Homeland Security, Mine Safety and Health Administration (MSHA), and the State of Nevada.

2.2.1.4 Ore and Waste Rock Loading and Hauling

The resultant broken rock from blasting is excavated on production benches using electric and hydraulic shovels. Haul trucks having carrying capacities of approximately 330 tons are used to transport the ore and waste rock out of the pit. The ore and waste rock is hauled to either: 1) the Bazza Waste Rock Facility, 2) ore processing facilities, 3) ore stockpiles, 4) tailings disposal facilities during construction, or 5) in pit waste rock backfill.

2.2.1.5 Ore Stockpiling and Processing Methods

BGMI has constructed milling and beneficiation facilities on BGMI's private land as depicted in **Figure 2-1**. The milling facilities include two separate mill circuits that are presently capable of handling approximately 36,000 tons of ore per day. The ore passes through a grinding circuit followed by ore oxidation through a pressure oxidation circuit (autoclaves) or roasting facility depending on ore type, followed by a CIL gold recovery process. The ore slurry, referred to as tailings, is treated with Caro's acid or the International Nickel Company (INCO) process to neutralize residual cyanide, and the slurry is pumped to BGMI's AA and North Block Tailings Facilities. The tailings solids settle in the impoundment and the fluids are recycled to the mill for continued use. The roaster started operating in 2000 and has a nominal capacity of 16,500 tons per day. Refer to Section 1.4.2.5 in the Betze Project Draft SEIS (BLM 2000a) and Sections 2.1.4.2 and 2.2.3.2 of the Betze Project Draft EIS (BLM 1991a) for a more complete description of the milling and beneficiation processes. At present, BGMI produces approximately 1,580,000 ounces of gold per year from its milling facilities. The location of the existing ore stockpiles is shown in **Figure 2-1**.

2.2.1.6 Heap Leach Facilities

The North Block Heap Leach Facility, which was located on the North Block, has been decommissioned, the spent leach material removed to the North Block Tailings Impoundment, and the facilities removed to facilitate development of the North Block Tailings Impoundment embankment and ore stockpiles in the area. The AA Heap Leach Facility has been decommissioned and reclaimed and is now undergoing closure.

2.2.1.7 Existing Infrastructure

<u>Roads</u>

There are four types of roads on the mine property: BLM ROW, access, haul, and exploration roads. The main access road begins at Newmont’s Mill No. 1 and continues north for 5.1 miles onto land controlled by BGMI. Haul roads connect the Betze Pit and the Meikle and Rodeo underground mines to the Bazza Waste Rock Facility, the ore processing facilities, and the ore stockpiling areas.

Electric Utilities

Electrical power is transmitted to the mine by the Sierra Pacific Power system. Electrical facilities include three main substations (Mill, South Block, and Bazza substations), several smaller substations throughout the property, and transmission lines.

Water Supply

Water used for processing and dust suppression is obtained from the existing mine dewatering program discussed in Section 2.2.1.12, Water Management Operations.

Sanitary and Solid Waste Disposal

Sanitary waste generated at the mine is collected and treated at the existing sewage treatment facilities. Effluent from the sewage treatment plants are pumped to the mill for disposal in the tailings facilities.

Non-toxic, non-hazardous solid waste materials generated currently are, and would continue to be, disposed of in the currently approved Class III waivered landfill. Disposal of non-toxic, non-hazardous solid wastes is conducted in accordance with all applicable federal, state, and county laws and regulations.

Fencing and Site Security

Operation of the existing security system in place at the Goldstrike Mine would continue. Access to the Goldstrike Mine is controlled by a gatehouse at the entrance to the site. Existing fences would be maintained to prevent access by wildlife and livestock and to provide for public safety.

2.2.1.8 Ancillary Support Facilities

Existing ancillary support facilities would be used to support the Proposed Action and alternatives. These facilities include the mine and maintenance buildings, administrative offices and technical buildings, emergency medical and safety station, warehouses, metallurgical and assay laboratory facilities, water treatment facility, diesel and gas storage facilities, and explosives storage.

2.2.1.9 Exploration

Ongoing exploration activities are conducted within the Goldstrike operations boundary per existing approvals, including BGMI POO N16-98-002P, to identify and delineate any additional ore reserves. Drilling also is conducted to confirm the grade of ore deposits or confirm that an area contains no economically recoverable gold (i.e., condemnation drilling). These activities consist of surface geologic or geophysical surveys, access road grading or construction, and exploration or condemnation hole drilling programs for surface and underground areas. Current exploration activity is occurring in the vicinity of the Meikle Mine area.

2.2.1.10 Hazardous Materials and Waste Management

Procedures for transportation, storage, waste management, and spill prevention and emergency response programs for hazardous materials currently are in place and implemented for the existing operations, as described in the Environmental Incident Response Manual (BGMI 2007b). There would be no change in the current reagent consumption rate at the existing mill to facilitate the processing of ore mined in the proposed expansion. As a result, on site reagent storage and usage at the existing facilities would continue to be covered under the existing permits. Fuel, lubricant, antifreeze, solvents, and explosive materials transportation, use, and storage also are covered under existing permits.

The majority of hazardous materials currently used on site are spent or consumed during operations. Materials that are not spent or consumed (antifreeze, solvents) are recycled, or disposed of off site in an approved depository in accordance with BGMI's Solid and Hazardous Waste Management Plan (JBR Consultants [JBR] 2006) and all applicable federal and state regulations.

2.2.1.11 Safety and Fire Protection

The existing facilities operate in conformance with all MSHA safety regulations (30 CFR 1-199). Site access is restricted to employees and authorized visitors. Fire protection equipment and a fire protection plan have been established for the Goldstrike Mine in accordance with Nevada State Fire Marshal standards. The current fire protection plan at the mine would be implemented for the proposed project.

2.2.1.12 Water Management Operations

Current water management operations (pumping of groundwater and related operations) would continue through 2015 under existing permits from the State of Nevada. The purpose of the pumping of groundwater, also described as dewatering, is to maintain the current water table below the Meikle Mine. Dewatering is no longer required for mining the Betze Pit.

Under the No Action Alternative, groundwater pumping to support mine operations would continue through 2026. Between 2008 and 2015, dewatering pumping rates would steadily diminish from a maximum of approximately 16,200 to 10,700 gallons per minute (gpm). An average of approximately 2,350 gpm of groundwater would be pumped for up to an additional 11 years beyond 2015 while mine reclamation and mineral processing activities continue. A summary of the dewatering, disposal rates, and water balance estimates for the No Action Alternative is shown in **Table 2-2**.

BGMI's water management operations for the Goldstrike Mine include a system of dewatering wells, water gathering and conveyance facilities, water storage, water use, and various management options for discharge of excess water. The current authorized water management components include the following:

- Mine dewatering wells and water collection system;
- TS Ranch Reservoir;
- Springs and sand dune canal;
- Irrigation in Boulder Valley;
- Infiltration;
- Injection;
- Sand Dune drainage embankments; and
- Humboldt River discharge authorization.

These components of the water management operations are described in more detail below.

Dewatering Operations, Wells, and Collection Systems

Dewatering of the Betze Pit is accomplished through the use of perimeter wells located peripheral to the pit area, in-pit wells, horizontal drains installed for passive dewatering of pit walls, and water collection sumps installed in the bottom of the pit. BGMI's dewatering activities are conducted in compliance with its approved water appropriations issued by the Nevada State Engineer's Office.

Dewatering operations for the Betze Pit were initiated in February 1990 to lower the groundwater level in order to mine the Betze deposit. **Figure 2-2** shows the historical groundwater level elevations from monitoring wells and the pumping rates monitored to dewater the Betze Pit. The groundwater elevations were approximately 5,265 feet above mean sea level (amsl), (United States Geological Survey [USGS] datum) in the pit area prior to dewatering operations. Dewatering rates increased steadily to over 60,000 gpm within the first quarter of 1993 with groundwater levels lowered to approximately 4,600 feet amsl. Average pumping rates generally remained above 60,000 gpm until 1995 with groundwater levels declining to below 4,100 feet amsl. In 1995

Table 2-2 Life of Mine Water Budget Summary Table for BGMI (annualized gpm) (No Action Alternative)

Year	Dewatering Rate	Delivered from Leeville	Sand Dune Canal Flow	Evaporation and Storage	Mine Processing[1]	Total Irrigation	Humboldt River Discharge	Total Reservoir Infiltration
2008	16,165	9,000	5,391	794	5,733	10,928	0	10,448
2009	14,407	15,417	4,393	1,080	3,734	15,361	0	11,934
2010	12,953	14,949	3,822	997	3,734	13,233	0	11,871
2011	12,033	9,076	3,166	704	3,734	9,397	0	8,769
2012	11,527	6,153	2,025	555	3,734	7,633	0	6,596
2013	11,193	4,781	1,018	484	3,734	6,647	0	5,430
2014	10,931	4,042	360	440	3,734	5,890	0	4,958
2015	10,686	3,605	63	412	3,734	5,468	0	4,676
2016	2,350	0	0	0	2,350	0	0	4,884
2017	2,350	0	0	0	2,350	0	0	0
2018	2,350	0	0	0	2,350	0	0	0
2019	2,350	0	0	0	2,350	0	0	0
2020	2,350	0	0	0	2,350	0	0	0
2021	2,350	0	0	0	2,350	0	0	0
2022	2,350	0	0	0	2,350	0	0	0
2023	2,350	0	0	0	2,350	0	0	0
2024	2,350	0	0	0	2,350	0	0	0
2025	2,350	0	0	0	2,350	0	0	0
2026	2,350	0	0	0	2,350	0	0	0

[1]Water utilized for mine processing is consumed, released as steam, lost through evaporation, or is trapped within tailings as interstitial solution.

Source: BGMI 2007a.

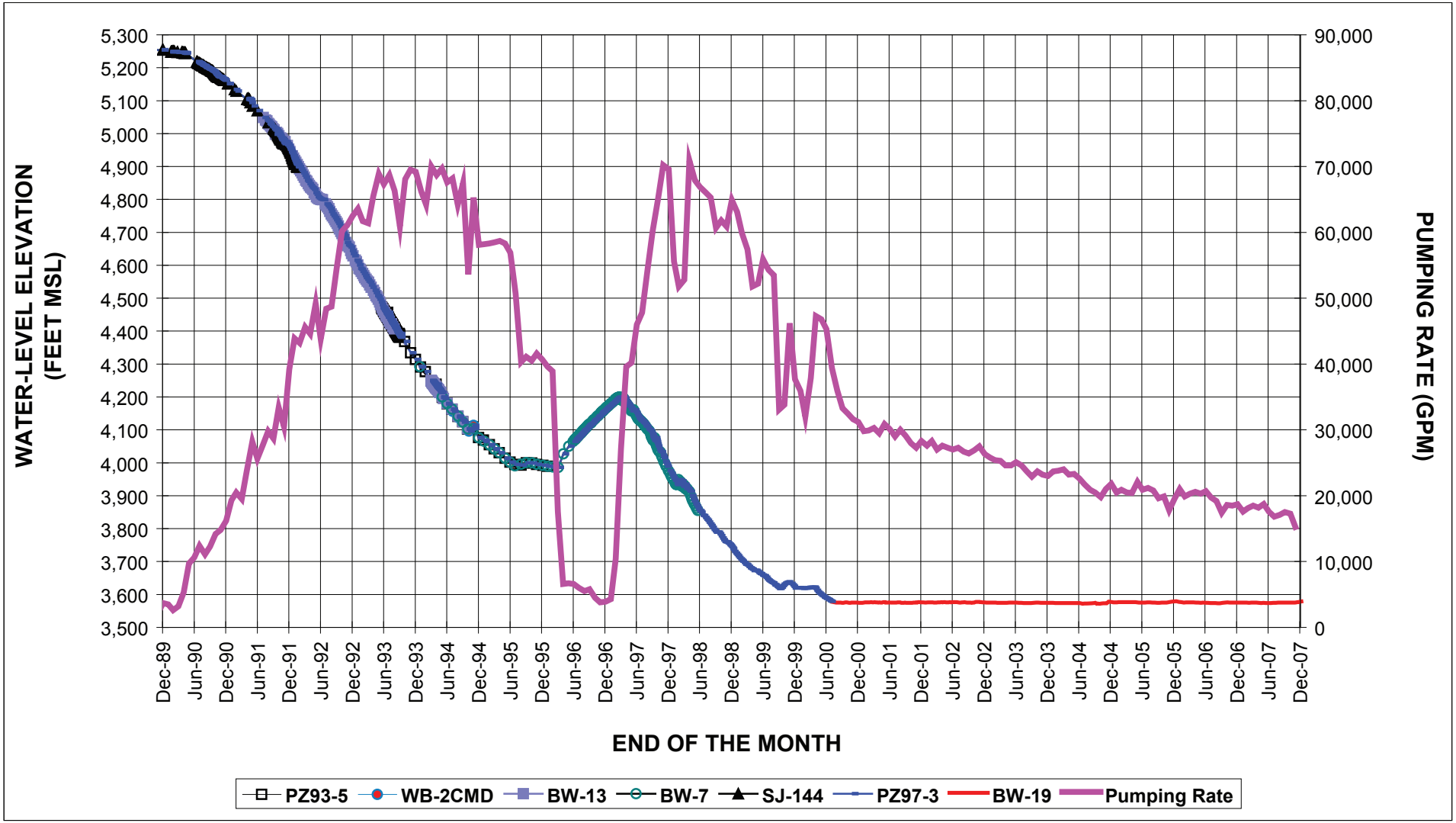


Figure 2-2 Betze Pit Dewatering Rates and Groundwater Level Elevations from Monitoring Wells

Source: Zhan 2008.

and 1996, pumping rates were reduced substantially (to less than 10,000 gpm between the third quarter of 1996 to the first quarter of 1997) with a corresponding 200-foot rebound in groundwater levels. Average pumping rates increased to a peak of approximately 70,000 gpm in 1998 before declining to approximately 17,000 gpm in July 2007 to maintain the target groundwater level of 3,576 feet amsl in the pit area (BGMI 2007c). Pumping rates are projected to be reduced further to approximately 10,700 gpm by the end of mining in 2015 as shown on **Table 2-2**.

Water is conveyed by pipelines to various use areas (e.g., process water tanks and mill facilities, water trucks for dust control, sanitary uses, and exploration drilling). In 2006, an average of 5,736 gpm of water was used for mining and milling at the Goldstrike Mine, delivered to BGMI's Meikle Mine, or delivered to Newmont for mining and milling use. Water that is not used for mining or milling purposes is delivered to the 72-inch-diameter gravity flow pipeline to the TS Ranch Reservoir (**Figure 2-3**). BGMI is authorized by a discharge permit issued by the NDEP, Permit #NEV89068, to discharge water produced by its groundwater pumping operations to groundwaters of the state via percolation, infiltration, and irrigation. Water storage is provided by the existing TS Ranch Reservoir.

The Goldstrike Mine process sites are “zero discharge facilities” and as such, any water entering the facility must stay within containment. Water is consumed and released as steam, lost through evaporation, or is trapped within the tailing mass as interstitial solution. The climate at the Goldstrike Mine is such that evaporation potential exceeds annual precipitation by a factor of approximately 4; therefore, a large amount of water is easily consumed through evaporation.

TS Ranch Reservoir

The TS Ranch Reservoir (**Figure 2-3**) stores excess dewatering water from the Goldstrike and Newmont’s Leeville mines. A naturally occurring permeable fracture in the reservoir floor results in the majority of the water being infiltrated into the rhyolite formation underlying the reservoir (authorized under #NEV89068). BGMI currently discharges approximately 10,000 gpm, and Newmont’s Leeville operations discharge approximately 9,000 gpm, to the reservoir via the gravity flow pipeline. When irrigation does not consume all of the water delivered to the TS Ranch Reservoir, the water is treated for arsenic prior to discharge in the reservoir.

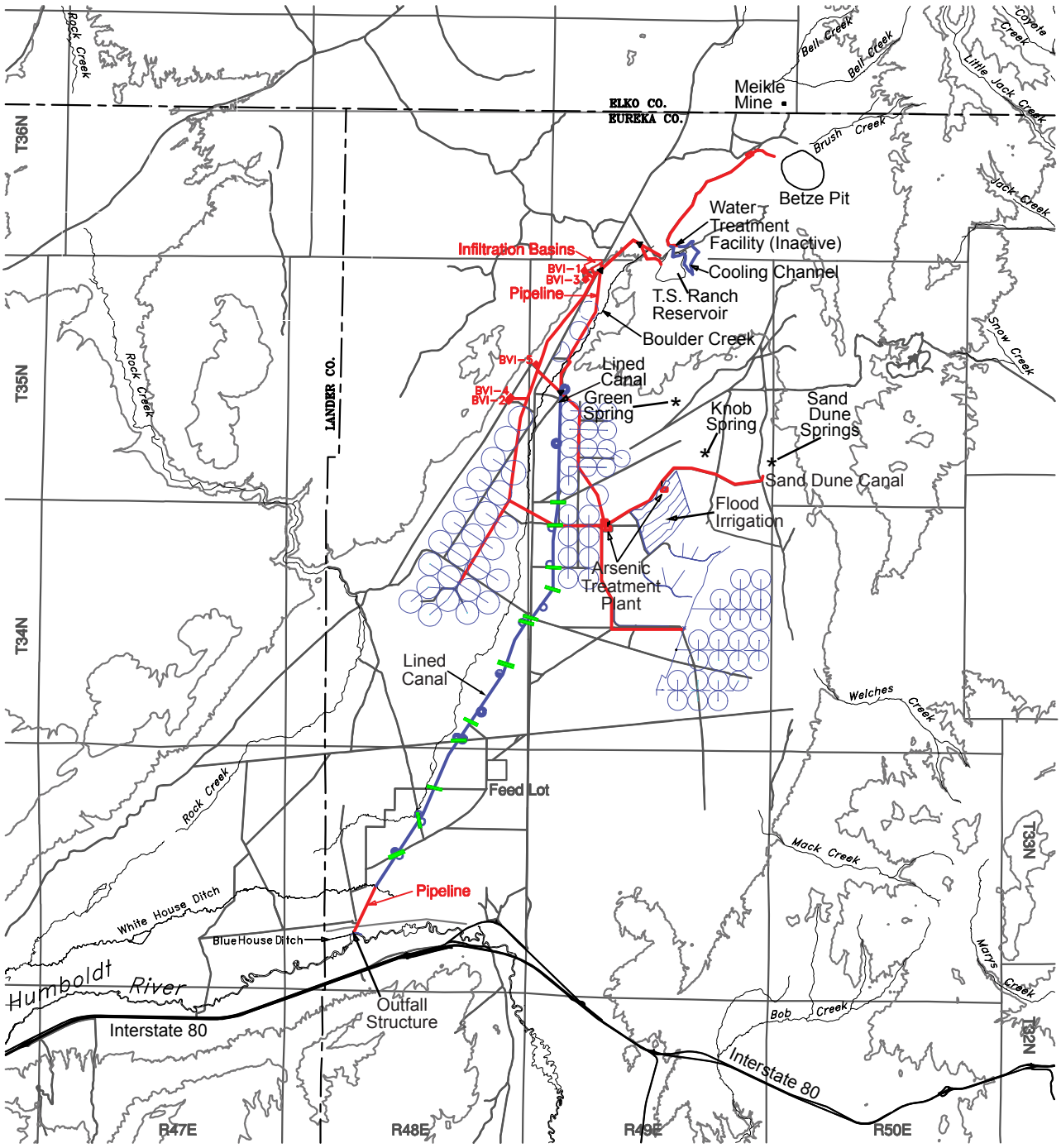
Springs and Sand Dune Canal

Water flows from the TS Ranch Reservoir through the fracture in the reservoir floor into the rhyolite formation, resulting in the creation of three new springs: Sand Dune (5.5 miles south of the TS Ranch Reservoir), Knob Spring (1 mile northwest of Sand Dune Spring), and Green Spring (northwest of Knob Spring). The locations of these springs are shown in **Figure 2-3**. In 2006, flows from the springs had reduced from a peak of 30,000 gpm in 1996 to 11,300 gpm.

Sand Dune Canal and pond collects the water flowing from the springs, and a pumping system delivers water to irrigation areas, injection wells, an infiltration area, and the TS Ranch Reservoir (**Figure 2-3**). At present, the system has the capacity to pump in excess of 45,000 gpm from the Sand Dune Canal to irrigation, infiltration, or injection areas (BLM 2000a, 2003a). An arsenic treatment plant (**Figure 2-3**) at the end of the Sand Dune Canal is available to remove naturally occurring arsenic from the canal flows prior to infiltration or injection if required (BLM 2000a, 2003a). Operation of the Sand Dune Canal and the recirculation system is regulated by the NDEP under Water Pollution Control Permit #NEV95114 (BLM 2000a, 2003a).

Irrigation in Boulder Valley

Since 1993, BGMI has provided irrigation water to ELLCO property. At present, approximately 10,000 acres on the TS Ranch and the Dean Rhoads' Ranch land have been developed for irrigation. During the irrigation season, which typically extends from April through September, an average of approximately 29,000 gpm (60,000 gpm maximum) of dewatering water has been delivered by BGMI and Newmont operations for irrigation of these lands. The irrigation systems can be supplied from the TS Ranch Reservoir via the Boulder Valley irrigation pipeline or from the Sand Dune Canal. During the irrigation season, water from the Sand Dune



LEGEND

- River, Creek, or Ditch
- Pipeline
- Conveyance Canal
- BVI-3◆ Injection Well
- Center Pivot Irrigation
- Canal Crossing
- Watering Pond

Contour Interval = 1,000 Feet

N

0 2.5 5 Miles

Source: BLM 2000a.

Betze Pit Expansion Project

Figure 2-3

Water Management Facilities

Canal is delivered to and consumed at the irrigation areas. If irrigation demand exceeds flow from the Sand Dune Canal, additional water can be delivered from the TS Ranch Reservoir to the irrigation areas (BLM 2000a, 2003a).

Infiltration

An outcrop of rhyolite in upper Boulder Valley (**Figure 2-3**) is currently used as a 6-acre Rapid Infiltration Basin (RIB) that has an infiltration capacity of approximately 15,000 gpm. The RIB is used primarily during the non-irrigation season. Infiltration of water from the TS Ranch Reservoir or the Sand Dune Canal is subject to Water Pollution Control Permits #NEV89068 and #NEV95114 issued by the NDEP (BLM 2000a, 2003a).

Injection

BGMI has five injection wells (**Figure 2-3**) authorized under an NDEP underground injection control permit (#NEV93209) to inject water from BGMI's groundwater pumping operations into the rhyolite in the upper Boulder Valley. BGMI estimates the capacity of the five existing injection wells at approximately 28,000 gpm (BLM 2000a, 2003a). Currently BGMI is not actively using these injection wells.

Sand Dune Drainage Embankments

Three temporary embankments were constructed across the Sand Dune drainage downgradient of the Sand Dune Canal. The managed drainages have been mostly dry except for brief periods related to rain or snowmelt events (BLM 2000a, 2003a).

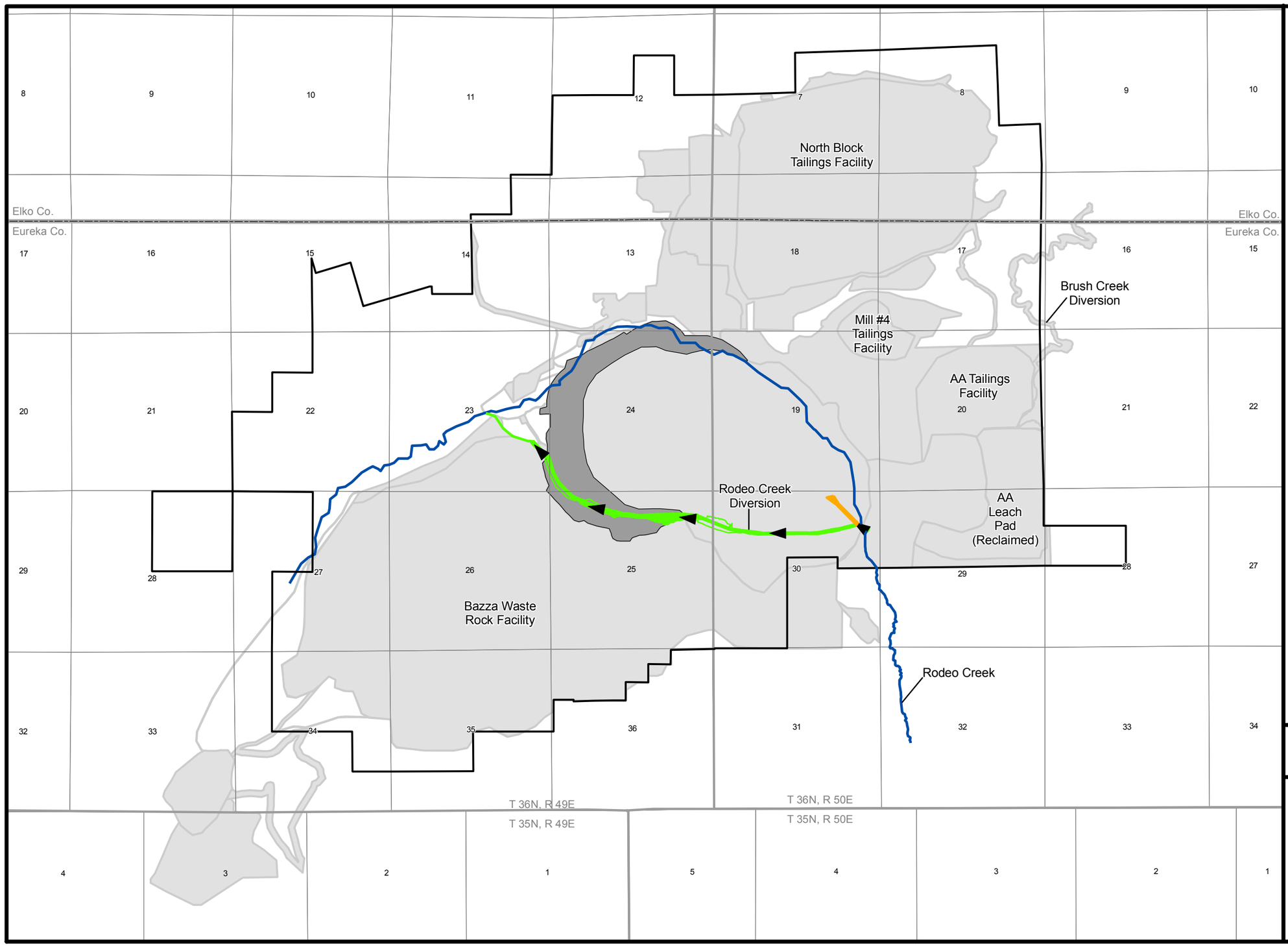
Humboldt River Discharge Authorization

BGMI is authorized to discharge up to 70,000 gpm to the Humboldt River via Boulder Creek, the White House Ditch, and Rock Creek or upland canals and pipelines through an NDEP-issued National Pollutant Discharge Elimination System permit (NV0022675). The system includes a water treatment facility and a water conveyance system composed of buried pipelines, and a synthetically lined upland canal from the treatment plant to an outfall at the Humboldt River (**Figure 2-3**). The water treatment facility is designed to lower the naturally occurring levels of total dissolved solids, fluoride, and boron in the groundwater to levels that are below the Humboldt River water quality standards including temperature. Mine dewatering discharges to the Humboldt River occurred for a 16-month period from September 1997 to early February 1999. Since that time, BGMI has not discharged to the Humboldt River. Currently, BGMI anticipates that use of infiltration and irrigation would be sufficient to manage its dewatering flows without the need for discharge to the Humboldt River. BGMI currently is not operating the water treatment plant or discharging to the Humboldt River; however, BGMI maintains the permit and the facilities.

Rodeo Creek Diversion

Expansion of the Betze Pit under current authorizations would require the relocation of Rodeo Creek from its existing alignment north of the pit to a new alignment south of the pit. BGMI would divert Rodeo Creek along the south wall of the Betze Pit, returning the diverted flow to the original stream channel downstream of the pit (**Figure 2-4**). The diversion would be 12,270 feet in length, 100 feet wide (channel and adjoining access road for channel maintenance), with a total disturbance of 28 acres. All of the disturbance would be on disturbed land owned by BGMI. The USACE has determined that there are no jurisdictional waters in the area (USACE 2006).

BGMI believes that terminating Rodeo Creek into the Betze Pit at the end of mining is the best choice for the long-term management of Rodeo Creek. The potential diversion of Rodeo Creek into the Betze Pit at the end of mining is a closure option. To that end, BGMI will apply for the necessary permits from the State of Nevada at the time of mine closure. If such a permit is not granted, Rodeo Creek would remain as a diversion on the south side of the pit, entirely on privately held lands. In either case, no permit from the BLM is necessary.



LEGEND

- Goldstrike Mine Operations Boundary
- Previous Disturbance
- Authorized Pit Layback Disturbance
- Current Rodeo Creek Alignment
- Rodeo Creek Diversion South of Betze Pit (Planned for Completion in 2009)
- Rodeo Creek Diversion into the Betze Pit (Closure Option)
- Stream Flow Direction

Source: BGMI 2007a, USGS no date.

N W E S

0 0.5 1 Miles

Betze Pit Expansion Project

Figure 2-4

Rodeo Creek Diversions

The planned diversion would consist of a channel bottom approximately 12 feet deep and 20 feet wide with 2 horizontal (H): 1 vertical (V) sideslopes. A portion of the diversion likely would be constructed in mine backfill. The channel would be constructed with two liner systems: one buried liner to prevent channel leakage from recharging the mine backfill and a second surface liner to prevent erosion of the channel and the drop structures. The channel is designed to pass the peak flow (1,700 cubic feet per second [cfs]) due to the 100-year 24-hour storm event occurring in the Rodeo Creek and Brush Creek basins. The Rodeo Creek Diversion is expected to be completed in 2009.

2.2.1.13 Applicant-committed Environmental Protection Measures

The applicant-committed environmental protection measures for the No Action Alternative are identified in the Betze Project EIS (BLM 1991a,b) and SEIS (BLM 2000a, 2003a). Monitoring and mitigation measures for the specific projects are identified in the associated RODs (BLM 1991c, 2003b). These measures would continue to be implemented throughout the life of the approved operations and may include berms, culverts diversion ditches, silt fencing, weed-free straw bales, and other widely accepted sediment control features. Best Management Practices (BMPs) implemented at the Goldstrike Mine are summarized in the Storm Water Pollution Prevention Plan (SWPPP) (JBR 2003; BGMI 2007d) and reclamation plan and include, but are not limited to, the following:

- Surface disturbances kept to a minimum;
- Growth media salvage;
- Reclamation and revegetation of disturbed areas as soon as possible;
- Reclamation monitoring and reseeding if necessary;
- Hay bale and silt fence sediment barrier installations where appropriate;
- Proper design and construction of drainage and diversion channels;
- Bank stabilization using rip-rap;
- Culverts with rip-rapped inlet and outlet;
- Sediment basins and check dams as appropriate;
- Good housekeeping practices in all management areas;
- Inspection of BMP structures after significant runoff events and implementation of repairs if substantial erosion or soil runoff observed; and
- Signage to alert maintenance personnel of inlet structures of retention and detention basins to keep inlets functional.

BGMI established three trust funds as part of mitigation in connection with the 1991 Betze Project EIS and ROD. These trust funds were created to mitigate impacts and provide long-term funding for monitoring of project facilities. A summary description of the three trust funds follows.

- Wetland Mitigation Fund – A $660,000 fund was established for the protection or enhancement of replacement riparian and wetland areas potentially affected by dewatering from the original Betze Project. It includes funding for monitoring of seeps and springs and riparian and wetland areas potentially affected by dewatering based on the maximum projected acreage of impact, 330 acres. The updated dewatering analysis of impacts from the Betze Project SEIS (BLM 2000a, 2003a) predicted that only 150 acres of seeps and springs and riparian and wetland areas potentially would be affected. Monitoring would be continued until at least 2030, and thereafter if determined necessary by the BLM. Monitoring after 2030 would be funded by the Long-term Monitoring Program. The Wetland Mitigation Fund was approximately $480,000 as of September 30, 2007.

The following projects have been funded in part or in total by the Wetland Mitigation Fund:

  - Culvert removal and replacement in the Maggie Creek Basin – Impassible culverts on Beaver Creek and the mainstem of Maggie Creek were replaced with structures suitable for fish passage in 2005.
  - Maggie Creek Land Exchange – Approximately 6,000 acres of historic Lahontan cutthroat trout (LCT) habitat along Susie Creek were acquired in 2004 as a result of the Maggie Creek Land Exchange.
  - Squaw Valley/Spanish Ranch Division Fence – The division fence between the Squaw Valley and Spanish Ranch allotments was completed in 2007 to provide control and management of livestock on LCT streams in the Squaw Valley Allotment.
  - Dixie Creek Fish Barrier – Survey, design, and permitting have been completed for the proposed fish barrier to be constructed in 2008.

- Long-term Monitoring Fund – A $250,000 fund was established for long-term monitoring of potential environmental consequences of the Goldstrike Mine by providing costs for conducting monitoring after 2030. BGMI contributed an additional $300,000 to the fund as part of the mitigation for the Betze Project SEIS (BLM 2003a) to ensure adequate funding for long-term monitoring. This fund was approximately $900,000 as of September 30, 2007.
- Long-term Monitoring and Mitigation Fund – A total of $1,000,000 was established by BGMI to fund the review, monitoring, and mitigation of unanticipated impacts not specifically identified in the EIS reclamation plan, or bond (BLM 1991b). This fund has accrued interest and was approximately $2,200,000 as of September 30, 2007.

The Betze Project SEIS and ROD (BLM 2003a,b) included additional mitigation for impacts due to dewatering operations. A summary description follows.

- Upper Willow Creek Habitat Enhancement Plan (UWCHEP) – The plan was developed to improve aquatic and riparian habitats while providing mitigation for environmental impacts analyzed in the Betze Project SEIS (BLM 2003a). The Proposed Action encompasses approximately 12,300 acres upstream of Willow Creek Reservoir and includes Upper Willow, Lewis, and Nelson creeks. The plan provides for habitat protection and restoration of 20.5 miles of LCT habitat and 635 acres of riparian habitat in the headwaters of upper Willow Creek. The uplands within the enhancement area include a variety of habitats for avian and terrestrial wildlife species, including sage-grouse and mule deer. The plan includes grazing management prescriptions, and stream, riparian, and uplands monitoring within the Proposed Action.
- Conveyance of 1.5-cfs instream flow right in Rock Creek to NDOW and BLM.
- Improvement of 15 springs in cooperation with BLM and NDOW.
- Additional funding for sage-grouse habitat improvement, for research on springsnail relocation techniques, and for biota monitoring in the Humboldt River.

2.2.2 Operations that may be Affected by the Proposed Action

Currently authorized Goldstrike Mine operations, facilities, or activities that may be affected by the proposed project are described in this section and are summarized below:

- Schedule and work force;
- Mining of the Betze Pit;
- In-pit and out-of-pit waste rock facilities;

- Ore processing facilities; and
- Tailings facilities.

2.2.2.1 Schedule and Work Force

Approximately 1,600 workers currently are employed by BGMI for open-pit and underground mining, processing, and reclamation activities at the existing Goldstrike Mine, with operations anticipated to continue through 2011 for the Betze Pit and through 2016 for the Meikle and Rodeo underground mines. BGMI also employs approximately 200 contractors on-site. Work is performed 24 hours a day, 7 days a week at the mine. Ongoing ore processing of ore stockpile reserves would continue for an additional 15 years (through 2026) after mining ceases. Decommissioning and final reclamation also would require a reduced work force until final closure of the mine.

2.2.2.2 Mining Operations and Existing Facilities

BGMI is presently mining the Betze open-pit mine, as well as the Meikle and Rodeo underground mines. Ore produced from the Betze Pit and from the Meikle and Rodeo mines is delivered to BGMI's milling and beneficiation facilities for gold recovery. BGMI's existing mining, milling, and beneficiation facilities are shown in **Figure 2-1**. **Table 2-3** shows the planned ore and waste rock to be mined under current operations (No Action Alternative). The following mining and processing operations would continue under the No Action Alternative.

Betze Pit

The rim of the Betze Pit is at an elevation of approximately 5,200 to 5,300 feet at the northwest edge. The Betze Pit is approximately 1,500 feet deep, 5,600 feet wide, and 10,000 feet long. The depth ranges from a maximum measured below the highest point near the south highwall at approximately 1,800 feet to a minimum beneath the west wall at approximately 1,100 feet. Under the No Action Alternative, typical mining techniques, that will continue unchanged are described in Section 2.2.1, Current Mining Operations or Facilities that will Continue Unchanged. BGMI presently is mining the Betze Pit at an average rate of approximately 420,000 tons of material per day. **Figure 2-4** shows the location of the currently authorized pit expansion under the No Action Alternative.

BGMI's present mine plan projects that mining would continue at the Betze Pit through 2011. Ore and waste volumes to be mined under the approved plans are shown in **Table 2-3**. Under current mining operations, a projected final pit configuration would disturb approximately 1,412 acres. Newmont accesses its Deep Post deposit from a portal at the bottom of the Betze Pit. Newmont’s operations in the pit would conclude at the end of 2009.

Waste Rock Facilities

Under the No Action Alternative, waste rock not utilized for construction purposes is disposed of in the Bazza Waste Rock Facility or backfilled into the Betze Pit. The Bazza Waste Rock Facility is located west and southwest of the Betze Pit (**Figure 2-1**). The Bazza Waste Rock Facility has an approximate plan surface area of 2,843 acres and a maximum height of approximately 700 feet above the ground surface. The facility is permitted for 2,843 acres of disturbance (Schafer and Geosystems 2006). As of the end of 2003, approximately 1.58 billion tons of waste rock had been placed in the Bazza facility incorporating a mixture of approximately 25 percent potentially acid generating (PAG) and 75 percent non-PAG waste rock in accordance with the Waste Rock Management Plan (Schafer and Geosystems 2004). Through the end of 2011, approximately 1.93 billion tons of waste rock are anticipated to be placed in the Bazza facility. The remaining 350 million tons of waste rock to be placed in Bazza are expected to be more alkaline than historic waste rock, and only 16 percent of the material is anticipated to be PAG (Schafer and Geosystems 2006).

Since 2003, some of the waste rock produced from the Goldstrike Mine has been used as backfill of part of the eastern portion of the Betze Pit. At the end of mining in 2011, a total of 570 million tons of waste rock would

backfill the pit. Approximately 25 percent of the material to be used as Betze Pit backfill is anticipated to be PAG (Schafer and Geosystems 2006).

Waste rock handling procedures as currently authorized and implemented are outlined in the BGMI Goldstrike Mine Waste Rock Management Plan for the Bazza Waste Rock Facility (Schafer and Geosystems 2004).

As of the end of 2007, approximately 300 acres of the Bazza Waste Rock Facility have been reclaimed. This area includes a portion of the northwest face and the southeast quadrant, adjacent to the un-named drainage and Skarn Hill. This acreage has been re-graded, has had cover and growth media placed as described in the Bazza Waste Rock Management and Permanent Closure plans, and has been seeded with an approved mixture. This acreage is still covered under financial assurance sureties and release from same has not been requested by BGMI from NDEP nor the BLM.

Tailings Facilities

BGMI currently operates two tailings facilities, the North Block Tailings Facility and the AA Tailings Facility (**Figure 2-1**). Under the No Action Alternative, tailings would continue to be placed in the North Block and AA tailings facilities. The North Block tailings impoundment has a downstream constructed embankment with basin seal and geomembrane liner. In addition, the impoundment area has a composite liner system with a low permeability soil liner overlain by a geomembrane liner. The impoundment liner system is covered with a drainage blanket to minimize hydraulic head on the liner. Rotating discharge points promote drying and consolidation of tailings.

The North Block Tailings Facility has a 175-million-ton design capacity, and current storage is 121 million tons. The stage 8 lift is currently in place at the facility, and BGMI has approval from the Nevada Division of Water Resources (NDWR) and NDEP to construct a stage 9 lift. Approximately 36,000 tons per day of tailings are deposited in the North Block Tailings Facility.

The AA Tailings Facility has a downstream constructed embankment with a soil and natural materials liner system, overlain by a drainage blanket. This tailings storage facility was inactive until July 2007. The AA Tailings Facility was reactivated in July 2007 to store additional tailings from ore processing activities. BGMI plans to dispose of an additional 6 million tons of tailings within the AA Tailings Facility by the end of 2008. The total storage capacity of the AA Tailings Facility would be an estimated 10.6 million tons of tailings. Reclamation and closure activities for this facility would begin in 2009.

Betze Pit Backfill

BGMI will place 570 million tons of waste rock from the currently authorized Betze Pit excavation into the pit. The backfill will be located primarily in the eastern and southern portions of the pit and lower portion of the Screamer extension (Schafer and Geochemica 2003).

2.2.3 Existing Mine Reclamation and Site Closure Plans

Under the No Action Alternative, the existing facilities would be reclaimed and closed in accordance with the currently approved reclamation plan, current permits, and applicable federal and state closure and reclamation requirements. Reclamation and final closure of the project site are discussed in the Betze Project EIS (BLM 1991a,b), Meikle Mine EA (BLM 1993), Final Permanent Closure Plan for the Bazza Waste Rock Facility (Schafer and Geosystems 2006), and the Revised Reclamation Plan and 2007 Three-year Update for the Goldstrike Mine Project (BGMI 2007e).

BGMI has 20 years of experience at the Goldstrike Mine in reclamation and closure planning, design, construction, performance monitoring, evaluation, and refinement. Reclamation practices continue to evolve as performance monitoring of past reclamation provides new information that will be used to improve closure design. Elements of the conceptual design include facility regrading and channel design, cover design, and vegetation establishment.

Table 2-3 Goldstrike Mine Estimated Ore and Waste Rock Annual Totals (in tons) Under the No Action Alternative

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Betze Pit																				
Total Ore Mined	5,967,000	12,826,000	6,242,000	12,094,000	9,635,000															
Total Waste Mined	133,962,000	124,160,000	134,912,000	129,700,000	132,942,000															
Total Mined	139,929,000	136,986,000	141,154,000	141,794,000	142,577,000															
Meikle Underground Mine																				
Total Ore Mined	564,061	602,634	574,502	531,419	522,163	417,088	377,319	313,178	210,463	103,180										
Total Waste Mined	196,705	135,031	151,258	192,251	154,782	94,495	93,801	46,167	47,545	18,438										
Total Mined	760,766	737,665	725,760	723,670	676,945	511,583	471,120	359,345	258,008	121,618										
Rodeo Underground Mine																				
Total Ore Mined	779,138	812,423	682,275	701,809	837,928	842,722	855,347	854,415	855,230	556,289										
Total Waste Mined	73,129	152,251	211,318	106,918	97,616	71,398	101,046	54,471	69,517	54,597										
Total Mined	852,267	964,674	893,593	808,727	935,544	914,120	956,393	908,886	924,747	610,886										
Total Process Throughput																				
Total Ore Processed	11,907,317	12,021,472	5,543,754	5,635,854	5,539,813	5,337,629	5,659,602	5,659,607	5,716,683	5,434,883	5,303,392	5,520,314	5,513,649	6,161,966	5,757,563	6,150,217	4,907,402	3,217,192	3,022,200	1,286,190

Source: BGMI 2007a.

The successful reclamation of the AA Leach Pad was based on BGMI's extensive experience at the Goldstrike Mine, particularly involving the use of Carlin formation material as a growth medium. The AA heap leach facility, a 250-acre run-of-mine (ROM) gold heap leaching facility, was reclaimed in 2000 and 2001. The AA Leach Pad was the first large facility to employ an evapotranspiration (ET) cover that reduces or eliminates infiltration of water and oxygen, and promotes long-term geomorphic stability. An ET cover has a sufficiently fine particle size graduation to reduce permeability and to provide a capillary break between the material on the leach pad and the cover. Its thickness has been optimized to store water during the period of maximum precipitation for elimination by evaporation and transpiration through the period of minimum precipitation (Myers et al. 2001; Zhan et al. 2000).

The AA Leach Pad ET cover system was constructed in 2000 using two cover systems: 4 feet of fine-grained Tertiary-aged valley fill deposits of the Carlin formation and 5 feet of salvaged topsoil materials. In March 2001, the seedbed was prepared and then broadcast seeded with 15.05 pounds per acre of a selected seed mix (perennial grasses, forbs and shrubs, and annual cereal used as a cover crop) and then harrowed to cover the seed. Within 2 years, over 30 percent cover had been achieved indicating good vegetation establishment. By Year 4 of the growing season, Carlin material had a higher cover of desirable perennial grasses and shrubs than topsoil (Zhan et al. 2006).

Results from reclamation monitoring on the AA Leach Pad and other sites have shown that the use of Carlin material as a growth medium allows germination and establishment of a diverse mix of perennial grasses, forbs, and shrubs, especially late-seral species such as bitterbrush (*Purshia tridentata*) and big sagebrush (*Artimesia tridentata*) with only limited annual grass development (Cedar Creek Associates 2007a). **Figures 2-5** and **2-6** show an early stage of reclamation (6 years of growth) on Carlin material on the AA Leach Pad in treatment areas H6 and H7. Four wing saltbush (*Atriplex canescens*) is the dominant shrub species representing 21.4 and 12.0 percent cover for treatment areas H6 and H7, respectively (Cedar Creek Associates 2007a). Four wing saltbush develops and matures quickly and is an early seral species for reclamation at the Goldstrike Mine. Late-seral species like bitterbrush and big sagebrush take more than a decade to mature and are typically found under the canopy of the early seral species like four wing saltbush during the early years of reclamation with Carlin material (Viert 2008). After 10 or more years of reclamation, bitterbrush and big sagebrush eventually replace four wing saltbush (Viert 2008). In contrast, reclamation monitoring over several years has found that bitterbrush and big sagebrush have not established on reclaimed surfaces using topsoil as a growth medium (Cedar Creek Associates 2007a). Reclaimed areas treated with topsoil had higher percent cover of cheatgrass (*Bromus tectorum*) compared with Carlin material (Cedar Creek Associates 2007a). **Figure 2-7** presents reclamation results from 7 years of growth with topsoil at treatment area AR3 on a north slope from the Bazza Waste Rock Facility. Four wing saltbush is the dominant shrub depicted in **Figure 2-7**.

The flux of meteoric water through the AA Leach Pad cover was measured using in-situ vadose zone monitoring. Both covers had very low deep percolation rates, especially after vegetation matured. The mixture of grasses, forbs, and shrubs provides erosion protection and helps maximize evapotranspiration, both important functions of the cover design (Zhan et al. 2006).

The AA Leach Pad reclamation monitoring results were used to optimize the Bazza Waste Rock Facility design (Zhan et al. 2006; Schafer and Geosystems 2006). The Bazza Waste Rock Facility, which will hold about 1.93 billion tons of waste rock within an area of 2,343 acres, will incorporate an ET cover of Carlin material and topsoil to reduce or eliminate infiltration of meteoric water into the Bazza Waste Rock Facility. The facility will be reshaped to resemble surrounding natural landforms prior to cover placement. A series of channels will be integrated into the hillslope morphology to channel surface runoff from the slopes. The channel design approach will utilize the principles of fluvial geomorphology in which channel morphology and grade and bed materials are designed to resemble natural drainage features. The cover will be revegetated with a mixture of native perennial grasses, forbs and shrubs (Schafer and Geosystems 2006; Shafer et al. 2005).

A significant quantity of Carlin Formation material (approximately 87 million tons) will be mined prior to the end of mine life (primarily 2007 to 2011) (Schafer and Geosystems 2006). Readily available Carlin Formation material from the Betze Pit alluvium is an ideal ET cover for leach pads, waste rock facilities, and tailings facilities, depending on particle size, engineering and hydraulic properties, and plant-available water capacity. The ET cover will be designed with Carlin Formation materials or a combination of Carlin and topsoil depending on the performance criteria required.

Approximately 300 acres of the Bazza Waste Rock Facility have already been reclaimed as of the end of 2007. **Figure 2-8** shows vegetation established on recently reclaimed portions of treatment Area AS of the Bazza Waste Rock Facility. Concurrent reclamation of the completed portions of the facility will continue until waste placement in the Bazza Waste Rock Facility ceases and final reclamation begins.

Documentation of the status of interim and final reclamation at the various mine facilities is summarized in the biannual revegetation monitoring reports for the Goldstrike Mine (Cedar Creek Associates 2007a). These reports document when seeding occurred, areas treated, description of facilities, location, the number of acres reclaimed, seeding method, status, when monitoring occurred, and provide a summary of the results.

BGMI received an excellence in mine reclamation award in 2007 from the Nevada Division of Minerals, NDOW, NDEP, BLM, and U.S. Forest Service (USFS) for wildlife habitat enhancement in the closure design of the Bazza Waste Rock Facility. The cover thickness, landform design and vegetative seed mix will combine to create a stable variable landform that will be valuable to local wildlife well into the future. NDOW noted the reclamation success that BGMI has had to date and noted that the seed mixture BGMI was using promoted the establishment and growth of desirable shrub, forb, and grass species on reclamation sites (Lamp 2007a). BGMI also received an excellence in mine reclamation award for the design of the AA Leach Pad in the 1997-1998 timeframe. Post-mining reclamation topography for the No Action Alternative is presented in **Figure 2-9**.

2.2.3.1 Post-mining Land Use and Reclamation Goals

Following closure, the project area would support the multiple land uses of livestock grazing, wildlife habitat, and dispersed recreation. BGMI would work with the agencies and local governments to evaluate alternative land uses that could provide long-term environmental and socioeconomic benefits from the mine infrastructure. All post-closure land uses would conform to applicable Eureka and Elko County requirements.

The objectives of the reclamation program are as follows:

- To provide a stable post-mining landform that supports defined land uses, such as wildlife habitat and domestic grazing;
- To minimize erosion damage and protect water resources through control of water runoff and stabilization of mine facilities;
- To establish post-reclamation surface soil conditions conducive to the regeneration of a stable plant community through salvage, stockpiling and reapplication of soil material;
- To revegetate disturbed areas with a diverse mixture of plant species in order to establish productive long-term plant communities compatible with existing land uses; and
- To maintain public safety by stabilizing or limiting access to landforms that could constitute a public hazard.

2.2.3.2 Growth Media Stockpiling and Use

Suitable growth media (primarily topsoil and Carlin Formation materials) are salvaged during open-pit mining for subsequent use in reclamation. Growth media is placed in stockpiles just outside of the facility footprint or

Figure 2-5 Vegetative Cover at Treatment Area H6 with Carlin Material (3:1 Slope and West Aspect) on the AA Leach Pad in 2007.
(Photo shows 6 years of growth)

Source: Cedar Creek Associates 2008.

Figure 2-6 Vegetative Cover at Treatment Area H7 with Carlin Material (3:1 Slope and East Aspect) on the AA Leach Pad in 2007.
(Photo shows 6 years of growth)

Source: Cedar Creek Associates 2008.

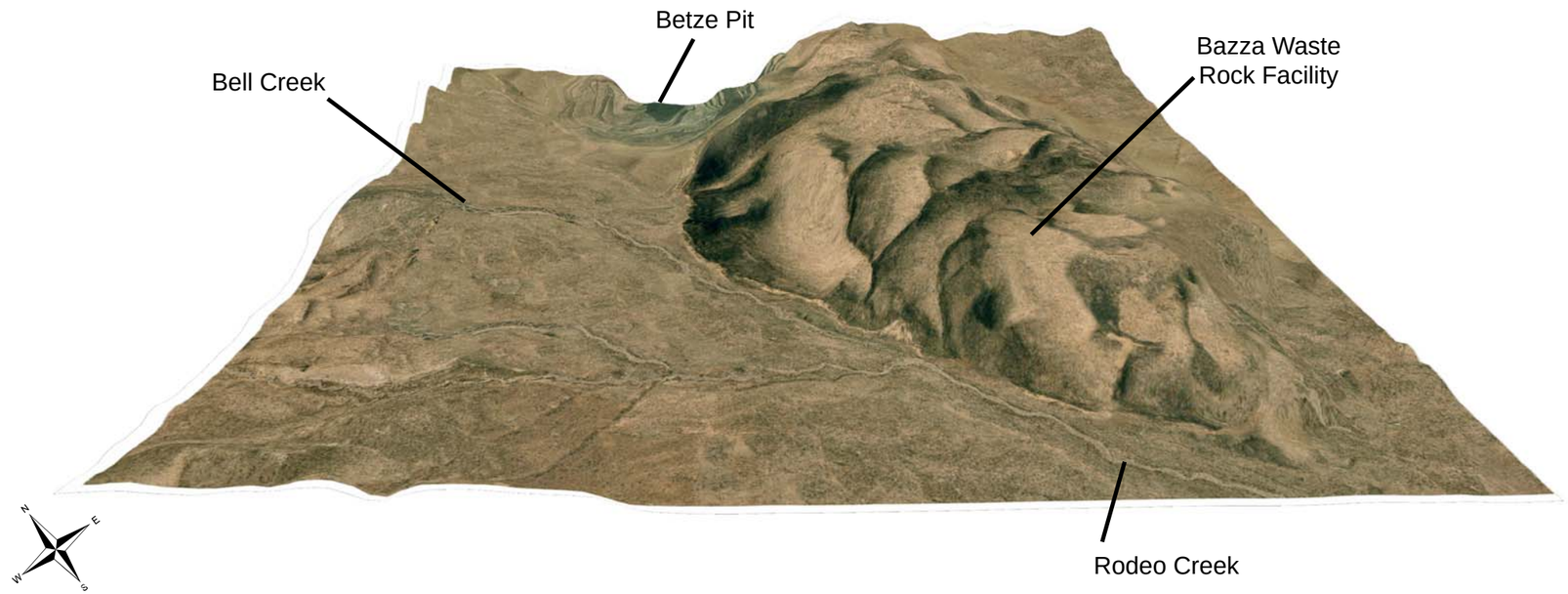
Figure 2-7 Vegetative Cover at Treatment Area AR3 with Topsoil (3:1 Slope and North Aspect) on the Bazza Waste Rock Facility Pad in 2007.
(Photo shows 7 years of growth)

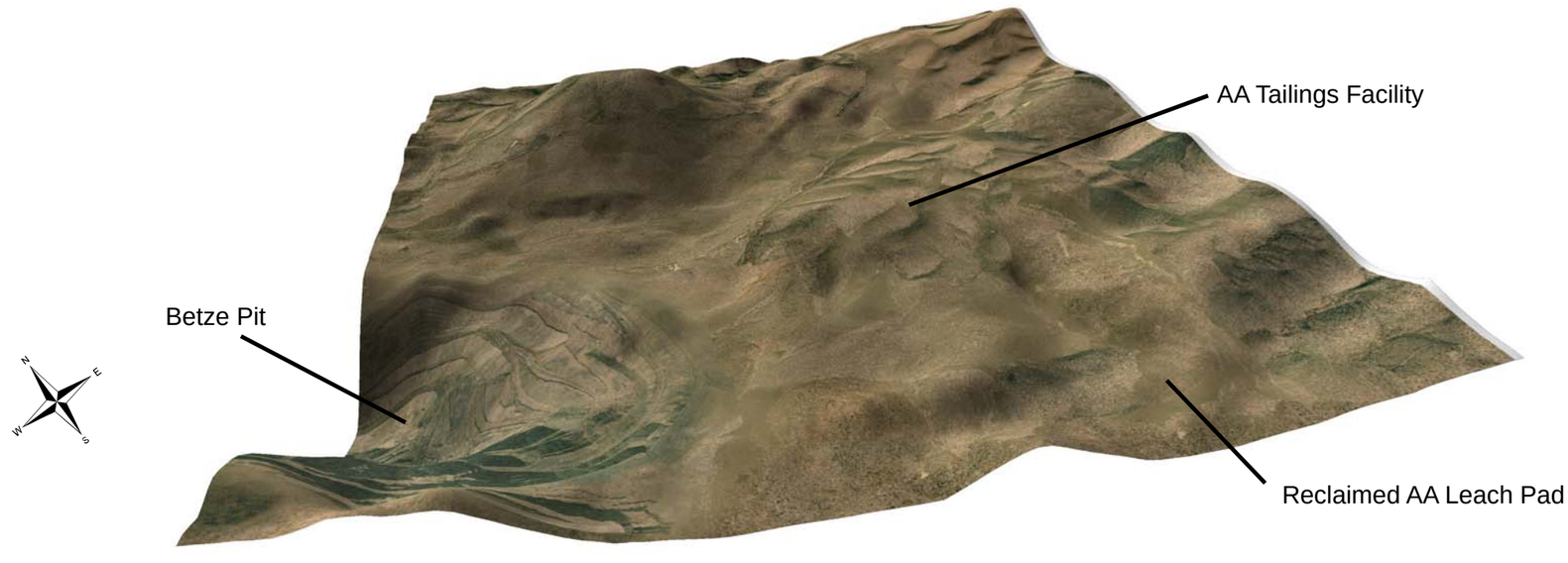
Note: Cheatgrass is present in some areas due to topsoil treatment.

Source: Cedar Creek Associates 2008.

Figure 2-8 Vegetative Cover at Treatment Area AS with Carlin Material (2.5:1 Slope and West Aspect) on the Bazza Waste Rock Facility in 2004.
(Photo shows 4 years of growth)

Source: Cedar Creek Associates 2008.





Source: BGMI 2008a.

Betze Pit
Expansion Project

Figure 2-9

No Action Alternative
Post-mining Reclamation
Topography

within the proposed disturbance area (i.e., ancillary disturbance area or completed portions of the waste rock facility) but located such that mining operations would not disturb them. To minimize wind and water erosion, the stockpiles are recontoured to slopes of 2.5H:1V and seeded with an interim seed mix (**Table 2-4**). Diversion channels and/or berms will be constructed around the stockpiles, as needed, to prevent erosion from overland runoff. In addition to direct reclamation, BMPs such as silt fences or straw bales will be used as necessary to contain sediment potentially liberated from direct precipitation. Alternately, the growth media is transported to, and redistributed on, mine-related surface disturbance areas undergoing concurrent reclamation (e.g., waste rock disposal facility). The salvaged soil has been used to construct berm stockpiles at the toe of the waste rock facility, thereby preventing waste rock from scattering downhill during placement. Following final regrading of the waste rock, the growth media berm will be hauled up onto the reshaped waste rock facility for spreading.

Table 2-4 Interim Reclamation Seed Mix

Common Name	Scientific Name	Application Rate (pounds pure live seed [PLS] per acre)
Crested Wheat Grass	*Agropyron cristatum*	12.0
Total Application Rate		**12.0**

Source: BGMI 2007a.

BGMI has been concurrently reclaiming waste rock facilities, tailing dams, leach pads, and topsoil stockpiles since 1987. Areas reclaimed are described in the Monitoring of Revegetation Efforts reports produced every 2 years by Cedar Creek Associates Inc. of Fort Collins, Colorado. BGMI's experience has shown the Carlin material to be superior to topsoil for the mine's reclamation needs. This material contains less nitrogen and does not harbor annual grass seed like topsoil. Topsoil can be placed at a horizon beneath the Carlin material, resulting in a growth medium with reduced invasive grass and weed species allowing a more desirable diverse plant community to establish.

The growth media replacement depth for the mine facilities (with the exception of the open pit) is a minimum of 12 inches based on reclamation experience at the Goldstrike Mine in accordance with the Revised Reclamation Plan and 2007 Three-year Update for the Goldstrike Mine Project (BGMI 2007e).

2.2.3.3 Seed Mixes

Prior to seeding, disturbance areas will be recontoured, surfaces will be ripped or scarified (where conditions warrant), and growth media will be redistributed. Where possible, seedbed preparation will be performed immediately prior to seeding to allow seed placement prior to soil recompaction. Seedbed preparation will consist of scarification. Seed will be applied with either a rangeland drill or with a mechanical broadcaster and harrow, depending upon accessibility. Seedbed preparation and seeding will take place in the fall after grading and topsoiling of reclaimed areas.

A reclamation seed mixture and application rate based on reclamation experience at the Goldstrike Mine and agency requirements are shown in **Table 2-5**. This mixture (or another suitable mix that is approved) would provide forage and cover species similar to the pre-disturbance conditions, facilitating the post-mining land uses of livestock grazing and wildlife habitat. In addition, the seed mix will be determined based on the species' effectiveness in providing erosion protection, the ability to grow within the constraints of the low annual precipitation experienced in the region, its suitability for site aspect, and the elevation and soil type. This seed mix and application rates are based on prior results and monitoring of reclaimed areas and test plots completed at the Goldstrike Mine.

Table 2-5 Reclamation Seed Mix

Common Name	Scientific Name	Species Number of Seeds/lb	Species Percent in Mix	Application Rate lbs. PLS/acre
Grasses				
Ephraim crested wheatgrass	*Agropyron cristatum* var. *ephraim*	200,000	4.5	0.5
Thickspike wheatgrass	*Agropyron dasystrachyum*	154,000	4.5	0.5
Bluebunch wheatgrass	*Agropyron spicatum*	117,000	31.8	3.5
Great Basin wildrye	*Elymus cinereus*	95,000	22.7	2.5
Big bluegrass	*Poa ampla*	917,000	2.3	0.25
Indian ricegrass	*Oryzopsis hymenoides*	188,000	4.5	0.5
Sandberg bluegrass	*Poa secunda*	925,000	2.3	0.25
Forbs				
Blue flax	*Linum lewisii*	293,000	2.3	0.25
Small burnet	*Sanguisorba minor*	55,000	4.4	0.5
Forage kochia	*Kochia prostrata* var. *immigrant*	407,700	0.9	0.1
Palmer penstemon	*Penstemon palmeri*	610,000	0.9	0.1
Shrubs				
Four-winged saltbush	*Atriplex canescens*	52,000	6.8	0.75
Antelope bitterbrush	*Purshia tridentate*	15,000	9.1	1
Winterfat	*Eurotia lanata*	111,000	2.3	0.25
Wyoming big sagebrush	*Artemesia tridentata wyomingensis*	2,500,000	0.5	0.05
Total				**10.8**

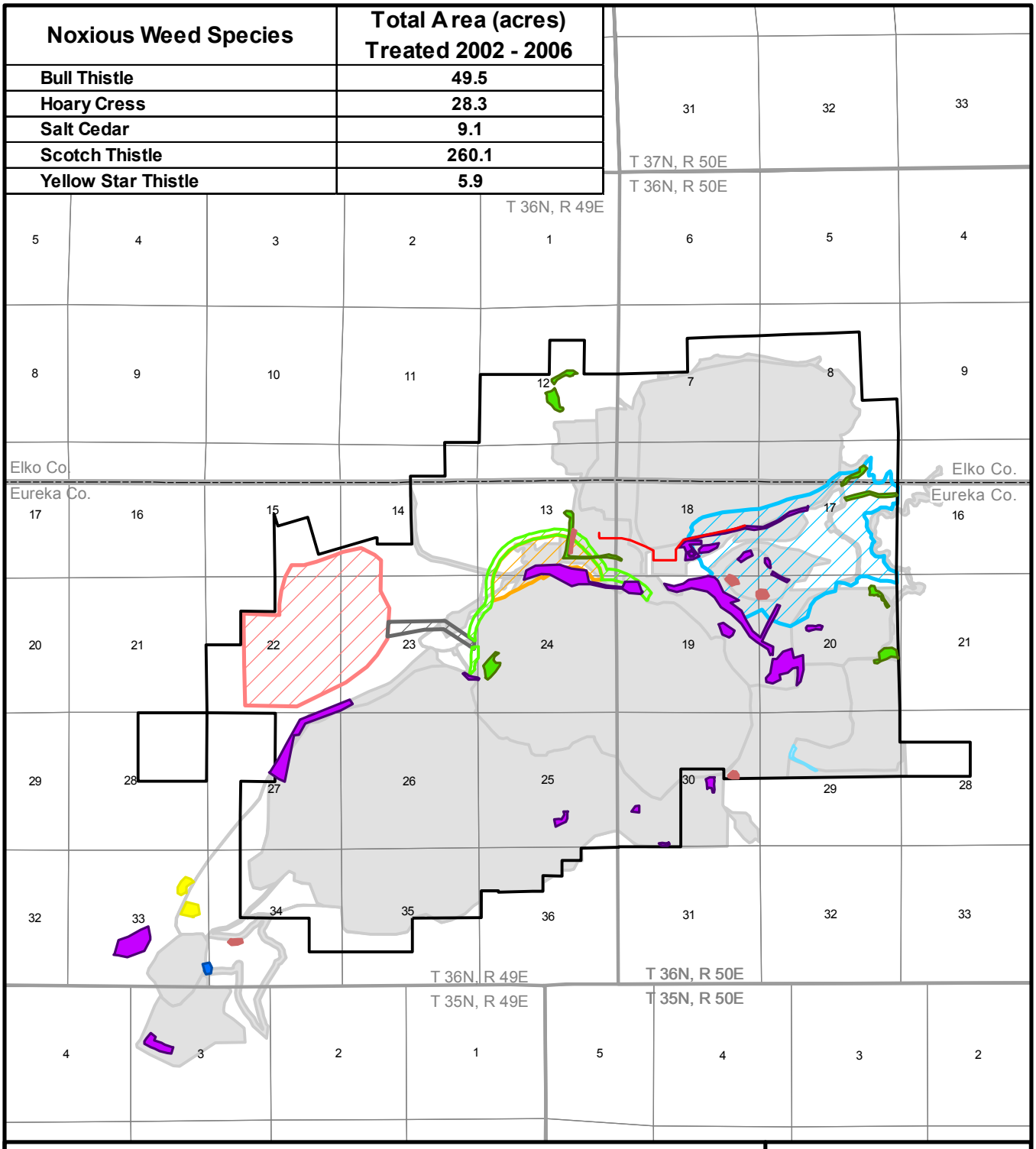
Source: BGMI 2007a.

2.2.3.4 Noxious Weed Management

BGMI has developed and implemented a noxious weed monitoring and control program for the Goldstrike Mine. The results of the annual monitoring program are used to update the plan and develop annual treatment programs. **Figure 2-10** presents noxious weed locations and species present. Noxious weeds shown were treated with appropriate herbicides from 2002 to 2006.

Weeds are actively monitored and managed on the Goldstrike property using prevention, training, monitoring, and eradication techniques. Disturbed ground is kept to a minimum to discourage weeds from establishing. Topsoil is handled in a manner that prevents weed seeds from being spread, and topsoil stockpiles and other growth media piles are seeded with nurse crops designed to out-compete weed species. When topsoil is

Noxious Weed Species	Total Area (acres) Treated 2002 - 2006
Bull Thistle	49.5
Hoary Cress	28.3
Salt Cedar	9.1
Scotch Thistle	260.1
Yellow Star Thistle	5.9



LEGEND

- Goldstrike Mine Operations Boundary
- Bull Thistle
- Hoary Cress
- Salt Cedar
- Scotch Thistle
- Scotch and Bull Thistle
- Yellow Star and Scotch Thistle
- Tailings Facility
- Pit Expansion
- Perimeter Buffer to Laybacks
- Waste Rock Facility
- Clydesdale Haul Road
- Previous Disturbance
- Tailings Pipelines

N

0 0.25 0.5 1 Miles

Source: BGMI 2008b.

Betze Pit Expansion Project

Figure 2-10

Noxious Weed Treatment Areas on Barrick Goldstrike Mine Site

06/26/2008

moved from a stockpile to a reclamation site, the outer surface is skimmed off to expose soil that has less viable weed seed. The outer rind is buried for later use after contained seeds die off.

Mine personnel who are involved with ground-disturbing activities are trained in the proper way to handle topsoil and growth media to prevent the spread of weed seeds. In the event that a particular noxious weed is identified on the property, appropriate personnel are notified and advised to assist in finding and eradicating the weeds. On a seasonal basis, a professional licensed herbicide applicator visits the Goldstrike Mine to monitor and eradicate weeds. Initially, the contractor canvasses the entire site looking for weeds. This visit is followed up by several rounds of herbicide application to ensure eradication of targeted species. The same contract applicator is generally chosen so the contractor develops a site history. This knowledge prepares the contractor for what weed species may be present, and which ones have been present on different locations of the mine in the past.

Weed recognition training is given to site personnel who in their daily routines travel to areas where weeds are expected to be found such as along access roads and mine rangeland interfaces.

2.2.3.5 Facility Reclamation

Existing permitted mine disturbance and facilities would be reclaimed according to the procedures and specifications described in the revised BGMI Goldstrike Reclamation Plan (2007e). The reclamation plan meets the requirements of BLM's 3809 regulations and the State of Nevada's NRS 519A regulations.

Existing permitted mine disturbance includes the Betze Pit, Rodeo and Meikle mines, Bazza Waste Rock Facility, North Block Tailings Facility, AA Tailings Facility, Mill No. 4 Tailings Facility, mine processing facilities, roads, and ancillary support facilities. As described earlier, reclamation of the 250-acre AA Leach Pad was initiated in 2000 and has been completed. Surface mine components would be permanently reclaimed and revegetated. Concurrent reclamation would be implemented where feasible.

In accordance with federal and state requirements, the following measures would be taken to prevent unnecessary or undue degradation for currently authorized actions:

- Mine facilities have been designed and constructed to meet or exceed BLM, NDEP, NDOW, and NDWR design criteria. Waste rock storage facilities and stockpiles that do not require engineered containment have been evaluated for their potential to release constituents and are being monitored routinely, and in accordance with an approved waste rock monitoring plan;
- Mineral exploration and development drill holes, monitoring and observation wells, and production dewatering wells subject to Nevada regulations would be properly plugged and abandoned to prevent potential contamination of water resources;
- Wastes are managed according to relevant regulations and BGMI management plans;
- Surface disturbance is minimized while optimizing the recovery of mineral resources;
- Fugitive dust emissions from disturbed and exposed surfaces is controlled in accordance with NDEP regulations and permits;
- Surface water drainage control is accomplished by diverting storm water, isolating facility runoff, and minimizing erosion; and
- Where suitable as a growth media, surface soils and some alluvial material in the open pit are managed as a growth media resource and removed, stockpiled, and would be used during reclamation.

The reclamation plan (BGMI 2007e) addresses earthwork and recontouring, revegetation and stabilization, chemical stabilization and disposal, and monitoring operations necessary to successfully reclaim the existing and authorized disturbance.

2.3 Proposed Action

2.3.1 Overview

BGMI would expand its existing operations at the Goldstrike Mine. An Amendment to the POO (NVN-70708) and Reclamation Permit (0026) for the Expansion of the Betze Pit, Goldstrike No. 3 Tailings Facility, and the Clydesdale Waste Rock Facility (the Amendment) for expansion of the Goldstrike Mine was submitted to the BLM in January 2007 by BGMI in compliance with BLM regulations (43 CFR Subpart 3809) and NDEP regulations governing the reclamation of mined lands (Nevada Administrative Code [NAC] 519A.010-635). A revised plan was submitted in June 2007 (BGMI and SRK 2007).

The proposed Betze Pit Expansion Project includes four major components (**Figure 2-11**):

- An expansion of the existing Betze Pit to include two additional laybacks to the north and west with associated in-pit and perimeter haul roads and buffer;
- The construction of a waste rock facility on the Clydesdale Block and associated access road and ephemeral stream crossing;
- Construction and operation of the Goldstrike No. 3 Tailings Facility; and
- An extension of surface mining and surface mining employment for 4 years.

The Proposed Action would extend the roaster facility use by up to 5 years and would allow for the accelerated reclamation of the existing Bazza Waste Rock Facility using Carlin material from the Betze Pit.

The proposed project would result in a total of approximately 1,180 acres of new surface disturbance within the 10,370-acre project boundary. **Table 2-6** presents a summary of surface disturbance associated with the proposed amendment. Some of the land under the proposed facilities has been previously disturbed. **Table 2-6** shows the change of use from one category to another and the net change in disturbance.

Table 2-6 Authorized and Proposed Disturbance for the Proposed Action

Component	Authorized Disturbance			Proposed Disturbance			Net Disturbance Change
	Public Acres	Private Acres	Total Existing Acres	Public Acres	Private Acres	Total Proposed Acres	
Pit Laybacks	-	-	-	23.0	103.0	126.0	126.0
Perimeter Buffer to Laybacks	-	-	-	26.5	62.5	89.0	89.0
Roads/Well Fields in Layback Area	7.1	79.2	86.3	-	-	-	(86.3)
Goldstrike No. 3 Tailings Facility[1]		-	-	46.0	644.0	690.0	690.0
Mill #4 Tailings Facility and Disturbance	9.0	202.0	211.0	-	-	-	(211.0)
Clydesdale Waste Rock Facility	-	-	-	400.0	135.0	535.0	535.0
Clydesdale Haul Road	-	-		14.1	22.7	36.8	36.8
Total[2]	**16**	**281**	**297**	**510**	**967**	**1,477**	**1,180**

[1]Includes approximately 211 acres of existing Mill #4 tailings storage facility and other reclaimed but not released areas previously authorized by BLM and NDEP.

[2]Totals have been rounded to the nearest acre.

Source: BGMI and SRK 2007; BGMI 2008a.

BGMI is currently authorized to disturb 7,882 acres (847 acres of public land and 7,035 acres of private land) within the authorized Goldstrike POO boundary associated with pits, waste rock facilities, heap leach facilities, tailings facilities, process buildings, roads, growth media stockpiles, and ancillary facilities. Roads in the layback area and Mill #4 Tailings Facility disturbances totaling 297 acres are categorized as previously authorized disturbance. Therefore, an additional net 1,180 acres (**Table 2-6**) associated with the Proposed Action would bring the total disturbed acreage to 9,062 acres.

2.3.2 Use and Occupancy of Public Lands

Subpart 3715 of 43 CFR identifies the requirements for use and "occupancy of public lands for the development of locatable mineral deposits by restricting such use or occupancy to that which is reasonably incident." BGMI is required to meet the specific conditions outlined in 43 CFR Subpart 3715.3-2 as the Proposed Action would affect 494 acres of public land managed by the BLM. A programmatic EA for mining claim, millsite use, and occupancy for selected actions was completed by the Nevada State Office of the BLM with a finding of no significant impact (BLM 2000c). The Programmatic EA provides the basis for a Determination of NEPA Adequacy for BGMI's proposed use and occupancy of public lands.

2.3.3 Land Ownership and Mining Claims

The proposed project would occur within the existing Goldstrike Mine operations boundary and would disturb approximately 494 acres (42 percent) of public lands within the POO boundary administered by the BLM Elko District Office and approximately 686 (58 percent) owned by BGMI (**Figure 1-2**). **Table 2-7** presents the legal description of the Proposed Action.

Table 2-7 Legal Description of Proposed Action

Township	Range	Section
36N	49E	13, 14, 15, 22, 23, 24, 25
36N	50E	17, 18, 19, 20

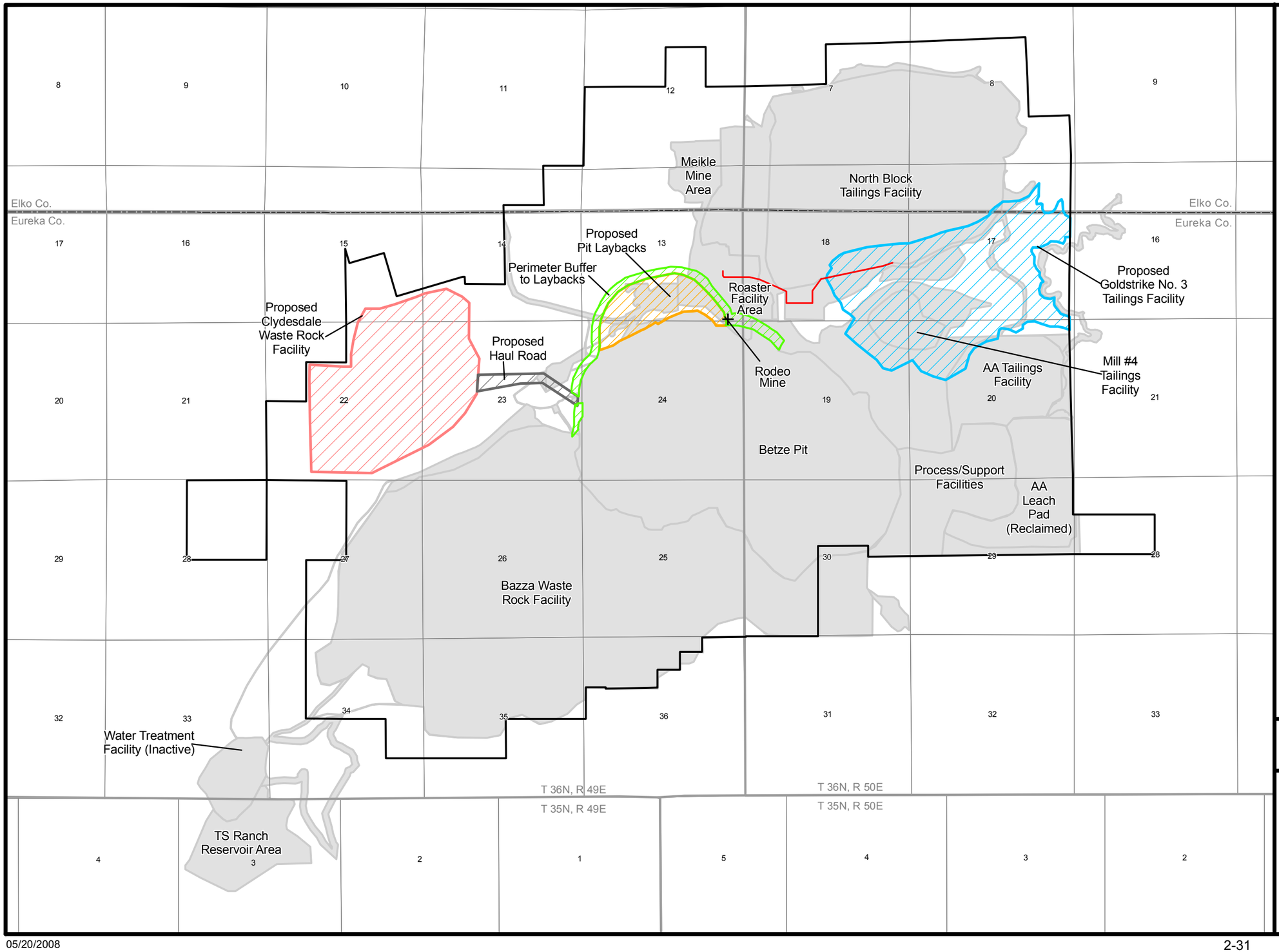
Source: BGMI and SRK 2007.

2.3.4 Schedule and Work Force

Construction and operation of the proposed Betze Pit Expansion Project is anticipated to be initiated in early 2009 pending authorization of required permits and approvals. Construction and operation of the proposed pit expansion would be completed in approximately 4 years. Mining of the second northwest layback would be undertaken in 2012 and would be followed by the third northwest layback in 2013. (Mining of the first northwest layback of the Betze Pit is currently authorized as part of the No Action Alternative.) Mining of the Betze Pit would be completed in approximately 2015. Ore processing from stockpiles would continue through 2031.

Underground mining at Meikle and Rodeo, which are immediately adjacent to the open pit are currently ongoing. This activity will continue through 2016. Manpower for this operation is included in the totals previously discussed.

Construction of the proposed Clydesdale Waste Rock Facility would begin in 2009 and continue through 2015. The Goldstrike No. 3 Tailings Facility would begin operation in 2011 and continue to operate through 2031. Concurrent reclamation would be conducted as areas and facilities become available. Reclamation of the Bazza Waste Rock Facility would be accelerated. Final reclamation and closure would occur 3 to 5 years beyond the useful life of each facility.



LEGEND

- Goldstrike Mine Operations Boundary
- Tailings Facility
- Pit Expansion
- Perimeter Buffer to Laybacks
- Waste Rock Facility
- Clydesdale Haul Road
- Previous Disturbance
- Tailings Pipelines

Source: BGMI and SRK 2007; BGMI 2007a.

N W E S

0 0.5 1 Miles

Betze Pit Expansion Project

Figure 2-11

Proposed Action Facilities

BGMI currently employs 1,600 workers at the existing Goldstrike Mine and approximately 200 contractors. BGMI would utilize the existing work force to complete the proposed project; as a result, no new employees would be hired. It is anticipated that the proposed project would provide employment at the mine through 2015 and at processing facilities through 2031. BGMI may utilize a contract work force to perform pre-stripping operations.

2.3.5 Expansion of Mining Operations

2.3.5.1 Expansion of the Betze Pit

Under the Proposed Action, the existing Betze Pit would be expanded to mine the ore deposit. Two contiguous pit laybacks are proposed: the second northwest and the third northwest. The first northwest layback will be mined under the No Action Alternative. Portions of the second and third northwest laybacks would be on public land and private land as shown in **Figure 1-2**. Approximately 23 acres would be located on public land and 103 acres would be located on private land. A perimeter buffer to the laybacks would include 26.5 acres of public land and 62.5 acres of private land. Existing facilities within the footprint of the proposed layback and buffer include dewatering wells, power distribution, and haul and access roads.

The layback area (**Figure 2-11**) would range in depth from approximately 1,140 feet to 1,260 feet. Crest elevations would range from 5,230 feet to 5,290 feet amsl. Benches would range from 20 to 60 feet in height, consistent with current bench heights. The layback areas would be approximately 4,300 feet long and approximately 1,100 feet wide at their maximum extent. The ultimate pit floor under the Proposed Action final wall layback is projected to be at an elevation of 4,120 feet (BGMI 2007a), which is above the currently authorized pit elevation of 3,600 feet or 3,575 feet amsl.

The design of the Betze Pit Expansion Project has been developed based on the configurations of the ore bodies as defined during exploration drilling, BGMI's experience in similar rock types, the results of geotechnical testing and hydrological studies, and surface mining industry and MSHA standards. Geologic structural mapping and open-pit wall and groundwater level monitoring would be conducted during mining to optimize pit design and ensure pit stability during operations. Slope movement monitoring would be continued to evaluate the safety of open-pit high walls. In addition, operational procedures for controlling blasting and bench scaling would facilitate mining of stable open-pit walls.

The western layback slopes generally exhibit favorable stability due to improved rock mass strengths, structural geology, and advanced depressurization of the rock mass. However, some adverse bedding orientations may require localized areas to have slightly flatter inter-ramp angles, compared to the rest of the layback near the upper ramps.

The removal of ore and waste rock from the proposed pit expansion areas would be accomplished using the same conventional open-pit mining methods (truck and shovel) currently used at the existing Betze Pit, including drilling, blasting, loading, and hauling (Sections 2.2.1.3 and 2.2.1.4). Mining would be conducted 24 hours per day, 7 days per week.

BGMI's waste rock classification system was formulated on the basis of geochemical testing of the ore to determine the balance of acid generation potential (AGP) and acid neutralization potential (ANP) and threshold levels of sulfide sulfur that would represent a risk of acid generation. PAG waste rock was defined as material with a net neutralization potential (NNP), which is the ANP minus the AGP, of less than 0 and a sulfide sulfur value greater than 0.3 percent. "Non-PAG" waste rock is classified as material with NNP greater than 0 or sulfide sulfur less than 0.3 percent (Schafer and Geosystems 2007). More detailed information on waste rock characterization and geochemistry is described in Section 3.3.1.8.

Both PAG and non-PAG waste rock would be removed with the ore and managed pursuant to the Waste Rock Management Plan for the Clydesdale Waste Rock Facility (Schafer and Geosystems Analysis 2007). The majority of the PAG material mined from this expansion would be placed as backfill within the pit under the

projected post-mining water level. Up to 10 percent of the PAG material would be placed in the proposed Clydesdale Waste Rock Facility. Non-PAG material mined from the expansion would be placed in the proposed Clydesdale Waste Rock Facility, in existing storage facilities, in the Betze Pit as backfill, or used to construct the proposed Goldstrike No. 3 Tailings Facility (BGMI and SRK 2007; Schafer 2007). **Table 2-8** presents the anticipated tonnage of material that would be removed from the proposed laybacks.

Table 2-8 Waste Rock, Carlin Material, and Ore Tonnages (millions of tons) to be Mined Under the Proposed Action

	2nd NW Layback	3rd NW Layback	Total
Non-PAG Waste Rock	125.5	185.0	310.5
PAG Waste Rock	2.1	2.4	4.5
Carlin Material	0.5	0	0.5
Ore	5.3	7.1	12.4
Total	**133.4**	**194.0**	**327.9**

Source: BGMI and SRK 2007.

A summary of the total annual ore and waste rock that would be mined from the Betze Pit, Meikle, and Rodeo underground mines is presented in **Table 2-9** and includes ore and waste rock to be mined under the Proposed Action as well as currently authorized ore and waste rock to be mined.

A list of the equipment requirements for the proposed laybacks is provided below in **Table 2-10**. This equipment is presently operating at the pit. BGMI may add to the mobile equipment fleet as part of The Proposed Action.

2.3.5.2 Haul Roads

A haul road would be constructed to provide for the transport of waste rock from the pit to the proposed Clydesdale Waste Rock Facility. The proposed road would be approximately 3,500 feet in length and would have a travel surface of 170 feet in width with a total width of 400 feet. The road would be constructed with safety berms on the outer edges and would be rocked, as needed, to provide for all weather travel. Drainage would be established between the road edge and safety berm.

The haul road would cross the historical drainages, which would not be carrying water since both Brush and Rodeo creeks would be diverted to the south perimeter of the Betze Pit. Corrugated metal pipe culverts would be placed at the Bell Creek crossing. The inlets and outlets for the culverts would be rip-rapped to minimize erosion and damage to the natural stream channel. The culverts would be designed to safely handle flows of a 100-year/24-hour storm event.

2.3.5.3 Waste Rock Facilities

Under the Proposed Action, a new waste rock facility (Clydesdale Waste Rock Facility) would be constructed. Waste rock from the proposed laybacks also would be placed in the existing Bazza Waste Rock Facility or as in-pit backfill.

Clydesdale Waste Rock Facility

The proposed Clydesdale Waste Rock Facility would accommodate up to 350 million tons of waste rock (**Figure 2-12**). To minimize haul distance and surface disturbance, the proposed facility would be constructed within the Clydesdale Block, approximately 3,500 feet west of the Betze Pit, and just west of the current

Table 2-9 Goldstrike Mine Estimated Ore and Waste Rock Annual Totals (in tons) that Include the Proposed Action

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Betze Pit																									
Total Ore Mined	5,967,000	12,826,000	6,242,000	12,094,000	9,635,000	11,669,000	6,923,000	7,656,000	4,197,000																
Total Waste Mined	133,962,000	124,160,000	134,912,000	129,700,000	132,942,000	131,661,000	136,094,000	109,259,000	8,000,000																
Total Mined	139,929,000	136,986,000	141,154,000	141,794,000	142,577,000	143,330,000	143,017,000	116,915,000	12,197,000																
Meikle Underground Mine																									
Total Ore Mined	564,061	602,634	574,502	531,419	522,163	417,088	377,319	313,178	210,463	103,180															
Total Waste Mined	196,705	135,031	151,258	192,251	154,782	94,495	93,801	46,167	47,545	18,438															
Total Mined	760,766	737,665	725,760	723,670	676,945	511,583	471,120	359,345	258,008	121,618															
Rodeo Underground Mine																									
Total Ore Mined	779,138	812,423	682,275	701,809	837,928	842,722	855,347	854,415	855,230	556,289															
Total Waste Mined	73,129	152,251	211,318	106,918	97,616	71,398	101,046	54,471	69,517	54,597															
Total Mined	852,267	964,674	893,593	808,727	935,544	914,120	956,393	908,886	924,747	610,886															
Total Process Throughput																									
Total Ore Processed	11,907,317	12,021,472	5,543,754	5,635,854	5,539,813	5,787,161	5,337,629	5,659,607	5,716,683	5,434,883	5,303,392	5,520,314	5,513,649	6,161,966	5,757,563	6,150,217	4,907,402	3,217,192	3,022,200	3,080,223	3,022,200	3,022,200	3,022,200	3,022,200	3,204,167

Source: BGMI 2007a.

Table 2-10 List of Expected Mine Mobile Equipment

Type of Equipment	Number
Electric shovels (P&H 2800 and 4100 classes)	4
Hydraulic shovel (Hitachi 5500-class)	1
Haul trucks (330-ton)	35 to 40
Rotary blasthole drills	7 to 10
Track bulldozers	5
Rubber-tired bulldozers	5
Graders	6
Water trucks	3

Source: BGMI and SRK 2007.

confluence of Bell and Rodeo creeks. The toe elevation would be approximately 5,150 feet amsl, and the crest elevation would be approximately 5,650 feet amsl for a facility height of approximately 500 feet. Cross-sections and profiles of the proposed facility are presented in **Figure 2-12**. To provide a spatial buffer for Bell and Rodeo creeks, the Clydesdale Waste Rock Facility will be set back at least 100 feet from the uppermost edge of the west creek bank.

The Clydesdale Waste Rock Facility would be engineered, constructed, and reclaimed in the same manner as the currently permitted Bazza Waste Rock Facility to ensure long-term stability and provide for effective reclamation. Mined waste rock would be hauled to the proposed Clydesdale Waste Rock Facility and placed by end dumping from haul trucks from the top of the active dump faces, resulting in working faces at the angle of repose (approximately 1.3H:1V). The bench heights would be in lifts of approximately 100 feet. Where feasible, the Clydesdale Waste Rock Facility would be built as a terraced structure to facilitate recontouring and reclamation. During reclamation, the terraces would be incorporated into the overall reclaimed slope at 2.5H:1V on the north and west slopes and at 2.8H:1V on the south and east slopes.

As required by NDEP, quarterly samples of distinct waste rock units currently are collected from the Betze Pit and subjected to meteoric water mobility and acid base accounting tests. Based on the results, any localized areas of acid-generating waste rock are placed internal to the waste rock disposal facility and encapsulated or blended with acid neutralizing waste rock prior to placement (Schafer and Geosystems 2007). These procedures, as well as specific waste rock handling procedures for the proposed Clydesdale storage facility, also would be implemented for the Betze Pit Expansion Project in accordance with the Waste Rock Management Plan for the Clydesdale Waste Rock Facility (Schafer and Geosystems 2007).

Approximately 310.5 million tons of non-PAG waste rock would be mined from the Betze Pit laybacks (**Table 2-8**). Most (90 percent) of the non-PAG waste rock would be placed in the Clydesdale Waste Rock Facility, or about 280 million tons. The remaining 10 percent (31 million tons) of non-PAG waste rock would go into the pit as backfill. The estimated PAG tonnage to be mined is 4.5 million tons. Ten percent of this would go into the Clydesdale Waste Rock Facility, or 0.45 million tons. Ninety percent of the PAG would go in the pit as backfill, or approximately 4.05 tons. By design, all PAG placed in the pit will be under the ultimate pit water level (BGMI and SRK 2007).

PAG waste rock routed to the proposed Clydesdale Waste Rock Facility would be placed in an encapsulated PAG cell within the facility. The PAG cell would have a minimum 50-foot setback from the base of the facility and would be overlain with a thick cover system. The 6-foot composite cover is designed to eliminate or reduce infiltration of water and oxygen. The non-PAG waste rock cover would consist of a minimum of 12 inches of either topsoil, Carlin material, or combination of materials (Schafer and Geosystems 2007).

To control erosion and for long-term stability of the proposed Clydesdale Waste Rock Facility, appropriate storm water controls would be constructed and the waste rock piles appropriately graded to control storm water runoff and runon. Engineered storm water diversions constructed upgradient of the facility, as needed, would be designed to accommodate flow from a 24-hour, 100-year storm event and would route the flow to the drainages downgradient (Bell, Rodeo, and Boulder creeks) of the facility. During operations, the waste rock facility would be visually monitored following spring snowmelt and intense rain events to ensure that drainage and sediment control measures are effective and operating properly.

This facility will disturb approximately 535 acres of public land but will allow for the accelerated reclamation of approximately 2,524 acres of the Bazza Waste Rock Facility. This accelerated reclamation is facilitated by the ability of the mine to utilize Carlin material that is mined during the early years of the proposed expansion as cover and growth media on the Bazza facility while other waste rock is diverted to the Clydesdale facility.

Betze Pit Backfill

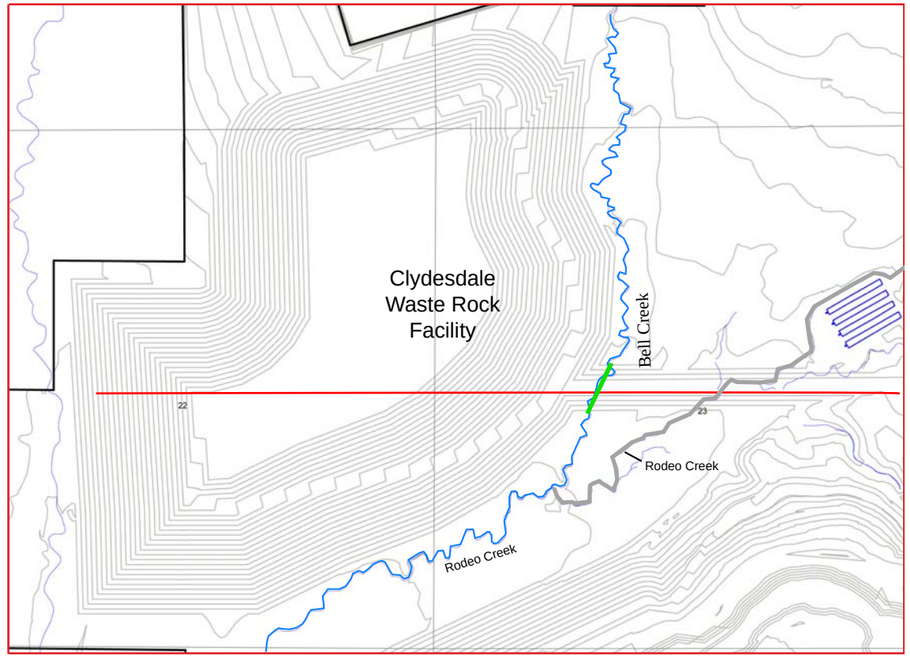
A portion of the waste rock from the Betze Pit will be placed in the existing Betze Pit backfill area (**Figure 2-13**). Three hundred seventy million tons of waste rock are proposed as backfill in addition to the 570 million tons of backfill in the current mine plan (Schafer 2007). Backfill would be placed in three zones including the lower backfill (<5,116 feet), middle backfill (5,116 to 5,246 feet), and upper backfill zone (>5,246 feet). The upper and middle backfill zones will be above water when the pit lake is completely inundated (Schafer 2008a). Section 3.3, Groundwater Resources and Geochemistry, further describes the Betze Pit backfill and pit lake.

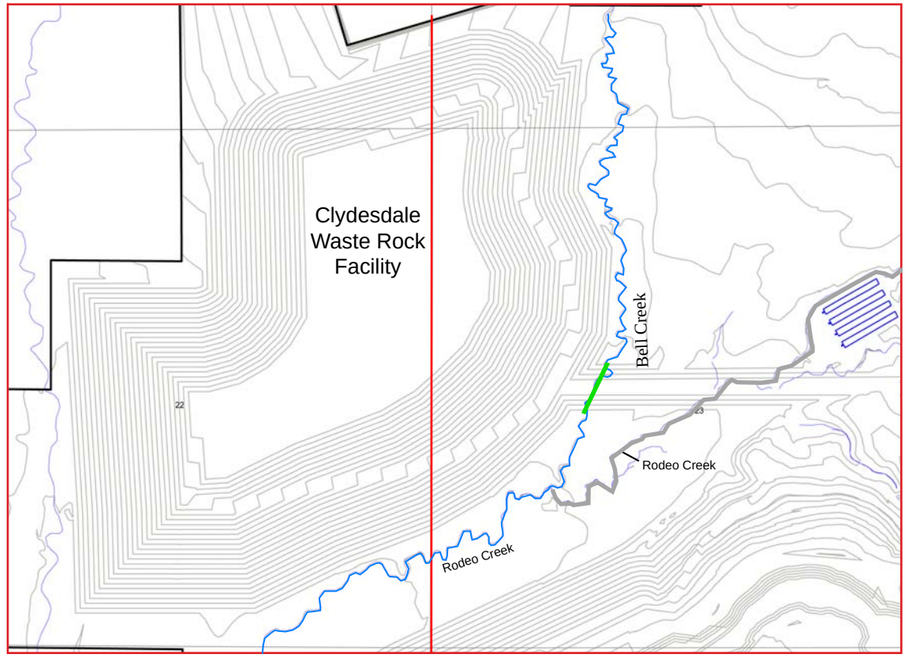
Approximately 4.5 million tons of PAG waste rock would be mined from the proposed Betze Pit laybacks (**Table 2-8**). Most (90 percent or about 4 million tons) of the PAG waste rock would be back-filled into the Betze Pit. PAG material would not be placed in the middle backfill zone. In addition, approximately 10 percent or about 31 million tons of the non-PAG waste rock material would be backfilled into the Betze Pit.

2.3.5.4 Goldstrike No. 3 Tailings Facility

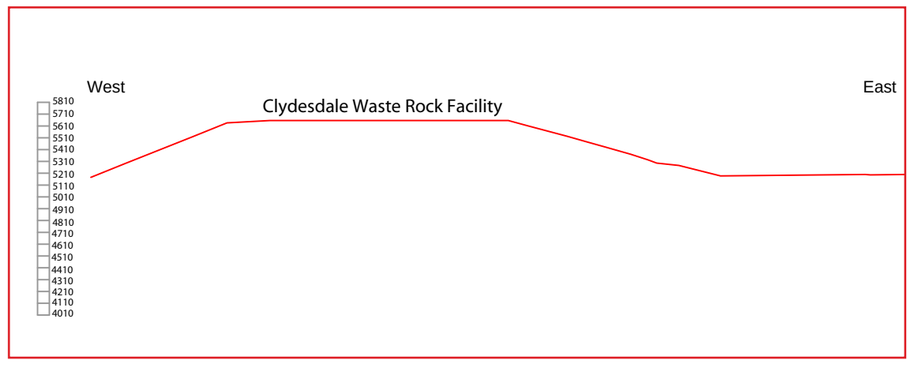
Tailings resulting from the processing of the mill-grade ore would be disposed of in a new tailings facility (Goldstrike No. 3 Tailings Facility). The Goldstrike No. 3 Tailings Facility would be located within the Brush Creek watershed, north of the existing AA Tailings Impoundment and south of the North Block Tailings Facility (**Figure 2-11**). The proposed facility would be constructed over the existing (inactive) Mill #4 Tailings Facility. The Mill #4 Tailings Facility is in temporary closure status (NAC 445.44) (NDEP 2005a). The presence of the Mill #4 Tailings Facility has required a modified design of the Goldstrike No. 3 Tailings Facility. The base of the Goldstrike No. 3 Tailings Facility has been designed with a footprint much larger than would be the case if the Mill #4 Tailings Facility were not present. This additional footprint, which provides a great deal of additional mass to support the dam, ensures the stability and safety of the new tailings dam as it is constructed over the older tailings facility. Construction of the proposed facility would occur in 2010 with operations beginning in 2011.

Dams, including tailings dams, constructed within the State of Nevada are regulated by the State Engineer as set forth in the NRS, Title 48 - Water, Chapter 532 – State Engineer. The State Engineer has produced regulations published in the NAC Chapter 535 – Dams and Other Obstructions. These regulations may be referenced at: http:\www.leg.state.nv.us/NAC/NAC-535.html. These regulations state in part that dams shall be designed by and constructed under the direct supervision of a Registered Professional Engineer by a licensed contractor, (NAC 535.260). The regulations also set forth certain minimum design criteria including those

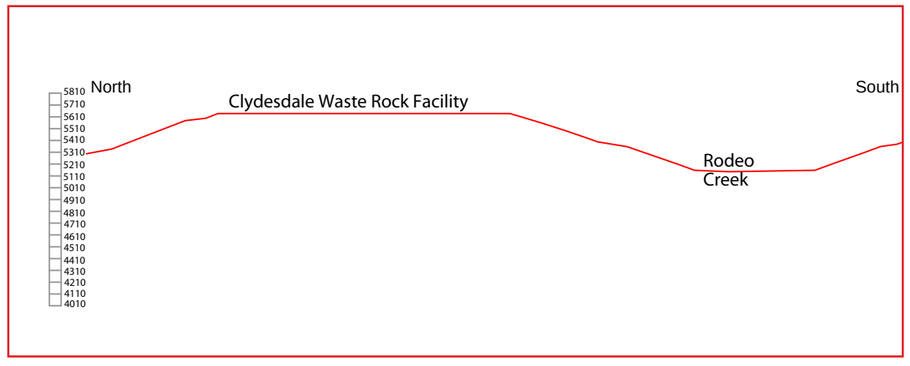




West-East Section



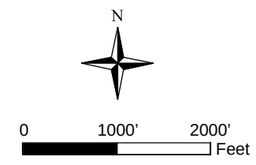
North-South Section



LEGEND

- Goldstrike Mine Operations Boundary
- Streams
- Retention Ponds
- Cross-section
- Culverts
- Rodeo Creek Channel Abandoned

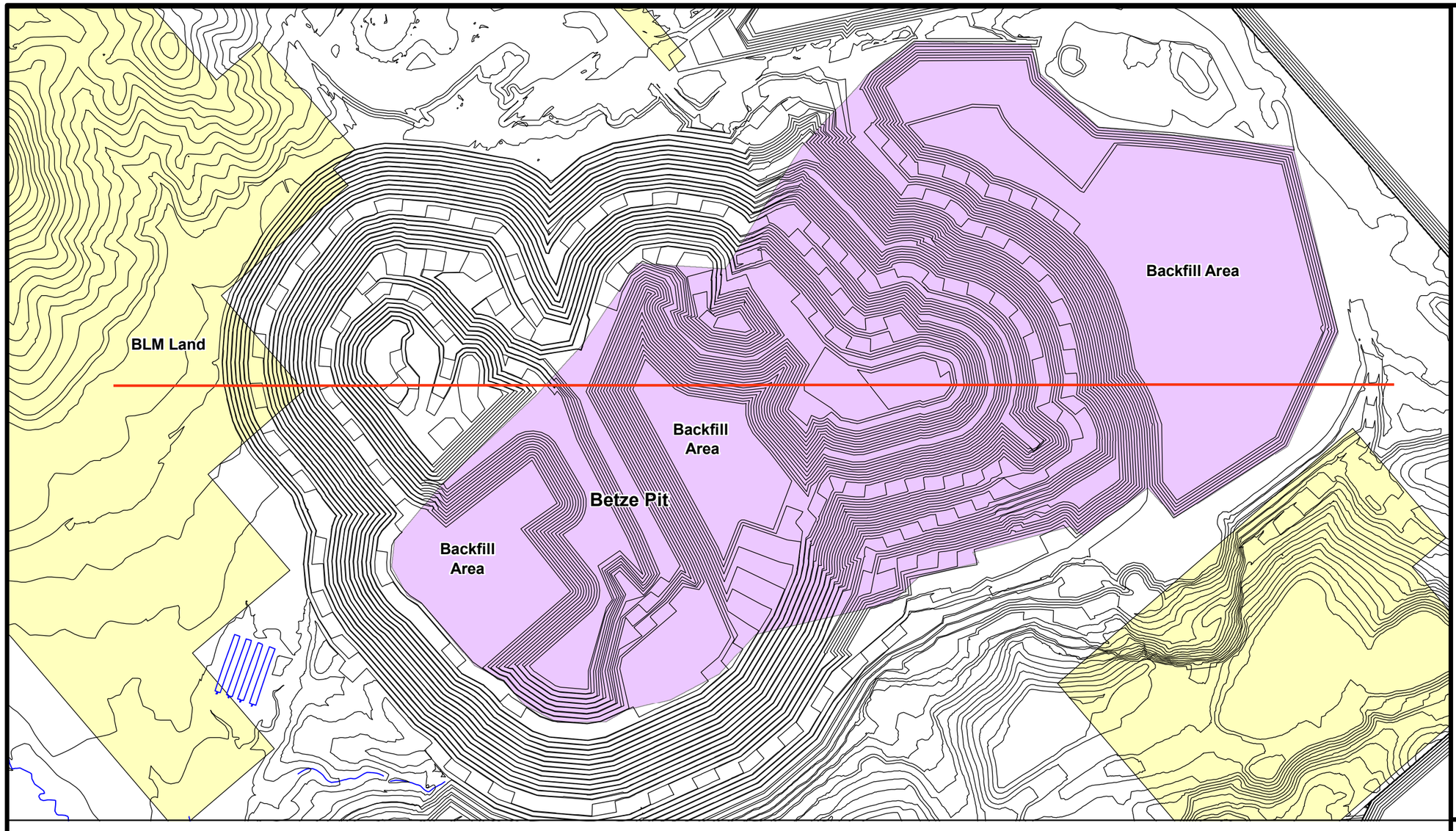
Source: BGMI and SRK 2007.



Betze Pit Expansion Project

Figure 2-12

Clydesdale Cross-section and Profile



LEGEND

- Cross Section
- Streams
- Retention Ponds
- Waste Rock Backfill Area
- BLM Land

Note: Contour Interval 20-feet.

Source: BGMI and SRK 2007; BGMI 2008a.

0 0.2 0.4 Miles

Betze Pit Expansion Project

Figure 2-13

Betze Pit Backfill Areas

concerning seismic stability (NAC 535.250). Additionally, the regulations stipulate that dams be periodically inspected by either the State Engineer's Office and the owner. These inspections are performed by a Registered Professional Engineer. Any defects or substandard conditions are noted and detailed in a report to the State Engineer who has the authority to order repairs. The proposed tailings facility would be constructed and operated according to these regulations. **Figure 2-14** shows the Goldstrike No. 3 Tailings Facility profile.

Facility Design

The Goldstrike No. 3 Tailings Disposal Facility design incorporates a zoned earth/rockfill dam with an ultimate crest elevation of 5,725 feet amsl. The facility embankment footprint would cover approximately 201 acres and would have a maximum height (crest to downstream toe) of approximately 335 feet. At its ultimate configuration, the facility would store approximately 115.4 million tons of tailings (assuming a dry density of 85 pounds per cubic foot), and the ultimate tailings surface would cover approximately 537 acres. A total footprint of 690 acres of land would ultimately be disturbed (644 acres of private land and 46 acres of public land). The total acreage of the embankment and the ultimate tailings surface exceed the final disturbance area because at its ultimate configuration, the tailings would be deposited over the upstream portion of the embankment disturbance (**Figure 2-14**).

The facility will be double lined with a leak capture system between the liners. Leaks will likely not occur for at least the life of the liner, which is conservatively estimated to be more than 200 years (Rowe 2005).

The tailings facility dam would be constructed in up to four stages using modified centerline construction techniques. A minimum crest width of 150 feet would be maintained to allow the embankment to be constructed using the existing mine construction equipment. The downstream embankment slopes would be constructed at a maximum slope of 2.5H:1V, while upstream slopes would be constructed at a maximum slope of 3H:1V to allow a 60-mil (1.5 millimeters) linear low density polyethylene (LLDPE) liner to be installed in the impoundment. The liner system in the impoundment and on the upstream face of the dam would be a composite liner, consisting of a compacted soil liner. The liner system would meet or exceed the NDEP requirement to provide protection equivalent to that of 12 inches of compacted soil with a maximum saturated hydraulic conductivity of $1x10^{-6}$ (centimeters per second [cm/sec]) overlain by a 60-mil LLDPE geosynthetic liner. These design specifications also would meet or exceed requirements under 43 CFR Subpart 3809 regulations and BLM guidance.

The embankment would incorporate an internal drain layer on the upstream face of the dam to capture seepage that may enter the embankment fill and prevent the development of a piezometric surface in the dam. The drain layer would be constructed using free-draining, durable, non-acid generating rock derived from mine operations.

The impoundment area would incorporate an underdrain system, which would be constructed beneath the composite liner to capture flows from springs or seeps within the Brush Creek basin, as well as an overdrain system, which would be constructed on top of the composite liner system to capture seepage from the tailings, aid tailings consolidation, and minimize head on the liner system. The underdrain system would consist of gravel drains with perforated high-density polyethylene (HDPE) pipes to efficiently collect flows and convey them downstream of the proposed embankment. In lieu of using gravel and perforated HDPE pipes, fabric wrapped polyethylene wick drains may be used for seepage collection above the liner. The wick drains would drain to a small gravel drain with a perforated collection pipe. During operations, the captured flow from the overdrain system would drain to a seepage collection sump downstream of the embankment, and then pumped back into the impoundment.

BGMI intends to extend the existing tailings pipelines that were terminated on the south leg of the North Block Tailings Dam to the proposed Goldstrike No. 3 Tailings Facility. Three 14-inch-diameter HDPE-lined steel pipelines would deliver tailings to the proposed tailings impoundment and one 14-inch steel pipeline would convey recycled process solution back to the roaster area. (**Figure 2-11**). These pipelines would be located

aboveground in a plastic-lined secondary containment corridor. A water reclaim pumping system would return water from the impoundment to the mill for reuse via the reclaim pipeline.

Surface water run-on would be controlled by the existing Brush Creek Diversion Channel. The diversion channel is located above (upgradient of) the ultimate tailings elevation and areal extent and is designed to convey the peak flow due to a 100-year/24-hour storm event occurring upstream of the diversion. The diverted Brush Creek eventually discharges into the Rodeo Creek Diversion Channel downstream of the existing Rodeo Creek Diversion Dam.

Facility Construction

The Goldstrike No. 3 Tailings Facility embankment and tailings impoundment area would be constructed in approximately four stages, depending on tailings production rates (**Figure 2-14**). Based on the anticipated production rates, the proposed stages and minimum elevations for each stage are provided in **Table 2-11**.

Table 2-11 Proposed Staged Construction of Goldstrike No. 3 Tailings Facility

Stage	Minimum Elevation (feet amsl)[1]
1 (Initial Construction)	5,600
2	5,654
3	5,688
4	5,725

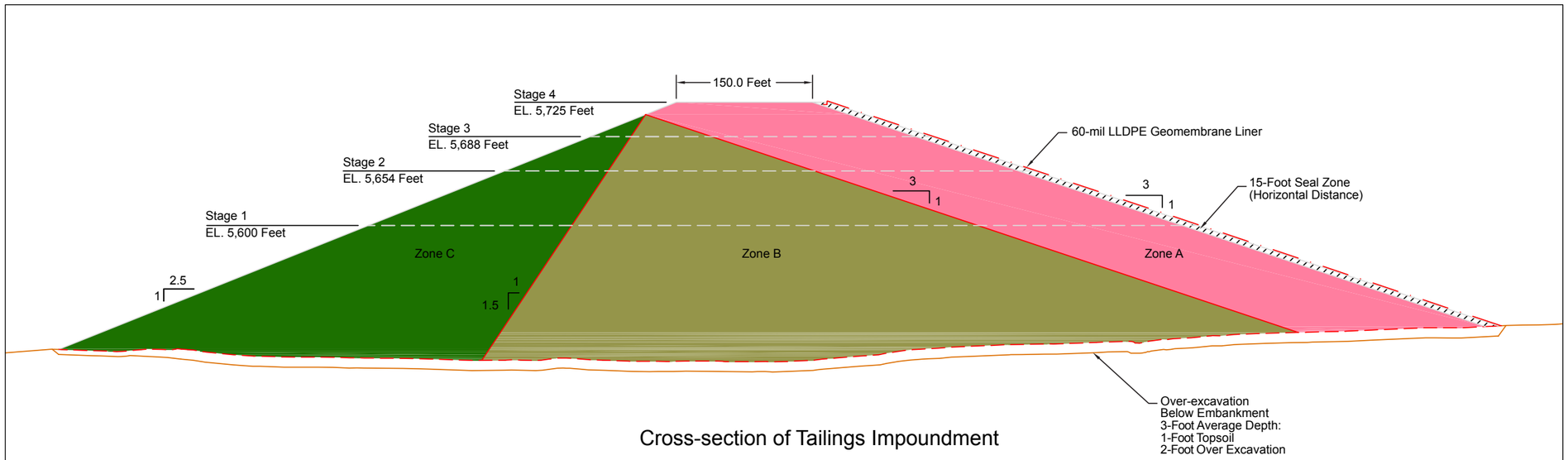
[1]Minimum elevation refers to the elevation of the lined portion of the embankment and the lined portion of the impoundment that would be constructed during each stage.

Source: BGMI and SRK 2007.

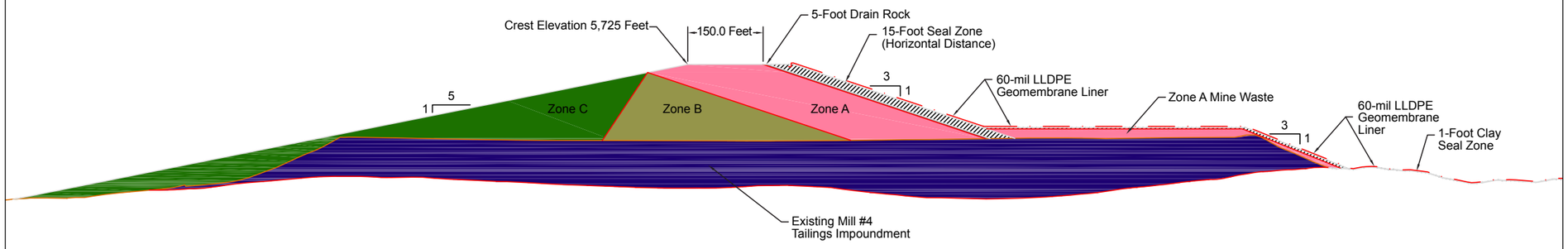
The footprint of the embankment would be prepared by stripping topsoil and over-excavating approximately 2 feet of foundation soils. The embankment would be constructed using modified centerline raise techniques; the maximum embankment footprint would be prepared during Stage 1 of construction. The foundation of the areas to be lined within the impoundment during later stages (Stages 2 through 4) would be prepared immediately prior to liner installation of that stage, as shown on **Figure 2-14**.

Embankment construction would use durable, non-PAG rock derived from open-pit mining operations at the Goldstrike Mine. Construction materials would be hauled and placed using the mine's existing haul trucks. The materials to be placed in the embankment are identified as Zone A, Zone B, or Zone C fills as shown in **Figure 2-14**. Each of the zones has a different specification for maximum lift thickness. Zone A fill would be placed in 4-foot lifts (maximum) if placed by mine equipment or 18-inch (maximum) lifts if placed using smaller equipment. Zone B would be placed in 8-foot lifts (maximum) using mine equipment, and Zone C fill would be placed in lifts with the maximum lift thickness to be determined during construction. In all cases, where mine equipment would be hauling and placing fill, compaction would be achieved by routing the haul trucks over the fills. This construction method is identical to that used in the construction of the existing North Block Tailings Facility embankments.

The liner system for the embankment would be constructed over the Zone A fill that would be placed on the upstream slope of the embankment. The liner system would consist of a compacted soil liner that meets or exceeds the NDEP requirement to provide protection equivalent to that of 12 inches of compacted soil with a maximum saturated hydraulic conductivity of $1x10^{-6}$ cm/sec, and a 60-mil LLDPE geosynthetic liner. Both the compacted soil liner and the LLDPE liner would be installed by a contractor. Third-party construction quality



Cross-section of Tailings Impoundment



Cross-section of Tailings Impoundment
Constructed over Mill #4 Tailings Impoundment

Source: BGMI and SRK 2007.

Betze Pit
Expansion Project

Figure 2-14

Goldstrike No. 3
Tailings Facility Profile

assurance would be provided for the soil liner and geosynthetic liner installation, as well as underdrain and overdrain construction to ensure the installation would be completed according to the technical specifications developed for the project during final design.

All necessary construction permits and modifications to operating permits would be obtained from the NDEP, BMRR, NDWR, and NDOW prior to initiation of facility construction.

Facility Operation

The Goldstrike No. 3 Tailings Facility would store thickened tailings as opposed to conventional slurried tailings to maximize storage volume and minimize long-term (closure or post-closure) management related to the consolidation and draindown of interstitial fluids contained within the tailings. The target for thickened tailings production is to produce a product containing 50 to 55 percent solids by weight. By means of comparison, the conventional tailings that are currently deposited in the existing North Block Tailings Facility are deposited at an average solids concentration of approximately 35 percent solids by weight. This thickened tailing has a decreased water content, higher density, and is expected to have a decreased draindown time over a conventional tailings facility.

The tailings would be deposited into the impoundment primarily from the west side of the impoundment to form a beach sloping toward the east, which also is away from the embankment. A small water pool is anticipated to form away from the embankment in response to the inflow of meteoric water from precipitation. Since the tailings would be deposited at a high solids content (50 to 55 percent solids, by weight), bleed water from the tailings would be minimized. The spigot locations would be rotated on a regular basis to distribute the tailings evenly throughout the impoundment and to ensure drying and consolidation of the tailings is maximized.

The facility would be operated as a zero discharge facility; as such, there would not be an emergency spillway constructed during operations. The facility is designed to store all anticipated inflows up to the Probable Maximum Flood determined for the facility. In the event of a large magnitude precipitation event, the facility would be able to store the accumulated runoff and eliminate the excess accumulated water by consuming it within the process circuit as is currently done in the existing North Block Tailings Facility. Tailing delivered to this facility will have undergone a cyanide destruct process. This process treats the tailings to a cyanide level that is below that considered to be harmful to waterfowl and wildlife (50 parts per million [ppm]) (Donato et al. 2007). The Roaster currently uses the INCO process, which utilizes sulfur dioxide (SO_2) and air along with ammonium bi-sulfite.

Facility Monitoring and Maintenance

The proposed Goldstrike No. 3 Tailings Facility components would undergo regular inspection, monitoring, and maintenance. These include the tailings distribution pumps, the tailings distribution pipelines, valves, and spigots, the water reclaim pump, and the water reclaim pipeline and valves. The tailings distribution and water reclaim systems would be checked daily for leaks and to ensure the pumps were functioning properly.

During facility operation, the process components would be inspected on a daily basis. Other facility components, such as the embankment itself, the lining system, the overdrain system, and the underdrain system would be periodically monitored. Examples of periodic monitoring include:

- Performing quarterly topographic surveys of the tailings and the water pool;
- Obtaining regular readings of instrumentation installed in the embankment (i.e., inclinometers and vibrating wire piezometers);
- Obtaining readings of instrumentation installed within the tailings and drainage components (i.e., vibrating wire piezometers);
- Obtaining readings from flowmeters measuring flow from the overdrain and underdrain systems; and

- Performing visual inspections of the embankment, the tailings impoundment area, and flow components.

Samples of overdrain and underdrain flows would be taken periodically to check the chemistry of the flows and sent to a NDEP-certified analytical testing laboratory for analysis. The frequency of the readings of the instrumentation and sampling of flows would vary between weekly and quarterly, depending upon the performance of each of the facility components. In the event there is any concern regarding the performance of any specific components, the frequency of readings or observations would be increased to ensure proper operation. Thorough dam safety inspections would be completed annually in accordance with BGMI's corporate policies on dam safety as well as those established by the NDWR.

2.3.5.5 Electric Utilities

In order to accommodate construction of the proposed Clydesdale Waste Rock Facility, the existing 120-kilovolt (kV) powerline would be rerouted around the south and west part of the proposed facility. A total of 7,500 feet of transmission line would be removed and 9,500 feet would be installed as part of the Proposed Action.

2.3.6 Applicant-committed Environmental Protection Measures

During construction and operation of the Betze Pit Expansion Project, BGMI would implement applicant-committed environmental protection measures to mitigate potential impacts to air, land, water, wildlife, cultural resources, and human resources and to prevent undue or unnecessary degradation of the resources in the project area as part of the proposed project's standard operating procedures. Pre-development planning, pollution prevention measures, and pollution control measures and equipment would be used to reduce potential project-generated environmental impacts.

Proposed environmental protection measures applicable to the Proposed Action have been adopted from the Amendment to the POO (NVN-70708), (BGMI and SRK 2007), Betze Project SEIS (BLM 2003a), and Betze Project EIS (BLM 1991a,b). These measures are identified below.

2.3.6.1 Geology

- Geotechnical monitoring, consisting of geologic structure mapping, groundwater monitoring, and slope stability analyses, would be conducted during active mining to assist in optimizing the final pit design. Slope movement monitoring also would be initiated to evaluate the safety of the open-pit high walls. In addition, operational procedures for controlling blasting and bench scaling would facilitate mining with stable pit walls.

2.3.6.2 Water Resources

- To minimize impacts to water resources, the proposed new tailings facility would be designed and operated as a zero discharge facility, with a composite liner system in accordance with NDEP criteria.
- Selective placement of waste rock, as needed, and routine monitoring of the waste rock disposal facilities (Clydesdale and Betze Pit backfill) during operations would be implemented to reduce the potential for acid rock drainage.
- To limit erosion and reduce sediment transport from project disturbance areas, erosion control measures, as outlined in the project's SWPPP and Reclamation Plan, would be installed as needed and maintained. To further reduce erosion potential, storm water diversions would be installed upgradient and around project facilities, as needed, to divert storm water runoff around disturbance areas. Facilities would be graded appropriately and monitored following spring snowmelt and intense rain events to ensure that drainage and sediment control measures are effective and operating properly. In addition, implementation of concurrent reclamation would further reduce erosion potential.

- Groundwater monitoring would be conducted to ensure compliance with permit criteria and to provide for early identification of potential impacts. The existing groundwater monitoring plan would be updated as necessary to include new facilities.
- All mineral exploration and development drill holes, and monitoring and observation wells would be properly plugged and abandoned following completion of their functions to prevent contamination of groundwater resources.
- One hundred tons of limestone would be placed in the pit bottom to act as a neutralizing buffer for any potentially acidic runoff which may occur during the initial years prior to the groundwater table's recharge above the pit floor. This potentially acidic runoff may occur in the pit lake regardless of Rodeo Creek Diversion closure option when meteoric water falls upon and travels over exposed PAG wall rock prior to the formation of the pit lake.

2.3.6.3 Soils, Vegetation, and Invasive and Non-native Species

- To minimize impacts to soils and provide for re-establishment of vegetation, suitable growth media would be salvaged and stockpiled during the Betze Pit expansion and during Clydesdale Waste Rock Facility construction for subsequent use in reclamation. The growth media also would be transported to, and redistributed on, mine-related surface disturbance areas undergoing concurrent reclamation (e.g., Bazza Waste Rock Facility).
- BMPs, as described in BGMI's SWPPP for Industrial Activities (JBR 2003), and conditions specified in the storm water permit (NVR300000) issued June 1, 2007, would be implemented to limit erosion from project facilities and disturbance areas during and following construction, operations, and initial stages of reclamation. These practices may include, but would not be limited to, installation of storm water diversions to route water around disturbance areas and project facilities using accepted engineering practices, and the placement of erosion control devices (e.g., silt fences, staked weed-free straw bales, riprap, sediment traps, etc. To ensure long-term erosion control, all sediment and erosion control measures would be inspected periodically, and repairs would be performed as needed.
- Waste rock facilities would be contoured where feasible to provide for the most hydrologically stable reclamation landform possible. Channel morphology and grade and bed materials would be designed to resemble natural drainage features whenever feasible.
- Revegetation of disturbance areas would be conducted as soon as practical to reduce the potential for wind and water erosion, minimize impacts to soils and vegetation, help prevent the spread of invasive and non-native species in disturbance areas, and facilitate post-mining land uses. Following construction activities, areas such as cut-and-fill embankments and growth media stockpiles would be seeded. Concurrent reclamation would be conducted to the extent practical to accelerate revegetation of disturbance areas. All sediment and erosion control measures and revegetated areas would be inspected periodically to ensure long-term erosion control and successful reclamation, and repairs would be performed as needed.
- To minimize the introduction and spread of noxious weeds in project-related disturbance areas, revegetation efforts described in the 2006 Goldstrike Mine Revegetation Efforts, Monitoring, Evaluation, and Recommendations Report would be implemented (Cedar Creek Associates 2007a). The plan outlines procedures for the prevention, monitoring, and treatment of noxious weed infestations. The results of the monitoring program would provide the basis for updating the plan, if needed.
- Seed Company certified weed-free seed mixes would be used for reclamation.

2.3.6.4 Wildlife and Special Status Species

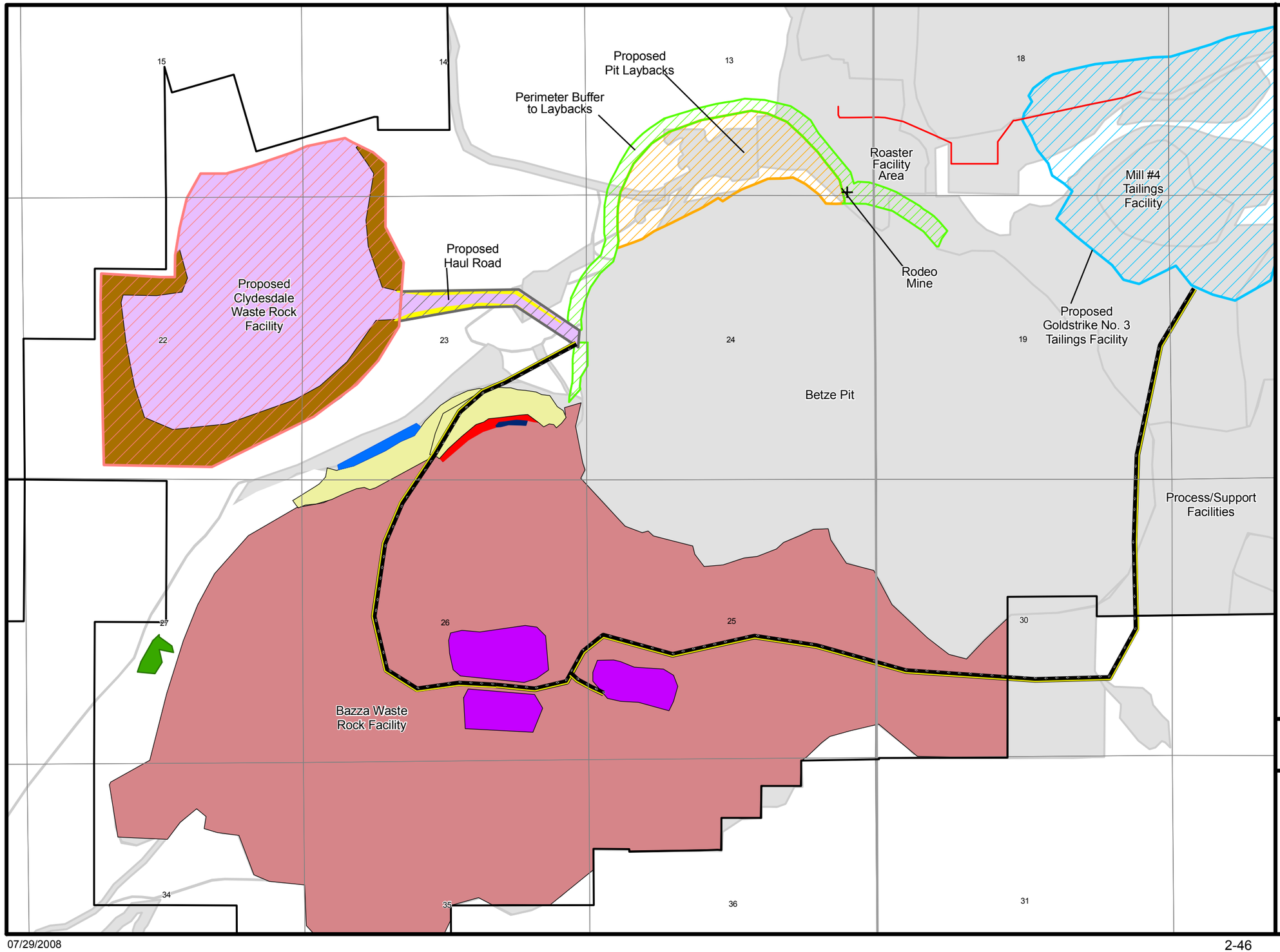
- To minimize potential impacts to wildlife species, weak acid dissociable (WAD) cyanide concentrations in the tailings impoundments would be maintained at non-lethal levels.

- In the event that initiation of the proposed project should occur during the raptor nesting season (March 1 through July 31), a raptor survey would be conducted, and appropriate mitigation measures, such as buffer zones around occupied nests, would be developed and implemented, as needed.
- To protect nesting birds, removal of migratory bird habitat on currently undisturbed lands in the project area would be avoided to the extent possible between March 1 and July 31. Should removal of habitat be required during this period, BGMI would coordinate with the BLM and NDOW to conduct breeding bird surveys and implement appropriate mitigation, such as buffer zones around occupied nests, as needed.
- To minimize wildlife/vehicle-related collision impacts during project operations, BGMI would continue its mandatory employee education program for all personnel.
- The rerouted transmission line segment would be designed and constructed to follow Avian Powerline Interaction Committee (APLIC) guidelines to minimize raptor electrocution potential. Anti-perching features would be incorporated on the rerouted transmission line segment to minimize raptor predation on greater sage-grouse. These measures are required by the 1991 Betze Project ROD.
- BGMI will assist in big game migration data collection by measures set forth by the BLM and NDOW. BGMI also will work with BLM, NDOW, and other mining proponents for a long-term solution to preserving the Area 6 big game migration corridor.
- To maintain the wildlife migration corridor near the Clydesdale Waste Rock Facility, the western portions of the Bazza Waste Rock Facility will be reclaimed concurrently or before the initial stages of the Clydesdale Waste Rock Facility construction (**Figure 2-15**). In accordance with environmental controls overseen by NDEP, material will be placed on the eastern edge of the Clydesdale Waste Rock Facility first so that reclamation can begin as soon as possible, progressing the Clydesdale's construction from east to west to allow reclamation that will reestablish the mule deer migration corridor in the least amount of time.
- Implementation of the proposed Reclamation Plan would minimize habitat impacts for wildlife species. Implementation of the plan also would minimize impacts to range resources through the re-establishment of forage.

2.3.6.5 Cultural Resources

- Five historic properties (i.e., sites eligible for nomination to the National Register of Historic Places [NRHP]) would be impacted by the expansion project. A treatment plan for the five historic properties within the proposed expansion was developed by a BLM approved archaeological contractor. BLM and State Historic Preservation Office (SHPO) reviewed and approved the plan as specified in the 1991 Programmatic Agreement (PA). The contractor completed the field work in the fall of 2007, and analysis and write-up are underway. The draft report will be submitted by July 11, 2008, for review and approval by BLM and SHPO.
- If previously undocumented cultural resource sites are discovered during construction of the mine facilities, construction would be halted in the area of the discovery, and the BLM Authorized Officer would be contacted to evaluate the find. If the site is eligible for listing on the NRHP, impacts would be mitigated through avoidance or an appropriate data recovery program developed pursuant to the 1991 PA among the BLM, Nevada SHPO, and BGMI.

BGMI would train employees and contractors in their responsibilities to protect cultural resources and enforce BGMI's policy against off-road cross-country travel and the removal of artifacts. BGMI also would implement a site monitoring program to ensure that damage does not occur to the remaining historic properties.



LEGEND

- Goldstrike Mine Operations Boundary
- Tailings Facility
- Pit Expansion
- Perimeter Buffer to Laybacks
- Waste Rock Facility
- Clydesdale Haul Road
- Previous Disturbance
- Tailings Pipelines

Reclamation Timing[1]

- 1990
- 1995
- 2000
- 2001
- 2002
- 2009 - 2012
- 2010
- 2013
- 2016 - 2018
- 2033 - 2035
- Stockpile Access Road

[1]All dates are dependent on January 2009 start.

Source: BGMI and SRK 2007; BGMI 2007a, 2008a.

N W E S

0 0.25 0.5 Miles

Betze Pit Expansion Project

Figure 2-15

Reclamation Chronology: Clydesdale and Bazza Waste Rock Facilities

2.3.6.6 Air Quality

- Fugitive dust controls, including water application on haul roads and other disturbed areas, chemical dust suppressant application (e.g., magnesium chloride), where appropriate, and application of other BMPs as approved by the NDEP Bureau of Air Pollution Control (BAPC), currently are, and would continue to be, implemented.
- The Goldstrike Mine currently operates with state-of-the-art mercury controls on its process facilities. Controls would be periodically evaluated and upgraded in accordance with the State of Nevada Mercury Control Program, which requires the incorporation of Maximum Achievable Control Technology (MACT).
- Temporary disturbance areas (e.g., growth media stockpiles, cut and fill embankments, etc.) would be seeded with an interim seed mix, and concurrent reclamation would be implemented on completed portions of the waste rock facilities, thereby minimizing fugitive dust emissions.
- To control combustion emissions, all manufacturer installed pollution control equipment would be operated and maintained in good working order.

2.3.6.7 Socioeconomics

- Development of post-mining land use plans may include future utilization of mine infrastructure for long-term economic benefits for the region.

2.3.6.8 Visual Resources

- During operations, the margins of the waste rock facilities would be constructed to provide for variable topography during final regrading, thereby providing a more natural post-mining landscape.
- Following the completion of mining, structures and buildings may be dismantled and removed from the site.
- Concurrent reclamation would be implemented to the extent possible.
- Waste rock facilities would be contoured where feasible to provide a natural looking post-reclamation land form.

2.3.6.9 Hazardous Materials

- Prior to initiation of the project, the existing Environmental Incident Response Manual (BGMI 2007b) would be amended, as necessary, to include the Betze Pit Expansion Project. Implementation of the prevention, containment, and cleanup procedures in this plan would minimize the potential for related impacts to soils, vegetation, wildlife, and water resources.
- Prior to initiation of the project, the existing Solid and Hazardous Waste Management Plan (JBR 2006) would be amended, as necessary, to include the Betze Pit Expansion Project. Implementation of the management procedures for the handling of solid and hazardous waste generated at the site, reagent storage, transportation, and handling requirements would minimize the potential for related impacts to soils, vegetation, wildlife, and water resources.

2.3.6.10 General Measures

- To the extent practical, BGMI would protect all survey monuments, witness corners, reference monuments, bearing trees, and line trees against unnecessary or undue destruction or damage. Public land survey system monuments would be protected and preserved in accordance with Nevada BLM Instructional Memorandum (IM) No. NV-2007-003. If destroyed, BGMI immediately would report the matter to the Authorized Officer.

2.3.7 Reclamation and Site Closure Plans

2.3.7.1 Changes to Existing Mine Reclamation Plans

Reclamation of the currently permitted facilities would continue to be conducted in accordance with the previously approved Revised Reclamation Plan and 2007 Three-year Update for the Goldstrike Mine Project (BGMI 2007e). This plan provided the basis for development of the draft reclamation plan for the proposed Betze Pit Expansion Project, as presented in the Amendment to the POO (NVN-70708) and Reclamation Permit (0026) for the Expansion of the Betze Pit, the Goldstrike No. 3 Tailings Facility and the Clydesdale Waste Rock Facility (BGMI and SRK 2007). Prior to initiation of the project, the reclamation plan would be revised, if needed, and submitted to the BLM and NDEP for final approval. The intent of the project's reclamation program is to restore the project area to a beneficial post-mining land use, prevent undue or unnecessary degradation to resources, and reclaim disturbed areas such that they would be visually and functionally compatible with the surrounding topography.

The areas of proposed disturbance include the following components: pit laybacks, waste rock facilities, tailings facility, tailings pipeline, powerline relocation, and haul road (see **Table 2-6**). With the exception of pit highwalls, ramps, and floors, all of the surface disturbance associated with these mine components would be reclaimed. Non-highwall portions of the open pit above the predicted pit lake level would be revegetated to the extent practicable.

BGMI believes that terminating Rodeo Creek into the Betze Pit at the end of mining is the best choice for the long-term management of Rodeo Creek. The potential diversion of Rodeo Creek in to the Betze Pit at the end of mining is a closure option. To that end, BGMI will apply for the necessary permits from the State of Nevada at the time of mine closure. If such a permit is not granted, Rodeo Creek will remain as a diversion on the south side of the pit, entirely on privately held lands. In either case, no permit from the BLM is necessary.

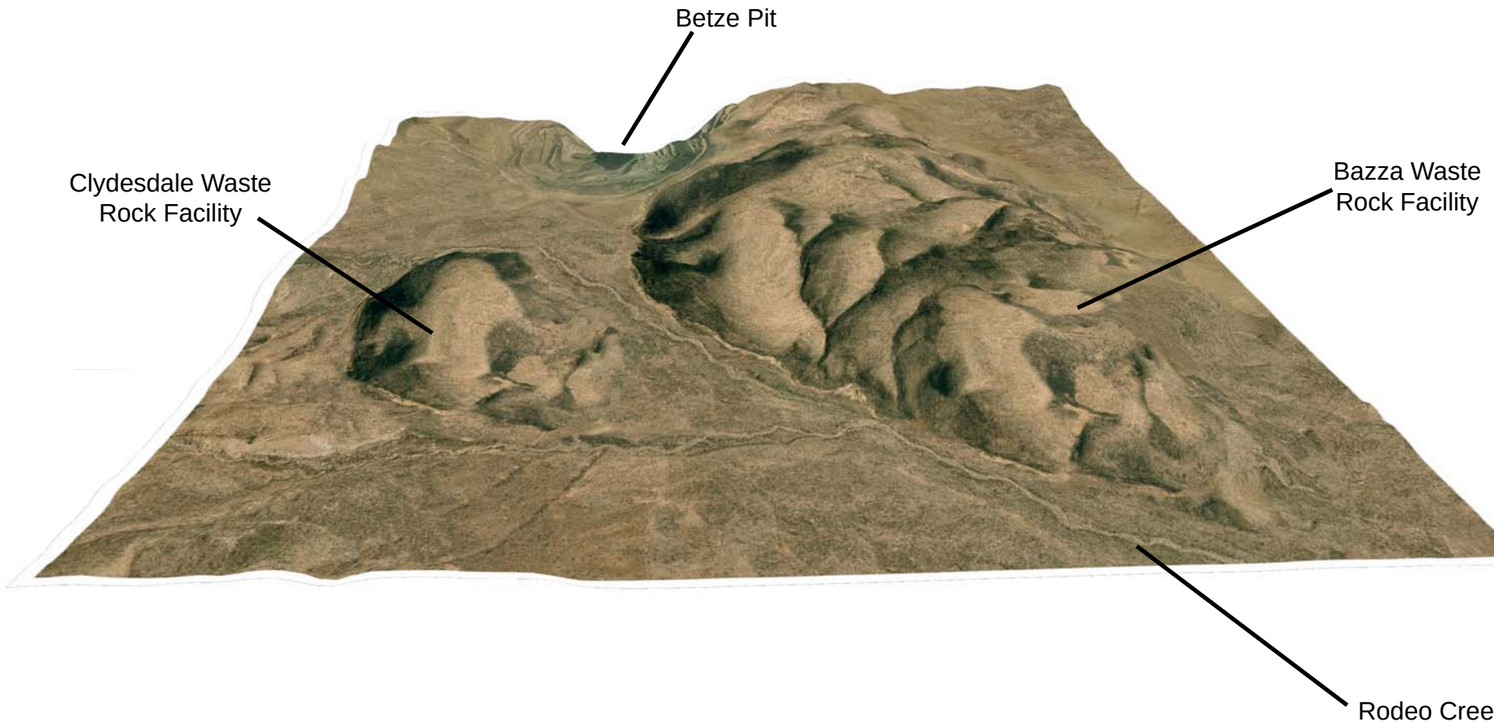
The final grading plan for the project is designed in part to minimize the visual impacts of unnatural lines and landforms. Slopes would be regraded to blend with surrounding topography, to the extent possible, and facilitate revegetation. Where feasible, large constructed topographic features such as the Clydesdale Waste Rock Facility may have rounded crests and variable slope angles to more closely resemble natural landforms. The Betze Pit would remain as a large depression partially filled with water. The conceptual post-mining reclamation topography is shown in **Figure 2-16**.

Revegetation of disturbance areas would be conducted as soon as practical to reduce the potential for wind and water erosion. Following construction activities, areas such as cut-and-fill embankments and growth media stockpiles would be seeded. Concurrent reclamation would be conducted to the extent practical to accelerate revegetation of disturbance areas. Reclamation of the Bazza Waste Rock Facility would be accelerated. All sediment and erosion control measures and revegetated areas would be inspected periodically to ensure long-term erosion control and successful reclamation.

2.3.7.2 Proposed Reclamation Schedule

Upon completion of mining, final waste rock facility reclamation would be completed pursuant to the final closure plan and schedule that would be submitted to the BLM and NDEP for approval. The detailed closure plan for each process facility component would be prepared at least 2 years prior to the anticipated closure date (NAC 445A.447), and would conform with the Water Pollution Control Permit regulations in effect at the time of closure.

The proposed pit expansion would be active for approximately 4 years (2012-2015). The Clydesdale Waste Rock Facility would be active from approximately 2009 through 2015, accepting waste rock from currently authorized pit expansion as well as from the proposed pit expansion. Concurrent reclamation of the eastern, southern, and southwestern perimeters of the Clydesdale Waste Rock Facility closest to the mule deer migration corridor would be reclaimed first beginning in 2013 (**Figure 2-15**). Recontouring, growth media



Source: BGMI 2008a.

Betze Pit Expansion Project

Figure 2-16

Proposed Action
Post-mining Reclamation
Topography

placement, and seeding of the remaining portion of the proposed Clydesdale Waste Rock Facility would occur from 2016 to 2018. The Goldstrike No. 3 Tailings Facility would continue to operate through 2031. Reclamation and closure of the proposed tailings facility would begin in 2032 and is anticipated to be completed in 2035. Under the Proposed Action, ongoing reclamation of the existing Bazza Waste Rock Facility would be accelerated and be substantially completed by the end of 2011. BGMI has performed reclamation on portions of the Bazza Waste Rock Facility, primarily on the northwest and southern portions of the facility. BGMI would concurrently reclaim the southern end of the facility as waste rock placement in this area is completed.

The initial reclamation work would involve grading and landform construction. This activity would commence where the previous reclamation stopped, moving to the west, around the perimeter of the facility in a clockwise direction. Once the landform is constructed, cover material and growth medium would be placed. If drainage stabilization such as rock or other erosion control measures are deemed appropriate, they would be installed at this time. Seeding of reclaimed areas would usually be performed in the fall to allow seeds to stratify in the soil and be ready for spring emergence.

The general direction of concurrent reclamation following the completion of the perimeter areas would be toward the east, covering the remaining areas which are available for reclamation. The same general sequence of events stated above would occur. Some areas on the facility would not be concurrently reclaimed. These would include several ore stockpiles located on the top of the facility as well as the landfill, lay down yards and associated access roads and powerline corridors. These would be reclaimed when they are no longer needed for active mining and processing. The projected reclamation schedule for the proposed project is shown in **Figure 2-17**.

2.3.7.3 Facility Reclamation

The goals of the reclamation program are as follows:

- Provide a stable post-mining landform that would support defined post-mining land uses;
- Minimize erosion and protect water resources through control of storm water runoff and stabilization of mine facilities;
- Establish post-reclamation surface soil conditions conducive to the regeneration of a stable plant community through stripping, stockpiling, and reapplication of growth media;
- Revegetate disturbed areas with a diversity of plant species in order to establish productive long-term plant communities compatible with post-mining land uses; and
- Maintain public safety by stabilizing or limiting access to landforms that could constitute a public hazard.

Clydesdale Waste Rock Facility

The reclamation goals for the waste rock facilities include stabilizing slopes, ensuring mass stability, shaping the edges to minimize visual impacts, revegetating surfaces, and erosion control. Reclamation of the waste rock facilities would be conducted concurrently with operations, to the extent possible. As areas of the facilities reach their ultimate height and become permanently inactive, the slopes would be regraded. Growth media subsequently would be placed on the prepared surfaces to a minimum depth of approximately 12 inches, and the areas reseeded. To minimize erosion until vegetation has re-established, silt fences, sediment traps, or other appropriate BMPs would be installed.

Reclamation of the proposed Clydesdale Waste Rock Facility would follow the cover design specifications as described in Clydesdale Waste Rock Management Plan (Schafer and Geosystems 2007):

- Use of a layered cover composed of topsoil and Carlin Formation material designed to reduce or eliminate infiltration of water and oxygen;

- Design of a thicker cover system consisting of 24 inches of topsoil and 48 inches of Carlin material placed over PAG cells; and
- Use of a minimum of 12 inches of cover consisting of either topsoil, Carlin Formation material, or a combination of materials for non-PAG areas.

As areas of the Clydesdale waste rock storage facility reach their ultimate configuration and become inactive, the waste rock facility face would be regraded. Once regraded, the surface would be covered with growth media as described above and seeded. The proposed Clydesdale Waste Rock Facility would be constructed in 100-foot lifts with 250-foot step-outs that would allow for an overall post-mining configuration of 2.5H:1V to 2.8H:1V slopes. Waste rock facility closure practices have been recently developed at the Goldstrike Mine that reduce or eliminate infiltration of water and oxygen, and promote long-term geomorphic stability. This design involves:

- Shaping the pile to a geomorphically stable configuration;
- Placing a soil cover that incorporates high water holding capacity and includes capillary breaks to reduce net infiltration; and
- Establishing perennial vegetation to meet post-mining land use objectives.

Goldstrike No. 3 Tailings Facility

The final configuration of the proposed tailings facility would be designed to maximize runoff and minimize infiltration of direct precipitation and ensure long-term containment of the tailings in addition to the reclamation goals identified previously.

As described above, a Final Plan for Permanent Closure would be developed 2 years prior to project closure pursuant to the requirements of the NDEP (NAC 445A.446 and 445A.447). The plan would include tailings closure specifications, including draindown management. A summary of tailings reclamation is presented below.

In the period leading up to closure, the tailings would be deposited to create a contoured surface that drains to the southwest corner of the facility. Following the final deposition of tailings in the impoundment, the tailings would be permitted to consolidate for a short period of time before placing a “store and release” soil cover of 48 to 60 inches of fine-grained low permeability soil. The soil cover would be seeded with native vegetation to stabilize the soil from wind and water erosion. The areas on the soil cover where flows may concentrate would be stabilized using riprap to prevent scour. All associated surface piping, structures, and equipment would be removed, and any related surface disturbance would be recontoured and reseeded. At closure, the downstream slope of the facility would be vegetated to stabilize the slope. Surface water controls would be put in place to ensure the long-term stability of the slope.

Reclamation of the Goldstrike No. 3 Tailings Facility would entail contouring the tails surface during operation to result in the desired beach angle and orientation. Upon completion of tailing deposition, the supernatant solution and any accumulated storm water will continue to report to the drainage system and will either be returned to the process stream or will be collected and evaporated via evaporation or evapotranspiration cells. A non-reactive waste rock layer will be placed over the tailing surface once the tails have consolidated to a density that will support the rock mass and equipment. This rock layer will act as a foundation for placement of a low-permeability store and release ET soil cover and also will act as a hydraulic capillary break, inhibiting wicking of any process solution into the soil cover and vegetation. This soil cover will deter any meteoric water from entering the tails mass. This technology has been successfully used at this mine site for reclamation and closure of a heap leach and waste rock disposal facilities (Zhan et al. 2000; Myers et al. 2001; Schafer et al. 2005; and Zhan et al. 2006) (see Section 2.2.3, Existing Mine Reclamation and Site Closure Plans). These covers have historically provided excellent winter range for wildlife (**Figures 2-18** and **2-19**).

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2032	2033	2034	2035	2036	2037	2038	2039	2040
Project Component																								
Rodeo Creek Diversion into the Pit																								
Pit Safety Berms Placement																								
Clydesdale Waste Rock Facility Reclamation																								
Goldstrike No. 3 Tailings Facility Reclamation																								
Bazza Waste Rock Facility Reclamation																								

Color Key
Miscellaneous
Recontouring
Growth Media Placement
Seeding
Place Store/Release Cover
Monitoring
Interim Solution Management
Short-term Solution Management

Source: BGMI and SRK 2007.

Figure 2-17 Proposed Action Conceptual Reclamation Schedule

Figure 2-18 Mule Deer Observed on the AA Leach Pad, February 2008

Figure 2-19 Mule Deer Observed on the AA Leach Pad, February 2008

Storm water falling onto this facility would be segregated from the process solution and would be routed through engineered storm water controls and BMPs into the adjacent Brush Creek Diversion channel. This storm water management technique also has been successfully utilized on the AA Heap Leach Facility for over 6 years. (Myer et al. 2001; Schafer and Geosystems 2006). Design modifications were made to the drainage network after an intense thunderstorm on June 1, 2002, delivered an estimated 1.6 inches of total rainfall in 20 minutes at the Goldstrike Mine. This unusual storm event resulted in localized flooding, and caused extensive damage to portions of the drainage channel on the slopes of the AA Leach Pad.

BGMI conducted an investigation of the AA Leach Pad after the storm event and developed some modifications to the drainage channel design to minimize future gullying from intense storm events on mine facilities. Design modifications included an extension of the channel network, increasing channel armour thickness, locating grade control structures at critical points, and modifications to the cross sectional shape of fall line channels. In the fall of 2002, some fall line rock channel segments were reconstructed on the AA Leach Pad due to the damage from the intense storm.

Should the zero-discharge design utilizing evaporation or ET cells prove infeasible at the time of closure, other water management options would be developed in coordination with the BLM and NDEP. These options may include, but would not be limited to:

- Cover redesign to further reduce seepage from meteoric infiltration;
- Enhanced evaporation via mechanical methods (e.g., snow makers, misters, etc.);
- Leach field installation; or
- Water treatment (e.g., precipitation and settling using lime, sulfide, ferrous solution, and/or flocculants, filtration, ion exchange, reverse osmosis, air stripping, biological preparation, or passive wetlands).

The tailings delivered to this facility are planned to be thickened to approximately 50 to 60 percent solid content as compared to conventional tailings with approximately 35 percent solid content. Thickened tailings do not have a large supernatant pond and are not expected to have as long a draindown period as conventionally placed tailings. The draindown curve estimate for the conventional tailings versus thickened tailings is shown in **Figure 2-20**. The tailings disposal facility is conceptually designed with a draindown collection system that will allow the water fraction of the tailings to be collected downstream of the dam.

In addition, passive disposal methods including evaporation or evapotranspiration are planned for this facility. This would be facilitated in lined, approved ponds which would be located on private land, down gradient of the proposed tailings dam.

Final Pit

The objective of mine pit reclamation is to create safe and stable topographic features. Following the completion of mining, in-pit benches, highwalls, and haul roads would be left in place. Post-mining safety barriers (e.g., berms or other appropriate barriers) would be installed peripherally to the crest of the Betze Pit (based on predicted wall stability at the time of closure) to control access by people, livestock, and most wildlife. Pit ramps would be barricaded to deter access.

At the end of mining, after dewatering operations cease, groundwater would begin a recovery period and enter the pit, ultimately resulting in the formation of a pit lake. Implementation of interim revegetation of in-pit waste rock during this recovery period would be completed to the extent practicable (BGMI and SRK 2007).

The proposed disturbance would be reclaimed in accordance with the approved reclamation and closure plan (Schafer and Geosystems 2007). The open-pit floors and ramps are expected to be competent rock surfaces that would be stable without reclamation. These areas would have little or no potential to support vegetation, and future conditions of the pits are not conducive to grazing or terrestrial wildlife habitat.

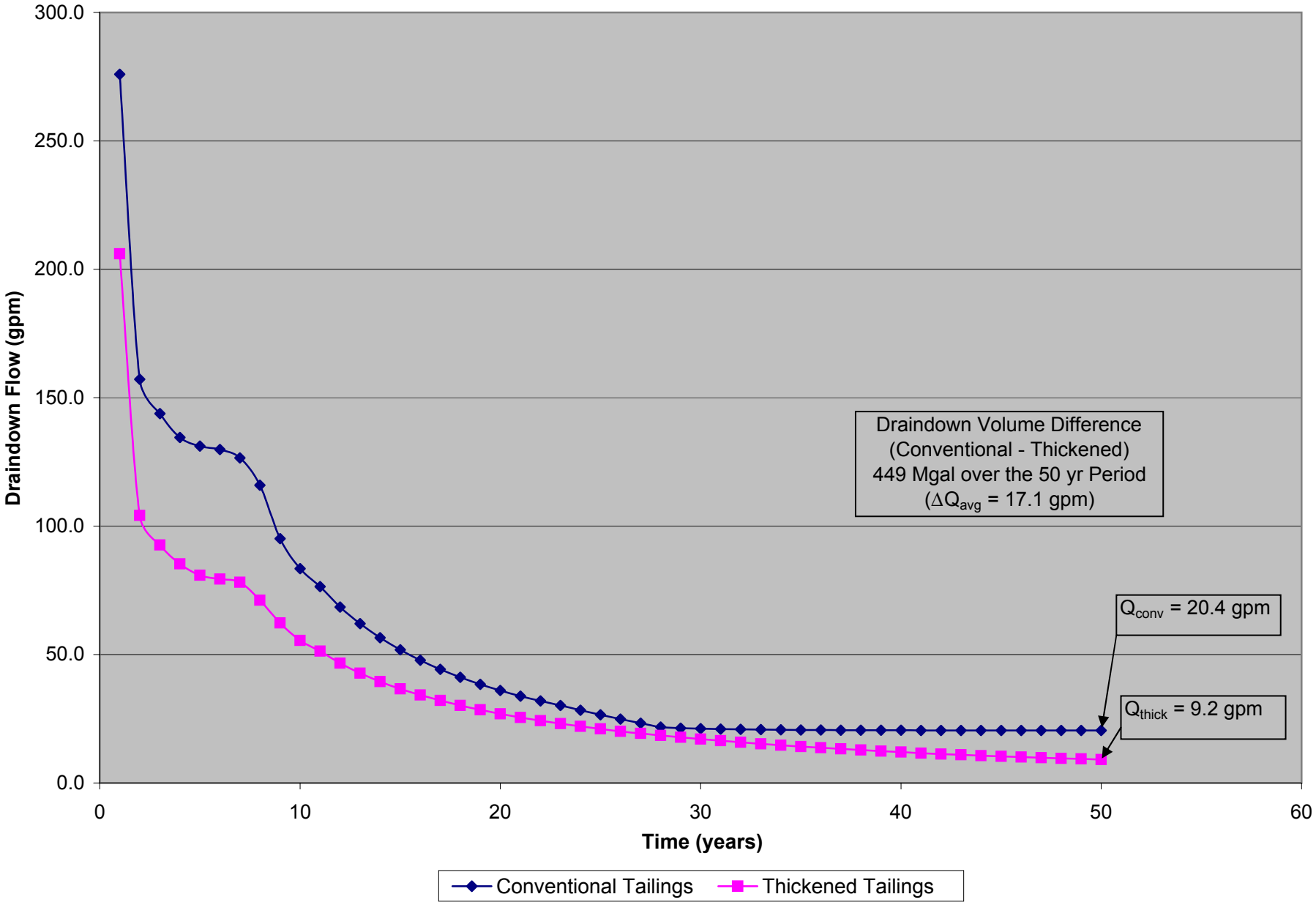


Figure 2-20 Goldstrike No. 3 Tailings Draindown Curve Comparison for Thickened Tailings

Source: Zhan 2008.

The walls of the Betze Pit would generally have an overall slope of 32° to 46° during operations. Operational and post-closure open-pit slope configuration would be controlled by several parameters that include the geometry of the ore body, geologic and geotechnical characteristics of the host rock, equipment constraints, and safe operating practices.

2.3.7.4 Post-reclamation Monitoring and Maintenance

Following mine closure, BGMI would conduct maintenance, site inspections, and any other necessary monitoring for the period of reclamation responsibility. Post-mining groundwater quality would be monitored according to the requirements established by NDEP. Monitoring of revegetation success would be conducted annually for a minimum of 3 years or until the revegetation standards have been met, as determined by the jurisdictional agencies. In addition, noxious weed monitoring and control would be implemented for a period of 5 years.

2.4 Bazza Waste Rock Facility Alternative (No Clydesdale)

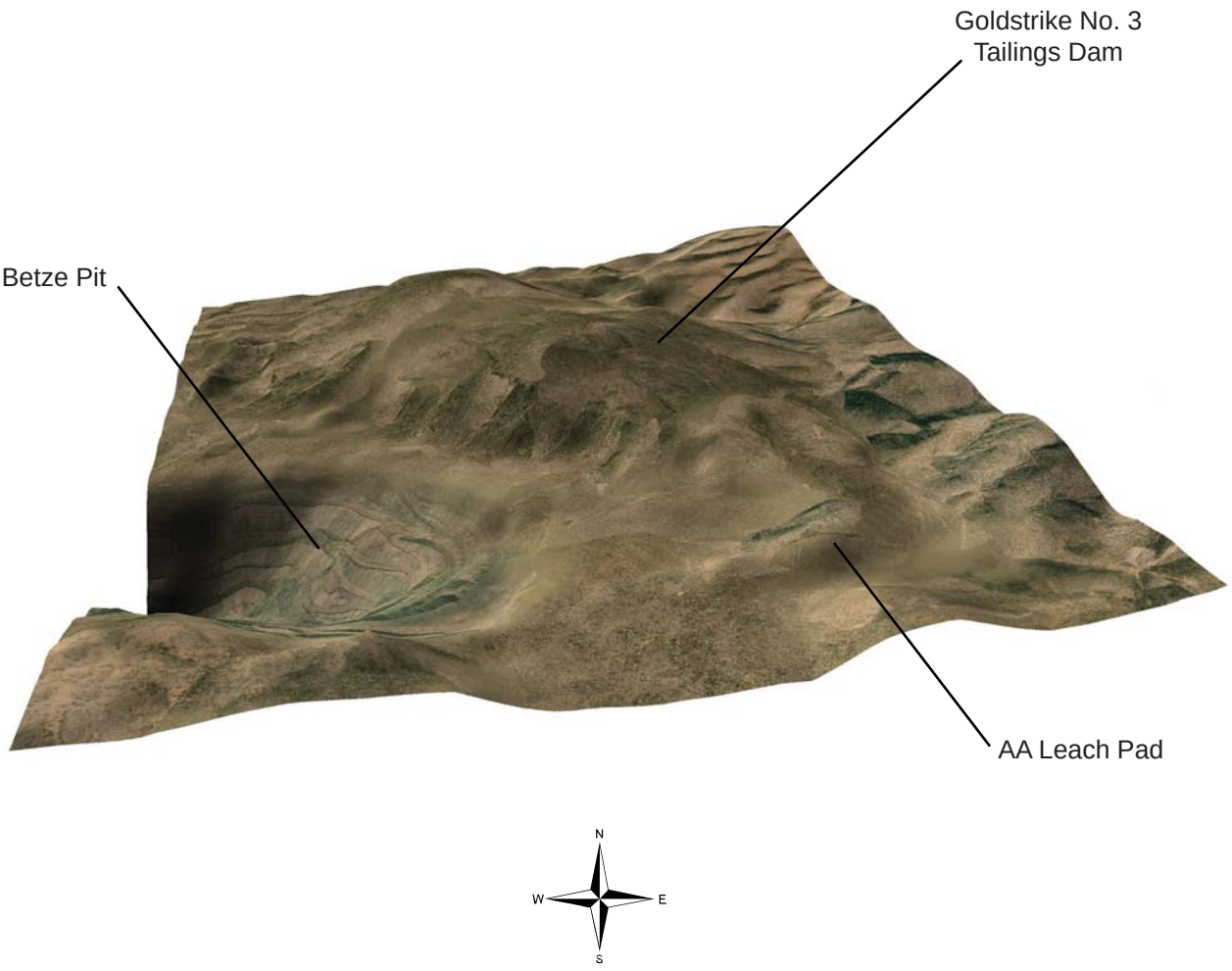
The BLM examined the option of continued use of the existing Bazza Waste Rock Facility without construction of the proposed Clydesdale Waste Rock Facility and Clydesdale haul road to reduce impacts to the existing big game wildlife migration corridor along Bell and lower Rodeo creeks. This migration corridor has been incrementally impacted over time as mining in the Carlin Trend has increased over the last 100 years. Section 3.8, Wildlife Resources, provides more detailed migration information. Under this alternative, in-pit dumps and the existing Bazza Waste Rock Facility would be used as a repository for waste rock from the proposed pit expansion.

Under this alternative, reclamation of the Bazza Waste Rock Facility would not be completed until 2018, a delay of 7 years compared with the Proposed Action. Reclamation procedures would parallel those described in Section 2.2.3, Existing Mine Reclamation and Site Closure Plans. The post-mining reclamation topography for this alternative is shown in **Figure 2-21**. The Bazza Waste Rock Facility cross-section and profile is presented in **Figure 2-22**. The reclamation schedule for the Bazza Waste Rock Facility Alternative is shown in **Figure 2-23**.

The existing Bazza Waste Rock Facility design capacity would be increased by 350 million tons to 2,280 million tons, and have a maximum height of approximately 800 feet above the valley floor under this alternative. The additional waste rock would be disposed of within the existing 2,843-acre disturbance footprint of the Bazza Waste Rock Facility by constructing the dump higher consistent with geotechnical slope stability requirements. The portions of the Bazza facility that have been previously reclaimed would not be re-disturbed. Under this alternative, the existing 120-kV transmission line in the Clydesdale area would not be rerouted. All other proposed facilities would be the same as described for the Proposed Action. Overall, this alternative would result in a total of 608 acres of new surface disturbance, 572 acres less disturbance than the Proposed Action.

Based on the Bazza Waste Rock Facility's capacity and the distance from the pit, the estimated total haul distance would be approximately 6.6 miles round trip resulting in a 9 percent increase in mining costs as well as an additional 58,850 additional operating hours of waste rock haulage over the life of the project, compared with haulage to the Clydesdale Waste Rock Facility under the Proposed Action. Five additional large capacity haul trucks and 5.3 millon gallons of additional fuel would be required under this alternative at a cost of $27 millon. Correspondingly, costs associated with tires, maintenance, parts and labor, operator wages, and overhead would increase. Approximately 20 additional employees (drivers and maintenance personnel) would be required under this alternative.

Delaying the reclamation of the Bazza Waste Rock Facility as is required by this alternative results in the loss of much of the Carlin material due to the mine's inability to stockpile adequate quantities safely. Carlin material is a fine-grained plastic clayey silt. This property is what makes it desirable for use as a low-permeability cover material. However, it also leads to low shear strength, which results in the inability to place it in large



Betze Pit Expansion Project

Figure 2-21

Bazza Waste Rock Facility Alternative Post-mining Topography

Source: BGMI 2008a.

06/13/08

stockpiles because of the risk of potential slope failure. This type of failure potentially can result in property damage, injury, or death if it occurs where equipment or personnel are present. This type of failure due to Carlin material was seen at the nearby Newmont Gold Quarry Mine on February 2, 2005, when approximately 10 million tons of waste rock material collapsed. The toe of this collapse moved laterally approximately 600 feet before coming to rest. The slide blocked State Route (SR) 766, a power line was damaged, and mine electrical power was lost. A blue ribbon taskforce was assembled by NDEP to determine the cause of the failure and to formulate a corrective action (Call and Nicholas 2006; http://ndep.nv.gov/bmrr/gold_quarry05.htm). Long-term recommendations for the particular material encountered at this site were to grade overall slope faces to 11° or 5.1H to 1V, slope angles between benches should be no more than 15 degrees or 3.7H to 1V, and all flat benches should be regraded to three percent to avoid ponding. There also were site-specific recommendations made, which do not apply on other mine sites. These recommendations were made for the specific material at this site. Acceptable slopes and loading conditions may vary depending upon the specific gradation and shear strength of the material encountered.

BGMI has long recognized the difficulties encountered in stockpiling Carlin material. Not only does this material present a slope stability safety concern, it also is difficult to traffic heavy mining equipment over, especially during the wet months, due to their weight and high ground pressure. To ameliorate this condition, BGMI has devised a strategy for managing Carlin material when it is not being directly placed for reclamation. The mine dispatchers route the Carlin-laden haul trucks to an area where other waste rock is being actively being placed so that it can be mixed, resulting in a higher shear strength, more competent composite material. Unfortunately, this results in a material which cannot be reused for growth medium or ET cover as it no longer exhibits the desired properties needed for this application.

BGMI's Goldstrike Mine also has a self imposed height limitation for Carlin stockpiles due to its reduced shear strength. Stockpiles are held to a maximum of 50 feet in height. This restriction coupled with the limited space available for stockpiling Carlin, severely limits the overall quantity that can be stored for future use as cover and growth medium.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

This section of the SEIS describes the alternatives previously considered but subsequently eliminated from detailed analysis by the BLM and the rationale for their elimination. The alternatives were considered relative to their means of addressing the identified purpose and need, their technological and economic feasibility, as well as their potential to address environmental issues and reduce potential impacts.

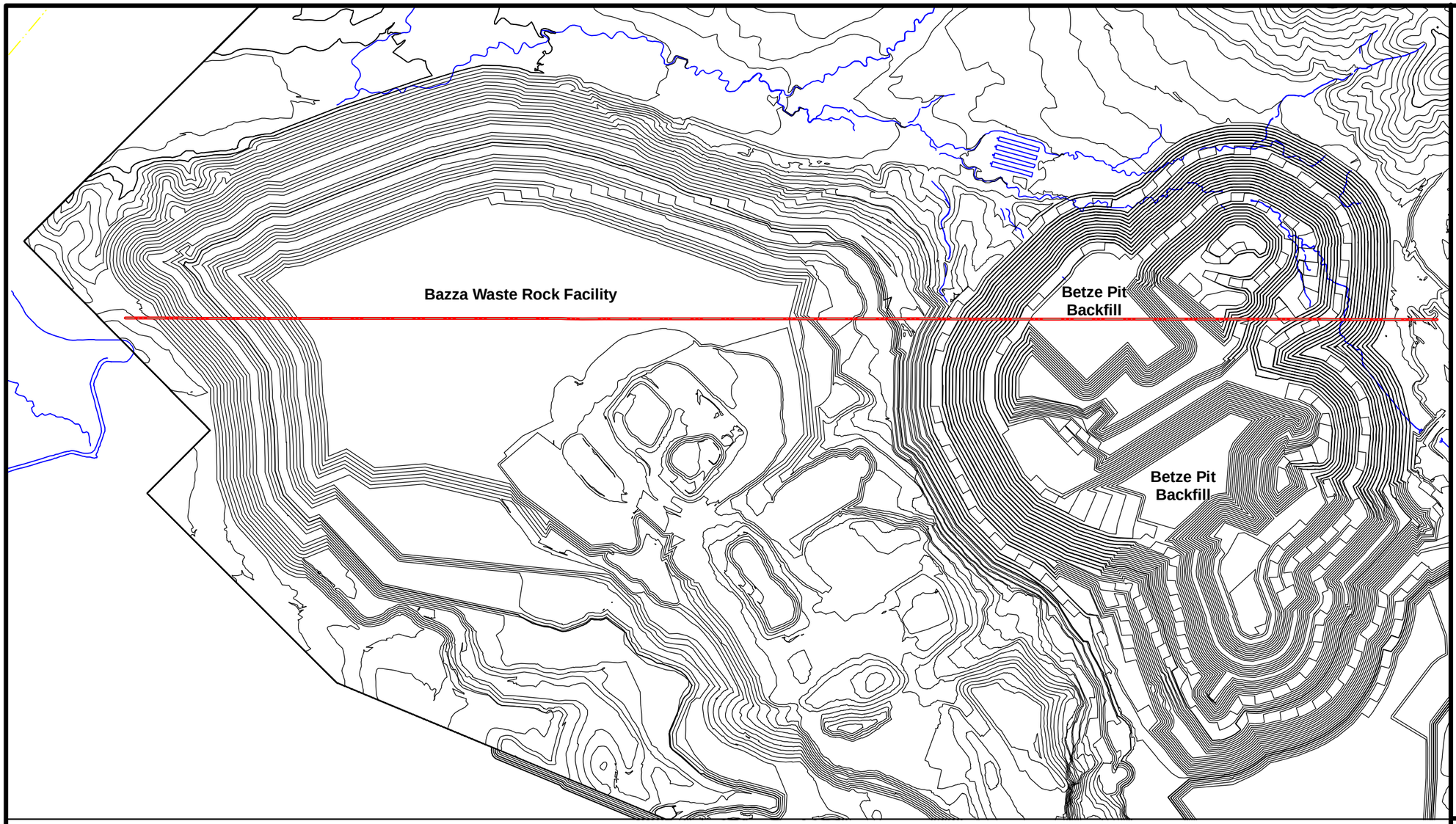
2.5.1 Modified Clydesdale Waste Rock Facility Alternative

Under this alternative, the Clydesdale Waste Rock Facility capacity would remain at 350 million tons, but the surface disturbance could be reduced by 62.5 acres on the western perimeter resulting in a total surface disturbance of 472.5 acres. The total height of the facility would increase by 220 feet from the Proposed Action to a total height of 720 feet.

This alternative was reviewed to determine whether there were any benefits to affected resources, particularly to wildlife that might utilize the migration corridor along Bell and Rodeo creeks. Based on the size and location of the 62.5-acre undisturbed area, BLM has concluded that this alternative would not provide any benefits to affected resources, including the mule deer migration corridor, compared with the Proposed Action. In addition, the additional haulage requirements to place waste in this higher dump would require an additional fuel consumption of 5.6 million gallons and a total additional mining cost of approximately $17.5 million dollars. As a result, this alternative was eliminated from further detailed analysis.

2.5.2 Offsite Waste Rock Facility

A new waste rock facility could potentially be located outside the Goldstrike Mine boundary at another location to minimize the impact on the existing wildlife migration corridor along Bell and Rodeo creeks. This alternative



LEGEND

- Cross Section
- Streams
- Retention Ponds

Source: BGMI and SRK 2007; BGMI 2007a.

0 0.25 0.5 Miles

Betze Pit Expansion Project

Figure 2-22

Bazza Waste Rock Facility Alternative Cross-section and Profile

Year	2008	2009	2010	1011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Project Component																
Rodeo Creek Diversion into the Pit																
Pit Safety Berms Placement																
Bazza Waste Rock Facility Reclamation																
Goldstrike No. 3 Tailings Facility Reclamation																

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Project Component																
Rodeo Creek Diversion into the Pit																
Pit Safety Berms Placement																
Bazza Waste Rock Facility Reclamation																
Goldstrike No. 3 Tailings Facility Reclamation																

Color Key
Miscellaneous
Waste Rock Placement
Recontouring
Growth Media Placement
Seeding
Place Store/Release Cover
Monitoring
Interim Solution Management
Short-term Solution Management

Source: BGMI and SRK 2007; BGMI 2008a.

Figure 2-23 Bazza Waste Rock Facility Alternative Reclamation Schedule

was eliminated from further detailed analysis because of administrative issues associated with location of a facility outside of the mine boundary potentially on public land, and the associated environmental and economic impacts; a longer haul road would cause greater environmental impacts due to increased land disturbance, air quality degradation, and higher costs of transporting waste rock.

2.5.3 Underground Mining Alternative

Ore potentially could be extracted using underground mining methods rather than open-pit methods that require laybacks. Underground mining would reduce the amount of tailings and waste rock, produced, thus making it possible to reduce the size of the proposed Clydesdale Waste Rock Facility as well as reducing the volume of haul road traffic.

The ore grades in the proposed pit laybacks average less than 0.13 ounce per ton. Underground mining is not economically feasible for gold ore grades less than 0.25 ounce per ton. In contrast, open-pit ore cut off grades for economic feasibility are on the order of 0.05 ounce per ton. Other factors that affect the method and cost of mining an ore reserve include continuity of the mineralized material, depth to mineralization, and volume of material to be mined. The mineralized zone in the proposed pit expansion area meets economic reserve requirements for open-pit mining in part due to the fact that it is an expansion and therefore has a significant amount of waste stripping already accounted for by the current open-pit mining.

The Underground Mining Alternative was eliminated from further consideration because of the relatively low grade of ore reserve present in the proposed layback zone and higher costs associated with this alternative. It is not economically feasible to mine the entire deposit using underground mining methods.

2.5.4 Reduced Tailings Facility Alternative

This alternative would result in constructing a smaller Goldstrike No. 3 Tailings Facility that would affect only private land owned by BGMI. Under this alternative, a total of 644 acres would be disturbed to construct the facility, thereby reducing the amount of surface disturbance by 46 acres compared with the Proposed Action, and thus reducing the capacity of the facility. The reduction in size of the tailings storage facility under this alternative would result in the need for additional tailings storage capacity in another facility, either the existing North Block Tailings Facility, the AA Tailings Facility, or construction of another new facility. Although BGMI could implement this option, the Reduced Tailings Facility Alternative does not provide any environmental benefits compared with the Proposed Action and would be more costly to implement. As a result, this alternative was eliminated from further consideration.

2.6 Comparative Analysis of Alternatives

Table 2-12 summarizes and compares the environmental impacts between the Proposed Action, the Bazza Waste Rock Facility Alternative, and the No Action Alternative. Detailed descriptions of impacts are presented in Chapter 3.0, Affected Environment and Environmental Consequences. The summarized impacts assume the implementation of applicant-committed environmental protection measures but the absence of potential BLM recommended mitigation measures. Implementation of the monitoring and mitigation measures identified in Chapter 3.0 potentially would further reduce impacts.

2.7 BLM-preferred Alternative

The BLM has selected a preferred alternative based on the analysis in this SEIS. This preferred alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, considering economic, environmental, technical, and other factors. The BLM has determined that the preferred alternative is the Proposed Action as outlined in Chapter 2.0 with mitigation measures specified in Chapter 3.0 of this SEIS.

The Proposed Action includes an expansion of the Betze Pit to include a small acreage of public land, construction of the Goldstrike No. 3 Tailings Facility, construction of the Clydesdale Waste Rock Facility, with

modifications to maximize the width of the mule deer migration corridor during mining operations, accelerated reclamation of the Bazza Waste Rock Facility, and continued use of other public lands within the operating area for the additional 4 years of operations. The Proposed Action also means continued employment for 4 additional years for about 1,600 employees of the Goldstrike Mine along with related socioeconomic benefits and impacts. The Proposed Action also includes a number of ancillary actions such as rerouting of 2,000 additional feet of powerline.

The Proposed Action would provide greater beneficial social and economic impacts (see Section 3.12, Social and Economic Values) relative to an extension of mine employment, expenditures, and tax revenues by 4 years compared with the No Action Alternative. The Proposal Action would maximize use of in-pit Carlin material, a valuable growth media and ET cover, to reclaim the Bazza Waste Rock Facility 7 years earlier than the No Action Alternative.

Under the No Action Alternative, the identified mineral resources would not be developed, resulting in the loss of recoverable gold. Most of the Carlin material would be lost and unavailable for reclamation under the No Action Alternative.

Identified impacts under the Bazza Waste Rock Facility Alternative generally would be similar to the Proposed Action with the following exceptions. The Bazza Waste Rock Facility Alternative would eliminate impacts associated with construction of the Clydesdale Waste Rock Facility and not reduce the width of the existing mule deer migration corridor; however, this alternative would result in additional impacts associated with increased waste rock haulage and result in a delay in final reclamation of the Bazza Waste Rock Facility by 7 years when compared with the Proposed Action. The Bazza Waste Rock Facility Alternative would not provide greater environmental benefits than the Proposed Action that includes mitigation to protect the existing mule deer migration corridor.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Geology and Minerals			
Mineral Extraction and Material Generation and Disposal	BGMI would continue to produce gold from the existing permitted operations for the Betze Project. Gold associated with the Betze Pit Expansion Project would remain in place. The associated waste rock and tailings material would not be generated.	BGMI would remove a total of 12.44 million tons of ore, extract gold, and generate and dispose of approximately 315 million tons of waste rock and 12.44 million tons of tailings material.	Impacts would be the same as the Proposed Action.
Geotechnical and Seismic Stability of Waste Rock and Tailings Facilities	No new waste rock or tailings facilities would be developed.	Facilities would be stable with appropriate design, construction, operation, and closure.	Impacts would be the same as the Proposed Action.
Pit Slope Stability	There is some potential for localized pit slope failure in the Betze Pit during the post-mining period.	Impacts are the same as the No Action Alternative.	Impacts would be the same as the Proposed Action.
Dewatering-induced Subsidence and Earth Fissure Hazards	Subsidence or risk of earth fissure development associated with the continuation of mine dewatering through 2015 is low.	There would be no direct impacts associated with the Proposed Action. There would be a slightly larger area subject to dewatering-induced subsidence due to a slightly larger cone of depression.	Impacts would be the same as the Proposed Action.
Future Availability of Mineral Resources	Identified mineral resource associated with the proposed project would remain in place.	The availability would be reduced by the amount of gold to be mined under the Proposed Action.	Impacts would be the same as the Proposed Action.
Alteration of Topographic or Geomorphic Features	Additional alteration of geomorphic and topographic features would be avoided as proposed facilities would not be developed.	Proposed pit laybacks, reclaimed Clydesdale Waste Rock Facility, and tailings impoundment would result in the permanent alteration of topographic or geomorphic features on approximately 1,143 acres.	The permanent alteration of geomorphic and topographic features (proposed pit laybacks and Goldstrike No. 3 Tailings Facility) would occur on approximately 608 acres.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Groundwater and Surface Water Resources			
Dewatering and Drawdown	Groundwater will be pumped through 2015. Drawdown would continue in Boulder Valley.	Because no additional dewatering is proposed, there would be no direct impacts associated with the Proposed Action. There would be a slightly larger maximum cone of depression due to a slower rebound in groundwater levels, and a slightly larger permanent cone of depression due to a larger pit lake, in comparison to pre-mining water levels.	Impacts would be the same as the Proposed Action.
Drawdown Effects on Perennial Streams and Springs	No additional impacts that were not previously identified as direct, indirect, or cumulative impacts in the Betze Final SEIS (BLM 2003a).	There would be no direct impacts associated with the Proposed Action.	Impacts would be the same as the Proposed Action.
Drawdown Effects on Water Rights	There would be no additional groundwater rights affected compared to the effects identified in the Betze Project Final SEIS (BLM 2003a).	There would be no direct impacts associated with the Proposed Action.	Impacts would be the same as the Proposed Action.
Pit Lake Development	A pit lake of approximately 803 acres in area would develop in the Betze Pit at steady state.	A pit lake of approximately 927 acres would develop in the Betze Pit at steady state.	Impacts would be the same as the Proposed Action.
Pit Lake Water Quality	Predicted pit lake water quality at equilibrium would have an alkaline pH (7.7) and the following representative constituent concentrations: total dissolved solids (<2,000 milligrams per liter [mg/L], sulfates (1,017 mg/L), arsenic (0.051 mg/L), nickel (1.23 mg/L), cadmium (0.037 mg/L), and selenium (0.007 mg/L).	A slightly larger pit lake would develop with slightly higher constituents such as total dissolved solids, sulfate, and trace metals.	Impacts would be the same as the Proposed Action.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Groundwater and Surface Water Resources (Continued)			
Water Quality Impacts Associated with Waste Rock and Tailings Facilities	There would be no impacts to groundwater or surface water quality.	There would be no impacts to groundwater or surface water quality.	There would be no impacts to groundwater or surface water quality.
Flooding	The Rodeo Creek Diversion from north of the Betze Pit to south of the pit would result in no impacts to the conveyance capacity of the 100-year floodplain.	There would be no impacts to the conveyance capacity of the 100-year floodplain.	There would be no impacts to the conveyance capacity of the 100-year floodplain.
Soils and Reclamation			
General Soils Impacts	Additional impacts to soils would be avoided as the proposed ground disturbance would not occur; however, most of the Carlin material from current authorized mining activities would be lost and unavailable as a growth medium.	Approximately 1,180 acres of soils would be disturbed with 129 acres of soils not reclaimed. Suitable topsoil and growth media would be salvaged and stockpiled during ground-disturbing activities for reclamation purposes. There would be long-term reductions in soil productivity in areas being reclaimed. Areas within the pit that would not be reclaimed would have permanent loss of productivity. There could be additional soil losses resulting from erosion due to project activities. Carlin material would be available as a reclamation cover.	Impacts would be similar to the Proposed Action, except approximately 608 acres of soils would be disturbed under this alternative, with 129 acres of soils not reclaimed. In addition, there would be a loss of the Carlin material as an effective reclamation cover.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Vegetation			
Upland Vegetation	There would be no additional impacts to vegetation as no new disturbance would occur. However, the loss of Carlin material would negatively affect vegetation recovery and reclamation of the Bazza Waste Rock Facility as the Carlin material supports a healthy vegetative cover, that exceeds reclamation requirements. Substitute materials including waste rock, provide only adequate vegetative cover.	The proposed mine expansion would disturb or remove approximately 1,180 acres of vegetation, the majority of which subsequently would be reclaimed. Areas within the Betze Pit expansion (approximately 129 acres) that would not be reclaimed would have a permanent loss of vegetation. Carlin material would be available to improve vegetation recovery of disturbed areas.	Impacts would be similar to the Proposed Action, except that: 1) approximately 608 acres of vegetation would be disturbed, of which all but 129 acres would be reclaimed; and 2) loss of effective use of Carlin material as an effective growth medium.
Wetland and Riparian Areas	No additional impacts that were not previously identified as direct, indirect, or cumulative impacts in the Betze Final SEIS (BLM 2003a).	There would be no direct impacts associated with the Proposed Action.	Impacts would be the same as the Proposed Action.
Special Status Plant Species	No additional impact to special status plant species or their habitat would occur.	No impacts to special status plant species would occur.	No impacts to special status plant species would occur.
Wildlife and Aquatic Resources			
Wildlife Habitat	No additional wildlife habitat would be disturbed.	Approximately 943 acres of terrestrial habitat (native vegetation) would be disturbed, of which approximately 101 acres of terrestrial habitat would not be reclaimed. Surface disturbance would result in a temporary incremental increase in habitat fragmentation and displacement until vegetation has been re-established.	Approximately 565 fewer acres of terrestrial habitat (native vegetation) would be disturbed.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Wildlife and Aquatic Resources (Continued)			
Mule Deer	No additional mule deer migration corridors or seasonal range would be disturbed.	Approximately 943 acres of low density mule deer habitat would be disturbed, of which approximately 101 acres would not be reclaimed. Approximately 565 acres of an important mule deer migration corridor would be directly impacted.	Approximately 378 acres of low density mule deer habitat would be disturbed, of which approximately 101 acres would not be reclaimed. No impacts would occur to an important mule deer game migration corridor.
Pronghorn	No additional pronghorn range would be disturbed.	Approximately 426 acres of pronghorn range would be disturbed. Approximately 360 acres of crucial pronghorn winter range would be directly impacted. However, impacts to pronghorn populations are anticipated to be low.	Approximately 205 acres of pronghorn range would be disturbed. No direct impacts would occur to crucial pronghorn winter range.
Impacts to Breeding Birds	No additional impacts to habitat; ongoing operations and reclamation would continue to impact habitat in existing disturbance areas. No additional impacts to breeding birds, including raptor and passerine species, would occur.	Direct impacts to bird species would include the temporary loss of approximately 943 acres, and the permanent loss of approximately 101 acres of potentially suitable breeding, roosting, and foraging habitat. Potential direct impacts (i.e., loss of nests, eggs, or young) to breeding birds would be minimized by vegetation clearing outside of the breeding season, to the extent possible, and the implementation of breeding bird surveys and appropriate mitigation, as needed, in coordination with BLM and NDOW.	Impacts would be the same as the Proposed Action, except approximately 565 fewer acres of breeding bird habitat would be disturbed.
Impacts to Invertebrates	No additional impacts that were not previously identified as direct, indirect, or cumulative impacts in the Betze Final SEIS (BLM 2003a).	No impacts to invertebrates would occur.	No impacts to invertebrates would occur.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Wildlife and Aquatic Resources (Continued)			
Fisheries Habitat	No additional perennial stream habitat would be disturbed. The Rodeo Creek Diversion from north of the Betze Pit to south of the pit would result in a reduction of approximately 1.5 miles of intermittent stream habitat.	No project-related disturbance would occur within perennial stream habitat.	Impacts would be the same as the Proposed Action.
Noise and Human Presence	These impacts would remain the same as current levels until ongoing operations and reclamation have been completed, at which time these impacts would end.	Impacts would be extended for 4 additional years.	Impacts would be the same as the Proposed Action.
Water Quantity and Quality	Potential impacts to wildlife habitat associated with existing approved water management operations would continue. There would be no new potential impacts to wildlife from cyanide ingestion.	No wetland or riparian habitat would be impacted by project disturbance. Based on BGMIs committed environmental protection measures, potential impacts to wildlife from cyanide ingestion would be low.	Impacts would be the same as discussed for the Proposed Action.
Pit Lake Formation	Potential impacts associated with the approved Betze Pit Lake would continue under the No Action Alternative.	Based on the results of groundwater modeling and ecological risk assessment, pit lake water would not pose a chemical risk to wildlife or aquatic resources.	Impacts would be the same as the Proposed Action.
Potential for Hazardous Materials Spill	Hazardous materials used for ongoing processing would continue to be transported to the existing operations.	Impacts would be the same as the No Action Alternative but extended for 4 years.	Impacts would be the same as the Proposed Action.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Wildlife and Aquatic Resources (Continued)			
Bats	No additional impacts to bat species or their habitat would occur.	The long-term disturbance of foraging habitat, including 867 acres of sagebrush shrubland habitat and permanent loss of 101 acres of sagebrush shrubland habitat would be considered a low impact.	Impacts would be the same as the Proposed Action except approximately 565 fewer acres of habitat would be disturbed.
Impacts to Pygmy Rabbit	No additional impacts to pygmy rabbits or potentially suitable habitat would occur.	The long-term loss of approximately 867 acres and the permanent loss of approximately 101 acres of potentially suitable sagebrush habitat would be considered a low impact. The potential loss of individual rabbits during construction would not result in population-level effects.	Impacts would be the same as the Proposed Action except approximately 565 fewer acres of sagebrush habitat would be disturbed.
Preble's Shrew	No additional impacts to Preble's shrew or potentially suitable habitat would occur.	The long-term reduction of approximately 943 acres and permanent loss of approximately 101 acres of potentially suitable habitat would be considered a low impact. The potential loss of individual shrews during construction would not result in population-level effects.	Impacts would be the same as the Proposed Action except approximately 565 fewer acres of habitat would be disturbed.
Fletcher Dark Kangaroo Mouse	No additional impacts to Fletcher dark kangaroo mouse or potentially suitable habitat would occur.	The long-term loss of approximately 943 acres and permanent loss of approximately 101 acres of potentially suitable habitat would be considered a low impact. The potential loss of individuals during construction would not result in population-level effects.	Impacts would be the same as the Proposed Action except approximately 565 fewer acres of habitat would be disturbed.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Wildlife and Aquatic Resources (Continued)			
Impacts to Sensitive Bird Species	No additional impacts to the bald eagle, golden eagle, Swainson's hawk, prairie falcon, peregrine falcon, and ferruginous hawk or potentially suitable habitat would occur.	Bald eagle, golden eagle, ferruginous hawk, Swainson's hawk, peregrine falcon, and prairie falcon – no direct impacts to nesting raptors are anticipated; long-term loss of approximately 867 acres of potential foraging habitat; indirect impacts would result from mine-related noise and human presence – potential impacts to these species would be low.	Impacts would be the same as the Proposed Action, except approximately 565 fewer acres of terrestrial habitat (native vegetation) would be disturbed.
Impacts to Greater Sage-grouse	No additional impacts to the greater sage-grouse or potentially suitable habitat would occur.	No impacts to breeding greater sage-grouse would be anticipated; impacts to brooding habitat would be low. Direct impacts associated with project-related habitat reduction (867 acres) would be considered negligible based on the availability of suitable habitat in the project vicinity.	Impacts would be the same as the Proposed Action, except approximately 565 fewer acres of terrestrial habitat (native vegetation) would be disturbed.
Impacts to Short-eared and Long-eared Owl	No additional impacts to the short-eared owl, long-eared owl, or potentially suitable habitat would occur.	Direct impacts associated with project-related habitat reduction (943 acres) would be considered negligible for the short-eared owl and low for the long-eared owl, based on the availability of suitable habitat in the project vicinity. Indirect impacts would result from mine-related noise and human presence.	Impacts would be the same as the Proposed Action, except approximately 565 fewer acres of terrestrial habitat (native vegetation) would be disturbed.
Impacts to Burrowing Owl	No additional impacts to the burrowing owl or potentially suitable habitat would occur.	Direct impacts would include the short-term reduction (pending successful reclamation) of potential shrubland breeding and foraging habitat (943 acres). Indirect impacts would result from mine-related noise and human presence. Potential impacts to	Impacts would be the same as the Proposed Action, except approximately 565 fewer acres of terrestrial habitat (native vegetation) would be disturbed.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
		this species would be considered low.	
Wildlife and Aquatic Resources (Continued)			
Impacts to Loggerhead Shrike, Vesper Sparrow, and Yellow-breasted Chat	No additional impacts to loggerhead shrike, vesper sparrow, yellow-breasted chat, or potentially suitable habitat would occur.	Loggerhead shrike, vesper sparrow, and yellow-breasted chat - direct impacts associated with project-related habitat reduction (943 acres) and indirect impacts from mine-related noise and human presence would be considered negligible.	Impacts would be the same as the Proposed Action, except approximately 565 fewer acres of terrestrial habitat (native vegetation) would be disturbed.
Cultural Resources			
	Adverse effects to five NRHP-eligible sites were mitigated in accordance with the treatment plan and PA. However, the sites would not be destroyed by project construction.	Adverse effects to five NRHP-eligible sites were mitigated in accordance with the treatment plan and PA. However, the sites ultimately would be destroyed by project construction, and some of their information would be lost.	Impacts would be the same as the Proposed Action.
Native American Traditional Values			
	There would be no impacts to known traditional cultural properties or places of cultural and religious importance. See "Cultural Resources" for impacts to NRHP eligible sites.	To date, none of the tribes participating in consultation have identified any traditional cultural properties, or places of cultural and religious importance in the project area. See "Cultural Resources" for impacts to NRHP-eligible sites.	Impacts would be the same as the Proposed Action.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Air Quality			
Air Emissions	Impacts to air quality would be limited to ongoing approved mining, mineral processing, and reclamation activities. The modeled concentrations indicate project emissions would comprise a small fraction of the applicable ambient air quality standards.	The extension of mining by 4 years and roaster operations by 5 years would not alter emission rates from current authorized activities. Therefore, results indicate that maximum concentrations of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), nitrogen oxide (NO_x), carbon monoxide (CO), SO_2, and ozone (O_3) would not exceed applicable Nevada or National Ambient Air Quality Standards (NAAQS). There would be no impacts to PSD Class I areas.	Impacts would be similar to the Proposed Action except that additional emissions would be generated due to longer waste rock haul distances required.
Hazardous Air Pollutant Emissions	The combined hazardous air pollutant (HAP) emissions are less than the major source limit of 25 tons per year (tpy); therefore, the No Action Alternative would not constitute a major HAP source.	The combined HAP emissions would be less than the major source limit of 25 tpy; therefore, the Proposed Action would not constitute a major HAP source.	Impacts would be similar to the Proposed Action.
Mercury Emissions	Mercury emissions were estimated 617 pounds per year in 2006 for ongoing approved mining and mineral processing activities. Modeling results indicate that mercury deposition ranges from approximately 10 percent near the mine source to less than 1 percent of the total background deposition of mercury at a distance of 30 to 100 kilometers (km) from the mine source. Mercury emissions are expected to decline with continued implementation of the Nevada Mercury Air Emissions Control Program.	Mineral processing of 12.44 million tons of ore would result in an estimated incremental increase of a total of 625 pounds of mercury over the 5 additional years of roaster operations.	Impacts would be the same as the Proposed Action.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Social and Economic Values			
Employment and Revenue	Closure of the Betze Pit would require a reduction of the work force beginning in approximately 2011. Nearly all of the current work force would be terminated between 2011 and final closure of the project in 2026.	The work force during construction and operations would remain approximately 1,600 workers for an additional 4 years, through 2015. The local economy would benefit from the resulting continuation of wage and salary payments. State and local government revenues also would benefit. Nearly all of the work force would be terminated between 2016 and final closure of the project in 2031. The work force is not expected to increase due to the Proposed Action.	Impacts would be nearly the same as the Proposed Action with a slight increase in employment necessary due to the extended haul distance.
Population	Changes in area population would be dependent on the availability of alternative employment in the area. Ultimately the area population could decline. Impacts on public infrastructure and services would occur due to reduction in mining force in 2011.	Mining would be extended by 4 years through 2015 with the current work force.	Impacts would be the same as the Proposed Action.
Tax Revenue	Tax revenues would decline between the end of mining in 2011 and complete closure of the project in 2026. There also would be a concurrent decline in tax proceeds.	Tax revenues would be extended by an additional 4 years relative to the No Action Alternative.	Impacts would be similar to the Proposed Action.
Local Infrastructure	Growth pressure on schools, housing, and public services would be reduced beginning in 2011. Potential population declines could lead to under-utilization of schools.	Impacts would be the same as the No Action Alternative, but occurring 4 years later.	Impacts would be the same as the Proposed Action.

Table 2-12 Impact Summary and Comparison of the Proposed Action, Bazza Waste Rock Facility Alternative, and No Action Alternative

Resource Areas	No Action Alternative	Proposed Action	Bazza Waste Rock Facility Alternative (No Clydesdale)
Visual Resources			
	There would be no additional disturbance beyond what currently exists or is currently permitted. The existing management guidelines for Visual Resource Management (VRM) Class IV lands would not be exceeded.	From key observation points (KOPs) #1 and #2, visual contrasts allowable for VRM Class IV lands within the mine site would be met during active mining. Proposed reclamation and revegetation would reduce the long-term visual effects and achieve VRM objectives in the Class IV areas from KOPs #1 and #2.	Visual impacts associated with an increase in height of the Bazza Waste Rock Facility relative to the Proposed Action would be offset in part by not constructing the Clydesdale Waste Rock Facility and haul road.
Hazardous Materials and Solid Waste			
Transportation	Transportation of hazardous materials associated with the existing operations would continue.	Transportation of hazardous materials would be extended up to an additional 5 years with no expected change in quantities transported from existing operations.	Impacts would be similar to the Proposed Action.
Storage and Use	Hazardous materials would continue to be transported, stored, and used at the site at the same rate as current operations until operations begin to wind down and the materials are no longer required.	Storage and use of hazardous materials would be extended up to an additional 5 years with no expected change in quantities stored or used.	Impacts would be similar to the Proposed Action.