1.0 INTRODUCTION

1.1 Background

Barrick Goldstrike Mines Inc. (Barrick) owns and operates the Goldstrike property, which is located in Elko and Eureka Counties, Nevada, approximately 23 miles northwest of Carlin, Nevada. In 1989, Barrick submitted a Plan of Operations (Plan) pursuant to the Surface Management Regulations, 43 Code of Federal Regulations (CFR) Part 3809, to the Bureau of Land Management (BLM) for the Betze Project. As provided by Section 102(c) of the National Environmental Policy Act of 1969, as amended (NEPA), BLM prepared an environmental impact statement (EIS) with respect to Barrick's proposed Plan. The Final EIS and Record of Decision for the Betze Project were issued on June 10, 1991. The Final EIS included a description of the environmental impacts projected to result from ground water pumping to be conducted by Barrick to lower the local ground water elevations below the proposed Betze mining operations.

Since the Betze EIS was issued, Barrick's implementation of the ground water pumping and management operations and its monitoring of ground water elevations have provided new information regarding the pumping requirements and potential environmental impacts of Barrick's ground water pumping operations. Upon noting that dewatering rates and hydrologic conditions were substantially different from those anticipated in the June 1991 Final EIS and Record of Decision for the Betze Project, the BLM raised concerns about the environmental impacts in a letter to Barrick dated December 17, 1992. By letter of December 22, 1992, Barrick agreed to underwrite the reasonable cost of conducting an analysis of the potential impacts of Barrick’s dewatering operations. Barrick also proposed to use the analysis as a means to define implementation programs for appropriate mitigation measures in keeping with the Betze Project Record of Decision. The BLM prepared this Supplemental EIS to address these issues and concerns.

Also, in July 1996 the Nevada Division of Environmental Protection (NDEP) issued a National Pollutant Discharge Elimination System (NPDES) Permit, NPDES Permit NV0022675, to Barrick authorizing the discharge of up to 70,000 gallons of water per minute (gpm) to the Humboldt River. Barrick completed construction of a treatment plant and conveyance system on private land in August 1997 and began discharging water to the Humboldt River in September 1997 as irrigation demand declined.

Finally, in May 1997 Barrick and Elko Land and Livestock Company (ELLCO) submitted an application to the BLM to amend an existing right-of-way to authorize the installation of an additional buried pipeline across public domain land administered by the BLM, as part of the existing water conveyance system. Installation of the additional buried pipeline would enhance the operational flexibility of the water distribution system established in Boulder Valley by Barrick and ELLCO.

This Supplemental EIS evaluates the environmental effects of Barrick's ongoing water management operations and of installing a second pipeline across public lands. Installation of the buried pipeline is the Proposed Action addressed in this Supplemental EIS and is the Proposed Action upon which the BLM will make a decision.

Barrick's current and anticipated future ground water pumping and water management operations are described in detail in Section 1.4. The Proposed Action, i.e., the buried pipeline, is described in Section 2.1.

The BLM recently prepared a Cumulative Impact Analysis (CIA) report (BLM 2000b) to address potential cumulative dewatering and discharge impacts associated with Barrick’s Betze Project and Newmont Gold Company’s (Newmont’s) proposed South Operations Area Project Amendment and Leeville Project. This CIA may result in the implementation of mitigation measures to address the cumulative impacts of the ground water pumping and water management operations of these three mines. The BLM will identify monitoring programs and mitigation measures in conjunction with the affected parties; monitoring and mitigation measures will be specified in the Final EISs for the three projects.

1.2 Purpose and Need

1.2.1 Purpose and Need for the Proposed Action (Buried Pipeline)

Approval of the amended right-of-way and installation of the proposed buried pipeline would: (1) enhance the operational flexibility of the water distribution system established in Boulder Valley by Barrick and ELLCO; (2) eliminate the need to treat a portion of the ground water delivered to irrigation uses on ELLCO's property; and (3) increase the quantity of water that could be delivered to irrigation uses. As described in Section 2.1, the proposed pipeline would enable Barrick to separate water that meets the water quality criteria of its NPDES Permit from water that can be used for irrigation without treatment. The capability to separate these flows would result in an increase in the availability of water for irrigation or for infiltration into Boulder Valley. This flexibility in handling would decrease or eliminate the amount of water discharged to the Humboldt River and thus removed from the hydrographic area in addition to decreasing treatment costs.

1.2.2 Purpose and Need for the Supplemental EIS

The purpose and need for the Supplemental EIS are to: (1) update the environmental analysis of Barrick's ground water pumping and water management operations that was conducted in the Betze Project EIS, based on additional data and other information collected since 1991 (see Chapter 3.0); and (2) analyze the environmental impacts associated with issuance of an amended right-of-way by BLM authorizing the construction and operation of a 3,936-foot buried pipeline across public lands (see Chapter 4.0).

1.3 Issues

The BLM is serving as lead agency in preparing this Supplemental EIS. Preparation of the Supplemental EIS is consistent with BLM's NEPA guidance, BLM Handbook H-1790-1, and the Council on Environmental Quality's (CEQ) NEPA regulations. The BLM published a Notice of Intent to prepare the Supplemental EIS for Barrick's ground water pumping and water management operations in the Federal Register on August 31, 1994, and mailed a Dear Interested Party letter dated September 2, 1994, announcing the preparation of the Supplemental EIS to 465 people. The BLM held scoping meetings in Elko and Reno, Nevada on September 14 and 15, 1994, respectively. The BLM received 11 written and 9 oral comments during the scoping period for the Supplemental EIS.

Following receipt of Barrick's and ELLCO's application to amend the right-of-way for the proposed buried pipeline, the BLM published a second Notice of Intent in the Federal Register on January 7, 1998, and mailed a second Dear Interested Party letter dated January 14, 1998, to 284 people. In response to the second scoping notice, the BLM received six written comments. Public and agency comments have been grouped according to general subject area and are summarized in Table 1-1. Table 1-1 also provides references to the sections of this EIS that respond to each issue raised in the comments. Those scoping comments that do not apply or are beyond the scope of the Supplemental EIS are noted as such in the table.

Based on these comments and the BLM's internal review, five issues of concern were identified and are the focus of the Supplemental EIS:

- Potential impacts to surface and ground water resources, including the Humboldt River;
- Potential impacts to livestock operations;
- Potential impacts to threatened and endangered species;
- Potential impacts to riparian and wetland vegetation; and
- Potential impacts to wildlife and fisheries resources.

Table 1-1

Issues and Concerns Identified in Scoping

Issue	SEIS Document Section(s)
Surface Water	
Describe effects on the water resources of the Maggie Creek/Boulder Creek basins and of the local vicinity, including the Humboldt River.	Chapter 3, Section 3.2.2.
Describe water disposal methods in detail, with volumes broken down according to disposal method. Disposal alternatives should be provided.	Chapter 1, Sections 1.4.3 and 1.5.
Modification of the flow volumes on the Humboldt River is a direct impact from the mining operations. Describe the affected environment and the known and anticipated environmental consequences, including cumulative impacts.	Chapter 3, Sections 3.2.1.3 and 3.2.2.2 (direct impacts), and Chapter 5, Section 5.2 (cumulative impacts).
Describe potential impacts on ground water and surface water, estimating rates of water produced and/or consumed by the proposed project as well as all other related projects.	Chapter 3, Sections 3.2.2.1 (direct impacts) and Chapter 5, Section 5.2 (cumulative impacts).
Discuss project compliance with state-adopted, EPA-approved water quality standards.	Chapter 3, Sections 3.2.2.1 and 3.2.2.2 for any predicted exceedences of approved water quality standards.
Discuss status of current NPDES permit(s) for discharges to surface water and whether any additional permits or modifications are anticipated in the future.	Chapter 3, Sections 3.2.1.3 and 3.2.2.2; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Document project consistency with applicable storm water permitting requirements.	Not applicable to this SEIS because there would be no surface disturbance (other than pipeline route).
Describe drainage patterns in the project locale. Include hydrologic and topographic maps.	Chapter 3, Sections 3.2.1.1 and 3.2.1.3.
Identify whether any components of the operations fall within 50- or 100-year flood plains and discuss potential for flash floods to transport sediment from disturbed areas to stream channels.	Chapter 3, Sections 3.2.1.1 and 3.2.2.1. Also see Final Betze Project EIS
Discuss potential for contamination of surface flows and mitigation measures to prevent this contamination.	Chapter 3, Section 3.2.2.1 and 3.2.2.2.
Describe the quality of existing surface and ground waters.	Chapter 3, Section 3.2.1.2.
Discuss potential for and effects of movement of any contaminated surface water to the subsurface.	Chapter 3, Section 3.2.2 discusses potential water quality impacts associated with Barrick's dewatering and water management activities. No water quality impacts (or sources of contamination) are anticipated for the Proposed Action.
Describe the status of operations related to the existing TS Reservoir, its relationship to the 404 permitting process, and the connection between the TS Reservoir and water discharge impacts.	Chapter 1, Section 1.4.3, and Chapter 3, Section 3.2.2.1.
Examine pit filling after mining operations cease and resulting potential impacts to nearby surface water resources.	Chapter 3, Section 3.2.2.1.
Discuss any impacts (ground water discharge, etc) to the Humboldt River and any other surface water bodies (springs and tributary streams) resulting from the mining operation.	Chapter 3, Section 3.2.2.2.

Issue	SEIS Document Section(s)
Discuss effects of changing water supplies to downstream water users, both during discharge and following cessation of discharge, including potential impacts of water quality on water use such as crop production.	Chapter 3, Section 3.2.2.2; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Estimate the additional evapotranspiration caused by raised water levels.	Chapter 3, Section 3.2.2.2.
Revise the previous pit lake study.	Chapter 3, Section 3.2.2.1.
Groundwater	
Consider additional recharge schemes upgradient from Boulder Valley to replenish the cone of depression.	Chapter 1, Section 1.5.
Consider recharge into faulted zones near the base of mountains.	Chapter 1, Section 1.5.
Provide detailed hydrologic data including pump tests of the lower Boulder Valley and a map of well levels.	Chapter 3, Section 3.2.2.1.
Use same wells used by USGS and update their ground water maps.	Ground water elevation maps were updated through 1998 in Section 3.2.1.2.
Consider enhanced natural recharge from the Humboldt River into the surrounding alluvium.	Potential impacts of mine dewatering discharges and water management operations on the Humboldt River are discussed in Section 3.2.2.2.
Quantify the pumping volume and provide an estimate of future pumping requirements.	Chapter 1, Section 1.4.3.
Summarize results of Barrick's groundwater flow model in a manner that is understood by the public.	Chapter 3, Section 3.2.2.1 and Appendix D.
Provide a technical summary of the groundwater model in an appendix.	Appendix D.
Compare Barrick's groundwater study with Newmont's. Validity and limitations of both models should be discussed.	Appendix D; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Identify direct, indirect, and cumulative impacts to surface and groundwater flow, water supply wells, and springs and seeps as a result of groundwater pumping and mine water discharge associated with the project.	Chapter 3, Sections 3.2.2.1 (direct impacts) and Chapter 5, Section 5.2 (cumulative impacts).
Describe relationship between the pit and the hydrogeologic system.	Chapter 3, Section 3.2.1.2.
Document volumes of water taken from aquifer storage versus recharge rates, as a result of dewatering operations along the Carlin trend.	Estimates provided in the *Cumulative Impact Analysis of Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Delineate the area of the full cone of depression that may result from the pumping of groundwater.	Chapter 3, Sections 3.2.2.1 and 3.9.
Describe changes in the area of the cone of depression through time and potential impacts on springs, seeps, and streams.	Chapter 3, Section 3.2.2.1.
Describe groundwater mounding and spring development downgradient from TS Ranch Reservoir, including trace elements in the water.	Chapter 3, Section 3.2.2.1.
Discuss long-term ramification of losses of ground water and associated changes in evapotranspiration rates.	Chapter 3, Section 3.2.2.1 and Appendix D.
Discuss benefits of reinjecting water back into the carbonate aquifer upgradient of the mine, at latter stages of mining.	Chapter 1, Section 1.7.
Discuss potential effects of groundwater withdrawals on subsidence.	Chapter 3, Section 3.1.2.

Issue	SEIS Document Section(s)
Vegetation/Grazing	
Describe the extent and character of wetland development downgradient of TS Ranch Reservoir.	Chapter 3, Section 3.3.
Identify wetland and riparian habitat and other unique or important habitat areas that could be affected by the project.	Chapter 3, Section 3.3.
Discuss any impacts to grazing/livestock operations resulting from mine dewatering activities.	Chapter 3, Section 3.7 (direct impacts) and Chapter 5, Section 5.7.1 (cumulative impacts).
Wildlife and Fisheries	
Discuss effect of the conveyance system on wildlife movement across Boulder Valley.	Chapter 3, Section 3.4.
Discuss avoidance, minimization, and mitigation of losses or modifications of habitat and plant and animal species composition.	Chapter 3, Sections 3.4, 3.5, and 3.6.
Include a thorough section on direct, indirect, and cumulative impacts related to mine dewatering and discharge. Emphasis should be placed on the measured and anticipated effects to biologic resources, especially those of special status, within the area of influence caused by physical and chemical changes in the hydrologic system as a result of mining operations.	Chapter 3, Sections 3.4, 3.5, and 3.6 (direct impacts) and Chapter 5, Sections 5.4.1, 5.5.1, and 5.6.1 (cumulative impacts).
Identify areas with sensitive resources.	Chapter 3, Sections 3.4, 3.5, and 3.6.
Describe impacts to Lahontan cutthroat trout (LCT) from water quality degradation and contaminant mobilization from this and other projects potentially affecting the Maggie Creek and Rock Creek subbasins.	Chapter 3, Section 3.6 (direct impacts) and Chapter 5, Section 5.6.1 (cumulative impacts).
Describe potential impacts to wildlife dependent on wetlands downgradient from TS Ranch Reservoir	Chapter 3, Sections 3.5 and 3.6.
Describe effects of the project on LCT emigration and migration between creeks and implications to continued existence of each population.	Chapter 3, Section 3.6 (direct impacts); discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Describe potential to create potential introduction sites for nonnative aquatic species. Such introductions could result in LCT population declines through predation, competition, hybridization, or secondary introduction of parasites and diseases.	The Proposed Action and Barrick's anticipated water management operations would not create new sites with the potential to introduce non-native species to occupied or potential LCT habitat. As stipulated in the Decision Record for the Meikle Mine, Barrick has implemented measures to prevent the introduction of non-native species to open water management facilities.
Describe changes in the area of the cone of depression through time and potential impacts on springs, seeps, and streams, and associated biota. Include impacts to LCT, spring snails, and other endemic invertebrates, and riparian vegetation.	Chapter 3, Sections 3.2.2 and 3.6.2.
Discuss risks to wildlife, including migratory birds, from drinking pit lake water and/or consuming aquatic biota from the lake.	Chapter 3, Section 3.4.
Include potential impacts to instream and riparian habitats, distribution and size of downstream wetlands, and abundance and diversity of both aquatic and terrestrial species associated with the Humboldt River.	Chapter 3, Sections 3.3.2, 3.4.2, and 3.5.2.
Discuss bioaccumulation of trace elements and other constituents by aquatic biota in the pit lake.	Chapter 3, Section 3.4.2.

Issue	SEIS Document Section(s)
Cumulative Impacts	
Address potential cumulative impacts to resources in the context of past, current, and reasonably foreseeable future mining. Include discussion of impacts to water quality and quantity, air quality, soils, vegetation, wildlife, and biodiversity.	Chapter 5; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Provide data on withdrawals and discharges from other operations within the Humboldt River basin. Emphasize water chemistry and potential effects to biologic resources. Reference the Humboldt River basin Assessment program and use existing monitoring data from that program.	Chapter 5, Sections 5.2, 5.3, 5.4, 5.5, and 5.6.
Determine potential impacts, including cumulative impacts, of the project on plant and wildlife species, especially species classified rare, threatened, or endangered on either state or Federal lists. Include candidate species.	Chapter 3, Sections 3.4, 3.5, and 3.6, Chapter 4, Sections 4.4, 4.5, and 4.6, and Chapter 5, Sections 5.3, 5.4, 5.5, and 5.6.
Discuss the series of future pit lakes within the Carlin Trend.	Chapter 3, Sections 3.2.2.1, 3.2.4.1, and 3.4.2.3; Chapter 5, Section 5.2.1.
Discuss cumulative effects of discharges of trace elements such as selenium, arsenic, and boron.	Chapter 5, Section 5.2; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss potential effects of project discharges on surface water quality, including cumulative impacts over time.	Chapter 5, Section 5.2 and discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss impacts associated with mining effluent discharge to the Humboldt Sink, including the Humboldt Wildlife Management Area.	Chapter 3, Sections 3.2 and 3.4 and Chapter 5, Sections 5.2 and 5.4.
Describe impacts of the incremental and cumulative volume of discharge and seasonality of discharge on river hydraulics, hydrology, and stream bank stability.	Chapter 5, Section 5.2; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss potential overlapping cones of depression from all dewatering activities.	Chapter 3, Sections 3.2 and Chapter 5, Section 5.2; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss impacts of changes in water quality in the Humboldt River and related impacts to wetlands, including increased concentrations and loads of trace elements and other constituents, with associated impacts to aquatic species and migratory birds. Include potential impacts to aquatic birds, including effects on reproduction and survival, in Humboldt Wildlife Management Area.	Chapter 3, Sections 3.2, 3.4 and Chapter 5, Sections 5.2.2 and 5.2.4.
Address potential cumulative impacts to Traditional Cultural Properties in the Area of Potential Effect caused by dewatering.	Discussed in the *Cumulative Impact Analysis of Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss potential cumulative impacts to sage grouse, a bird identified as significant to Western Shoshone culture.	Discussed in the *Cumulative Impact Analysis of Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.

Issue	SEIS Document Section(s)
Discuss the ability to maintain traditional religious, healing, and educational practices in the assessment area.	Discussed in the *Cumulative Impact Analysis of Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss impacts to natural elements that could impact Western Shoshone cosmology.	Discussed in the *Cumulative Impact Analysis of Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Address potential effects to surface waters in the Area of Potential Effect, including drying up of these waters or effects to water quality.	Discussed in the *Cumulative Impact Analysis of Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Mitigation/Monitoring	
Consider using the Humboldt River to convey flow downstream to offstream recharge sites.	Chapter 1, Section 1.7.
Consider diverting a portion of the proposed discharge through the White House Ditch and Rock Creek system to benefit wildlife and wetland values.	Chapter 1, Section 1.7.
Consider planting and maintaining willows and other riparian vegetation on all disturbed areas on the Humboldt River.	Planting willows and other riparian vegetation along the Humboldt River would be impractical and unnecessary since Barrick does not control the private land and planting willows would not re-establish baseflows.
Fund an antelope winter range project in the hills north of the canal.	Chapter 3, Section 3.4.3 identifies mitigation measures for wildlife.
For the lined canal, consider reducing side slope angles and installation escape structures. Have a standard barbed wire fence and design the canal so animals can easily escape.	Chapter 1, Section 1.4.
Discuss how potential impacts from fill operations are currently being mitigated. Include: acreage and habitat type of waters of the US created, restored, or modified; water sources to maintain the mitigation area; revegetation plans; maintenance and monitoring plans; size of location and mitigation zones; parties ultimately responsible for plan's success; and contingency plans that would be enacted if the original plan fails.	Chapter 4, Section 4.3.1.
Discuss mitigation measures taken to prevent exposure of migratory waterfowl and other wildlife to any toxic waters.	Monitoring and mitigation (i.e., funding for research) was identified in the Betze EIS ROD (still applicable for the SEIS).
Include mitigation for replacement of habitat adversely affected by the project.	Chapter 1, Section 1.6.
Discuss mitigation/compensation measures including reclamation plans for the project site.	Chapter 3, Sections 3.4.3, 3.5.3, and 3.6.3.
Discuss the development of measures to avoid long-term impacts or limit them to insignificant levels.	Chapter 1, Section 1.6.
Describe how impacts will be monitored over the long-term to ensure significant impacts do not occur, including monitoring standards and parameters to be described.	Chapter 1, Section 1.6.
Discuss a mechanism for implementing additional mitigation/compensation measures in the event monitoring data indicate greater impacts than originally anticipated.	Chapter 1, Section 1.6.

Issue	SEIS Document Section(s)
Miscellaneous	
Encourage tiering to the original Betze EIS.	Chapter 1, Section 1.1.
Describe the primary purpose of the Supplemental EIS, which should not be confused with purpose and need of the proposed action.	Chapter 1, Sections 1.1. and 1.2.
Evaluate all reasonable alternatives, including reasonable alternatives not within the jurisdiction of the BLM.	Chapter 1, Section 1.5.
Discuss measures taken to analyze the environmental effects of the proposed action on minority communities and low-income populations.	Chapter 3, Section 3.8.
Describe measures taken to present opportunities for affected communities to provide input into the NEPA process.	Chapter 1, Section 1.3 and Chapter 5.
Describe consultations with potentially affected Tribes and the results of those consultations.	Chapter 3, Section 3.8; discussed in *Cumulative Impact Analysis* of *Dewatering Operations for the Betze Project, South Operations Area Project Amendment, and Leeville Project* on file at the BLM Elko Field Office.
Discuss potential effects of future land exchanges relating to mining.	Land exchanges are not proposed as part of this SEIS.
Mine/Mill Facilities	
Include Meikle operation within the scope of the EIS and fully describe and analyze in the document.	Brief summary of mine/mill facilities in Chapter 1, Section 1.4.2. No new or expanded facilities would occur as part of the water management operations.
Include substantial information and analysis of new mine-related activities or other information not included in the Betze EIS.	
Include a description of existing and anticipated Federal and state permits and regulatory requirements, and the responsible agencies.	
Describe designs of the existing ore processing facilities and any planned modifications and/or new facilities.	
Discuss how accidental releases of hazardous materials would be handled. Identify the potential impacts, methods for discovering such failures, and degree to which impacts would be reversible.	
Discuss acid generation/neutralization potential for waste rock, stockpiles, tailings, and backfill at the site, and appropriate mitigation measures.	
Describe applicable tests on ore and waste rock and the results for each test.	
Provide a Waste Rock Characterization and Disposal Plan.	
Project chemical characterization of water in any open ponds.	
If cyanide is to be used, describe the chemistry of cyanide in water and soil and estimate quantities of cyanide likely to be "lost" and its fate.	
Identify how solution impoundments would be treated to prevent poisonings.	
Consider covering any pregnant solution ponds.	
Assure maintenance would continue after operations or while operations are suspended.	
Discuss any measures to ensure compliance with Resource Conservation and Recovery Act regulations.	

Issue	SEIS Document Section(s)
Describe measures taken to decommission mine operations, and neutralize or cap waste rock, tailings, and leach heaps.	
Identify areas targeted for reclamation, and clarify the intended degree of treatment in each area, including irrigation requirements.	
Discuss timing of reclamation relative to mining operations and duration of reclamation treatment.	
Provide standards for determining and means of assuring successful reclamation.	
Air Quality	
Discuss NAAQS and PSD increments applicable to air quality in the project area.	Not applicable to this SEIS because no new air emissions would occur as a result of water management operations.
Identify any Class I PSD areas within 100 kilometers of the project site.	
Discuss New Source Performance Standards for Metallic Mineral Processing Plants with respect to the proposed project.	
Explain how the proposed project is in conformity with the Nevada State Implementation Plan (SIP).	
Discuss the possibility of an air quality monitoring program to ensure project compliance with all applicable air quality standards and permits.	

1.4 Description of Barrick's Continuing Operations

1.4.1 Location and Land Ownership

Barrick's existing gold mining operations are located on the western flank of the Tuscarora Mountains in north-central Nevada, approximately 23 miles northwest of Carlin, Nevada, as depicted in Figure 1-1. The Goldstrike property is situated in the Little Boulder Basin, a topographic feature that contains the drainages of Rodeo Creek, Brush Creek, Bell Creek, and Boulder Creek (see Section 3.2.1.3, Surface Water). Brush and Bell Creeks drain to Rodeo Creek, and Rodeo Creek converges with Boulder Creek in northern Boulder Valley, west of the active mining area. Elevations in Little Boulder Basin range from 5,100 feet above mean sea level (amsl)[1] in the foothills of Boulder Valley to over 8,700 feet amsl (USGS) at the peak of the Tuscarora Mountains, a north-trending range typical of the Basin and Range physiographic province.

Boulder Valley extends from Little Boulder Basin southwest approximately 20 miles to the Humboldt River. Elevations in lower Boulder Valley range from 4,590 feet amsl (USGS) at the valley floor to over 8,000 feet amsl (USGS) at the peaks of the Tuscarora Mountains. Boulder Valley is bounded on the east by the Tuscarora Mountains and on the west by the Sheep Creek Mountains. Boulder Creek and Rock Creek are the prominent drainages in Boulder Valley; both creek channels become extensively braided in lower Boulder Valley, and flows are ephemeral, rarely reaching the Humboldt River.

Barrick owns or controls approximately 8,000 acres of land within Little Boulder Basin and Boulder Valley. In addition, by virtue of agreements with Newmont and its subsidiary ELLCO, Barrick has rights to make use of certain lands owned by Newmont and ELLCO in Boulder Valley. The land status in Little Boulder basin and Boulder Valley is depicted in Figure 1-2.

At the time the Betze Plan was submitted to the BLM and the Betze Final EIS was prepared, most of Barrick's mining operations were being conducted or planned to be conducted on public lands managed by the BLM. In 1994, Barrick 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 Barrick's milling and beneficiation operations are situated. Subsequently in 1995, Barrick completed a land exchange with the BLM that transferred 1,657 additional acres of public land at the Goldstrike property to Barrick (BLM 1994a). The North Block Tailings Facility and most of the waste rock disposal area are situated on the land acquired in the 1995 land exchange. A second land exchange was completed in 1997 that transferred 1,279 acres of public land to Barrick (BLM 1995). At present, all of Barrick's mining operations are being conducted on private land owned by Barrick or Newmont with the exception of approximately 300 acres of a waste rock disposal area, ore stockpiles, topsoil stockpiles, and a laydown area that are located on public lands. Similarly, all of Barrick's milling and beneficiation operations are being conducted on private land owned by Barrick or Newmont, except for the approximately 95 acres of the North Block Tailings Facility embankment that are situated on public land. Table 1-2 provides a list of the permits currently in place at the Goldstrike property and the responsible regulatory agencies.

1.4.2 Mining, Milling, and Beneficiation Operations

Barrick presently is mining the Betze-Post Mine, an open-pit mining operation, and the Meikle Mine, an underground mining operation. The Betze-Post Mine operation produces ore from property owned by Barrick and from property owned by Newmont. Under the terms of an agreement with Newmont, Barrick mines ore from Newmont property and delivers it to Newmont for gold recovery. The ore produced from Barrick's

[1] Unless otherwise indicated, references to elevation bases are established by Barrick. There are differences among the three survey systems currently in use in the area (Barrick, Newmont Gold Company, and U.S. Geological Survey [USGS]); for consistency, this document is based on Barrick's survey and elevations.

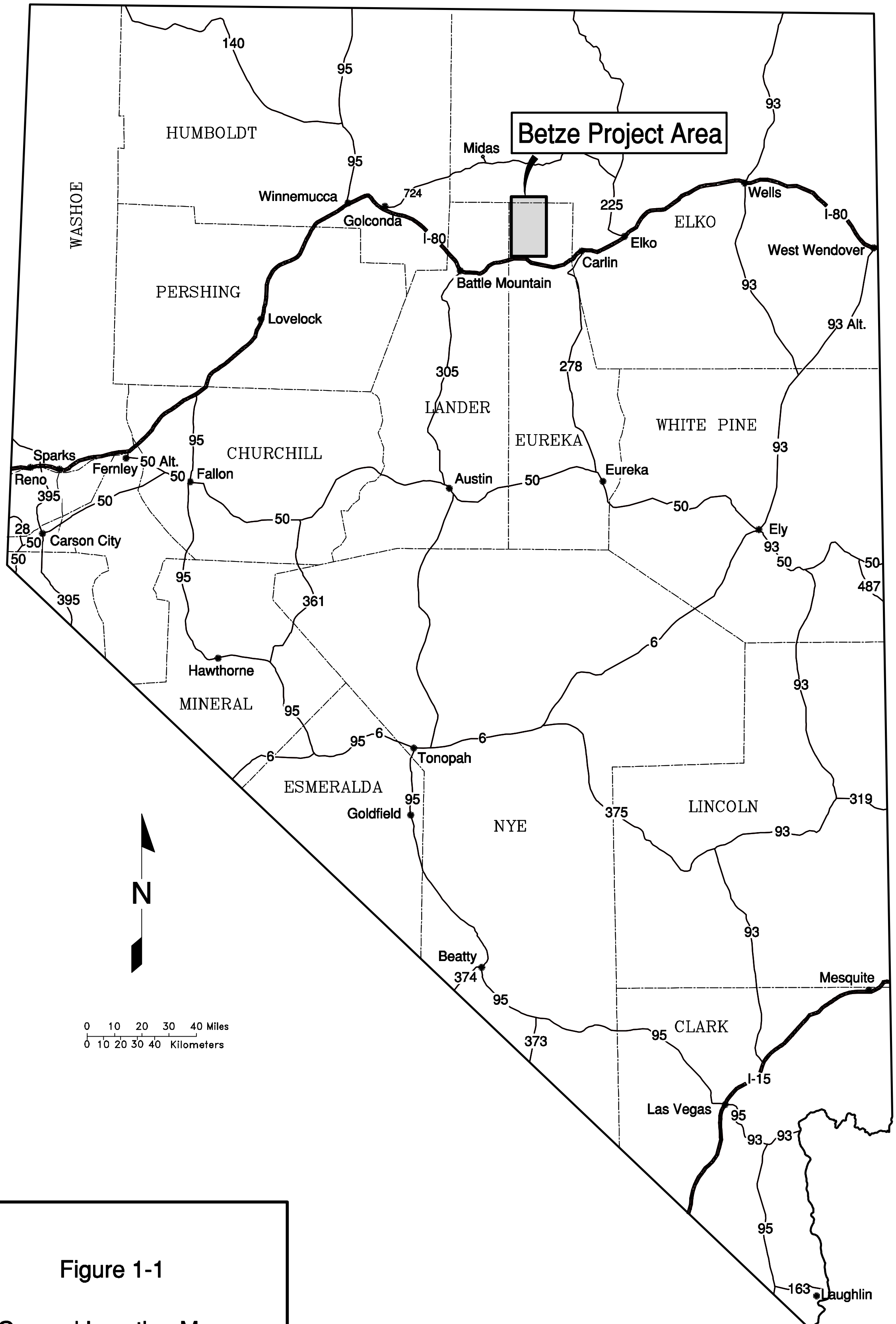

Figure 1-1

General Location Map

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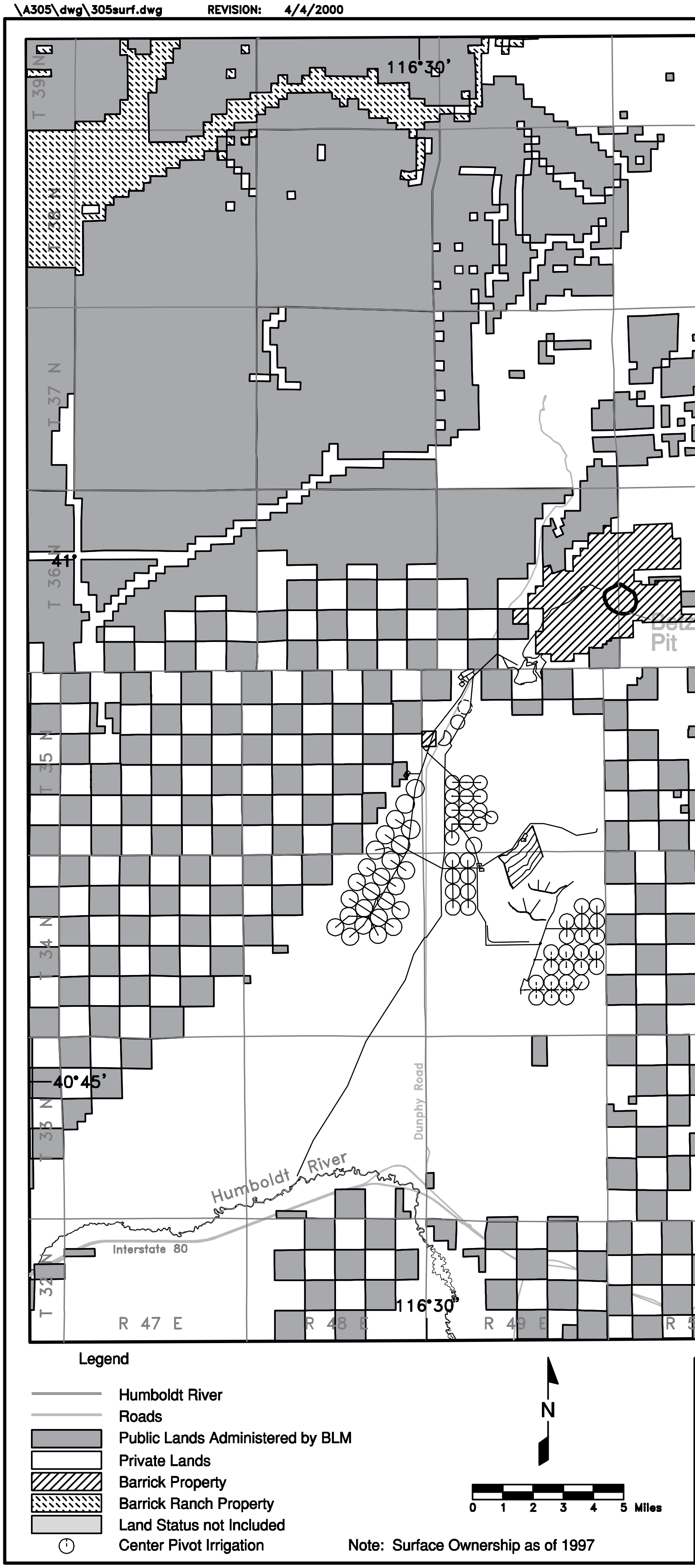

Figure 1-2

Surface Management Status

Table 1-2
Permits Currently Authorized at the Goldstrike Mine

Permits	Regulatory Agency
Water Pollution Control Permits (Mining Facilities Permit, Infiltration Permits)	NDEP, Bureau of Mining Regulation and Reclamation
Sewage System Approvals	NDEP, Bureau of Water Pollution Control
Underground Injection Permits	NDEP, Bureau of Water Pollution Control
Stormwater Permits	NDEP, Bureau of Water Pollution Control
NPDES Permit	NDEP, Bureau of Water Pollution Control
Potable Water Permits	NDEP, Bureau of Water Pollution Control
Individual Sewage Disposal Systems	NDEP, Bureau of Water Pollution Control
Air Quality Operating Permits	NDEP, Bureau of Air Quality
Open Burn Permit	NDEP, Bureau of Air Quality
Radioactive Materials License	Nevada Division of Health
Industrial Artificial Pond Permits	Nevada Division of Wildlife
Reclamation Permits	Nevada Bureau of Mining Regulation and Reclamation
Nationwide Permits (Section 404)	U.S. Army Corps of Engineers (USCOE)

portion of the Betze-Post Mine and from the Meikle Mine is delivered to Barrick's milling and beneficiation facilities for gold recovery. Barrick's mining, milling, and beneficiation (i.e., roaster, pads, heap leach, tailings facilities, etc.) operations are shown in Figure 1-3 and are described in the following sections.

1.4.2.1 Betze-Post Mine

The Betze-Post mining operation uses conventional drilling, blasting, excavating, and hauling methods to remove overburden and gold-bearing ore. Drill rigs are used to drill blast holes that are charged with ammonium nitrate fuel oil (ANFO) prill (or slurry) and blasted. The resultant broken rock is excavated on production benches that have individual heights of either 20 or 40 feet. Excavation is performed by electric and hydraulic shovels and large front-end loaders. Currently, haul trucks with carrying capacities of 190 to 300 tons are used to transport material from the mine to the waste rock disposal areas, to Newmont, or to Barrick's milling and beneficiation facilities. Barrick has installed an overhead electric trolley system on several ramps in the mine and established haulage routes that enable the haulage trucks to operate on line power over the longer, steeper grades. The trolley system increases the speed of the trucks, reduces the amount of diesel fuel consumed by the trucks, and increases the life of the truck engines.

Barrick presently is mining the Betze-Post Pit at an average rate of approximately 420,000 tons of material per day. The existing surface disturbance of the open pit is approximately 970 acres, the mine is approximately 1,200 feet deep, 6,000 feet wide, and 9,000 feet long. Barrick's initial agreement with Newmont projected that mining of the Betze and Post pit would be completed by the end of 2005. Newmont is developing the Deep Post Deposit using underground mining methods. The portals for the underground mine are situated on private land within the Betze-Post Pit. Barrick and Newmont adopted an agreement that coordinates the operation of Barrick's open-pit mining operations with Newmont's underground mining operations. In addition, based on 1999 changes in mineral ownership, the parties revised the existing agreement that they have been operating under since 1992. These changes are expected to result in completion of open-pit mining operations under that agreement at the end of 2001, several years earlier than

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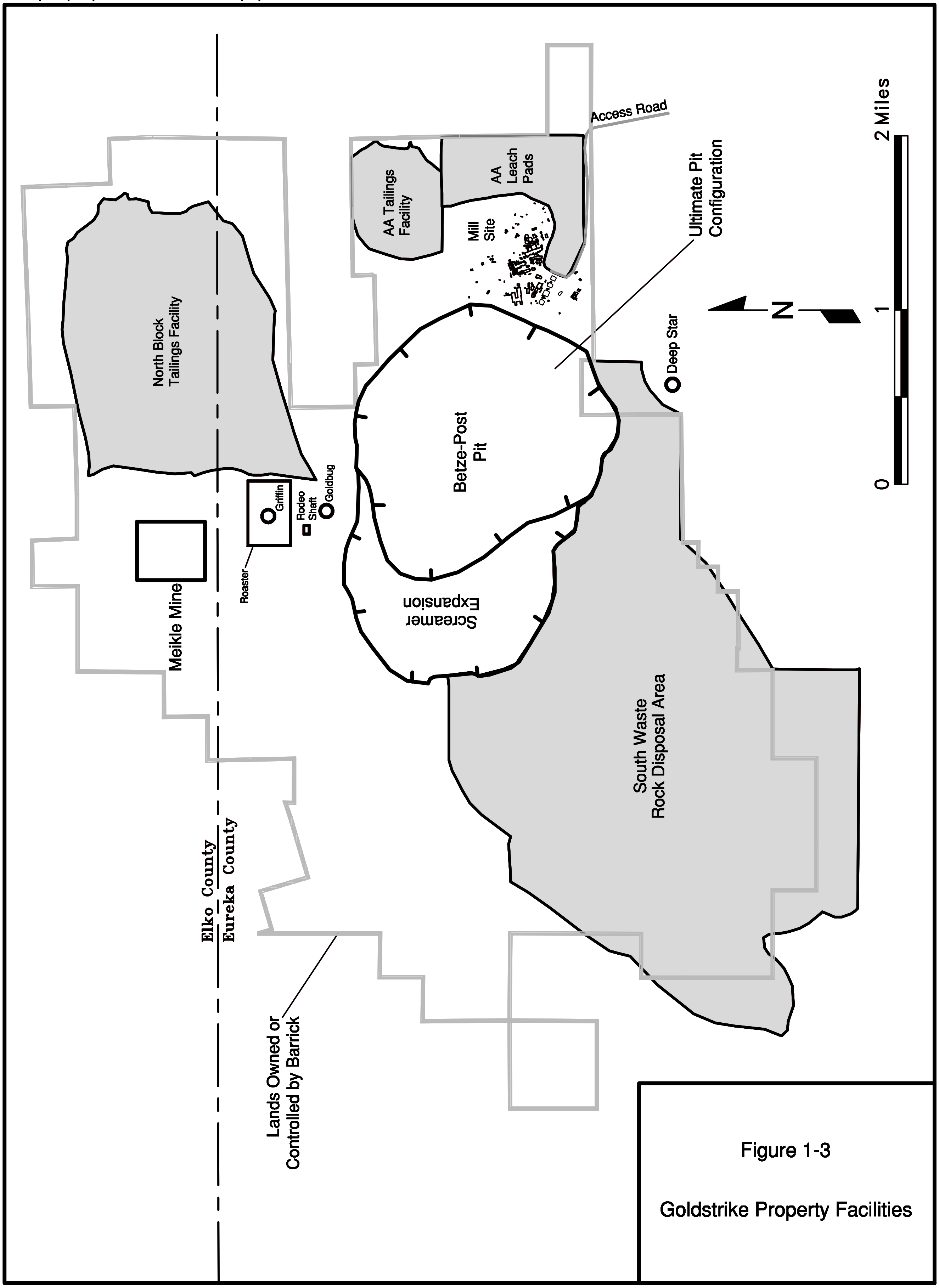

Figure 1-3

Goldstrike Property Facilities

initially planned. In addition to the Betze and Post deposits, Barrick has discovered or delineated other deposits, including the West Betze and Screamer deposits, that Barrick intends to mine through further development of the Betze-Post Mine by open-pit or potential underground mining methods. Barrick's present mine plan projects that mining will continue at the Betze-Post Mine through the year 2011. Ore and waste volumes to be mined during the next 5 years are shown in Table 1-3. A projected final pit configuration, which would disturb approximately 1,380 acres, is presented in Figure 1-3. This configuration extends into a larger area than the pit area analyzed in the Betze EIS. The mine plan through the year 2011 has been used to develop the ground water pumping and ground water recovery projections for purposes of this Supplemental EIS.

1.4.2.2 Meikle Mine

The Meikle Mine is an underground mine that Barrick began to develop in 1994 to mine the Meikle deposit. The location of the Meikle Mine is shown in Figure 1-3. Barrick initiated production from the upper levels of the Meikle deposit in late 1996. During 1999, Barrick deepened 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. During the first half of 1999, the Meikle Mine produced an average of 2,392 tons of ore per day. With completion of the underground workings at lower elevations, production is expected to increase to 3,800 tons per day during the second half of 1999. Production from the Meikle Mine is scheduled to continue through the year 2010. A more complete description of the Meikle Mine is provided in the Meikle Mine Development Environmental Assessment (BLM 1993a). Ore from the Meikle Mine is delivered to Barrick's milling and beneficiation facilities for gold recovery.

1.4.2.3 Rodeo and Goldbug Exploration

Barrick 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 1-3. The exploration shaft provides Barrick with underground access to explore the Griffin deposit, located between the Rodeo shaft and the Meikle Mine, and the Rodeo deposit. As part of an asset exchange with Newmont that was completed in May 1999, Barrick acquired the Goldbug deposit, located south of the Rodeo shaft as shown in Figure 1-3. Barrick initiated underground drift development from the Rodeo shaft to the Goldbug deposit in mid-1999. Exploration of the Rodeo, Griffin, and Goldbug deposits will continue in an effort to develop additional ore reserves.

1.4.2.4 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 majority of the ore placed on the heap leach pads was near-surface oxide gold ore mined from the Post and Betze-Post mines. In 1998, Barrick produced approximately 19,700 ounces of gold from its heap leaching operations. A more complete description of Barrick's heap leach operations is provided in Section 2.1.4.1 of the Betze Draft EIS.

1.4.2.5 Milling and Beneficiation Facilities

Barrick has constructed milling and beneficiation facilities on Barrick's private land as depicted in Figure 1-3. The milling facilities include two separate mill circuits that are presently capable of handling approximately 20,000 tons of ore per day. After the ore passes through the grinding circuit, it is delivered to one of six pressure oxidation vessels (autoclaves) in which heat, pressure, and oxygen are added to the ore slurry to oxidize the sulfide minerals in the ore. Following the pressure oxidation circuit, the ore slurry is delivered to the carbon-in-leach vessels where a dilute cyanide solution is used to dissolve the gold in the ore. The gold is then adsorbed onto activated carbon particles that are screened from the slurry and sent to the stripping circuit for gold recovery. The ore slurry, now referred to as tailings, is treated with Caro's acid or the INCO process to neutralize residual cyanide, and the slurry is pumped to one of Barrick's two tailings disposal facilities, the North Block Tailings Facility and the AA Tailings

Table 1-3
Goldstrike Property Mining Plans Through the Year 2004
(in millions of tons)

	1999	2000	2001	2002	2003	2004
Betze-Post Pit						
Total Ore Mined	5.2	10.0	15.1	12.6	6.0	11.6
Total Waste Mined	153.9	134.9	134.8	138.0	143.9	138.9
Total Mined	159.2	145.0	150.0	150.6	149.9	150.5
Meikle Underground Mine						
Total Ore Mined	1.0	1.1	1.5	1.5	1.8	1.9
Goldstrike Processing						
Total Mill Throughput	5.9	9.4	10.4	10.4	10.4	10.4
Total to Leach Pad	0	0	0	0	0	0

Facility. The tailings solids settle in the impoundment, and the fluids are recycled to the mill for continued use.

During 1998, Barrick initiated construction of a dry grinding and roasting plant (roaster facility) on private land owned by Barrick just south of the Meikle Mine. The roaster facility has a nominal capacity of 18,500 tons of ore per day. The facility is composed of the following primary components: ore crushing facilities, dry ore grinding circuits, ore oxidation (roasting), carbon-in-leach gold recovery process, and ancillary processes. The roaster facility enables Barrick to oxidize carbonaceous ore so that gold can be recovered efficiently by the carbon-in-leach process. The Nevada Division of Environmental Protection, Bureau of Air Quality issued an air quality permit for the roaster facility that includes emissions control and monitoring requirements. Barrick anticipates that construction of the roaster facility will be completed and production will begin during 2000.

During 1998, Barrick produced approximately 2,326,000 ounces of gold from its milling operations. Barrick presently anticipates that almost all of the gold from the ore produced from its surface and underground mining operations in the future will be recovered through the mill facilities. A more complete description of the milling and beneficiation processes is presented in Sections 2.1.4.2 and 2.2.3.2 of the Betze Draft EIS.

1.4.3 Water Management Operations

The gold deposits that Barrick is presently mining and plans to mine in the future are situated below the pre-dewatering water table. In order to mine the Betze deposit, Barrick initiated a ground water pumping program in February 1990. As authorized by water appropriations issued by the Nevada State Engineer's Office, Barrick has pumped up to approximately 70,000 gpm. At the time the Betze EIS was prepared, Barrick projected that ground water pumping operations would lower the water level by 1,160 feet over a 10-year period. The ground water model used in the Betze EIS projected pumping rates based on that schedule and estimated that a total of approximately 285,000 acre-feet of water would be pumped to achieve the water level objective. From 1990 to the first quarter of 1996, Barrick lowered water elevations by about 1,300 feet and pumped approximately 446,000 acre-feet of water. In effect, Barrick lowered water elevations more than projected in 1990 and in half the time.

As a result, the pumping rates exceeded the projections presented in the Betze EIS.

At the end of 1998, water levels were at about the 3,738-foot elevation (1,527 feet below the original elevation); about 621,000 acre-feet of water had been pumped. In April 1996, Barrick reduced pumping rates to match water demand for mining, milling, and irrigation uses for a period of approximately 12 months. During that period, water levels rose approximately 225 feet due to Barrick's curtailment of ground water pumping operations. In the second half of 1997, water levels declined after Barrick increased pumping rates to a maximum of approximately 65,000 gpm (average quarterly rate). Pumping rates were maintained above 60,000 gpm through the first quarter of 1999. From the second quarter of 1999 through the end of 2009, pumping rates were projected to be reduced gradually from approximately 50,000 in the second quarter of 1999 to 15,000 gpm at the end of 2009 (Barrick 1999b). In approximately 2010, dewatering would cease; however, approximately 2,000 to 4,000 gpm of ground water would be pumped for up to an additional 10 years for mine reclamation and mineral processing activities.

As described above and in Section 1.1, Barrick's continued dewatering and discharge activities are conducted in compliance with its approved water appropriations and NPDES Permit. Following the identification of increased pumping rates and ground water drawdown beyond the estimates projected in the Betze Project EIS, the BLM and Barrick agreed to conduct supplemental analyses of Barrick's ground water pumping and water management operations. This Supplemental EIS and the associated CIA (BLM 2000b) address these issues. Consistent with conditions of the state water appropriations and the Betze Record of Decision, Barrick has established and regularly monitors an extensive network of surface and ground water monitoring sites. The results of the monitoring program are reported quarterly to the State Engineer and the BLM in the Boulder Valley Monitoring Plan (BVMP). The following section describes the facilities developed to pump the ground water and to use, store, or manage the ground water produced by Barrick's pumping operations.

1.4.3.1 Wells and Collection System

Barrick produces ground water from in-pit wells and sumps, horizontal drains, and perimeter wells. Initially the majority of the water was pumped from in-pit wells and sumps; however, Barrick has now established a well field outside the boundaries of the present mine that is capable of pumping most of the water to achieve Barrick's ground water drawdown objectives. Based on the experience gained during the past 9 years of ground water pumping operations, Barrick has defined four zones from which ground water is produced (see Section 3.2.1.2 Ground Water). The first area, which is bounded by the Post and Siphon faults, is very transmissive and produces the majority of the water. The second area, to the east of the Post Fault, is less transmissive and produces a relatively small percentage of the water. The third area, to the south of the Granodiorite stock, is highly transmissive yet produces only a small percentage of the water as the low transmissive nature of the stock limits flow from this area. Fourth, to the northwest of the mining areas, the rocks are also less transmissive and produce only a small percentage of the water pumped. Barrick has drilled a total of 34 wells in the highly transmissive area. These wells typically are up to 2,000 feet deep, are fitted with 2,000 -horsepower downhole pumps, and are capable of producing up to 2,500 to 3,000 gpm. In contrast, the over 100 wells drilled by Barrick in the less transmissive area typically are 1,000 feet deep, are fitted with 10 to 350-horsepower downhole pumps and are capable of producing only 25 to 300 gpm. In addition, Barrick has installed approximately 500,000 feet of horizontal drains in the walls of the mine which initially produce anywhere from 0 to 200 gpm. Water production from individual horizontal drains drops rapidly with time, usually stopping within a 4-week period. In the future, Barrick may drill additional wells on private land to replace the existing wells that are situated within the ultimate pit shell depicted in Figure 1-3.

Water is pumped from the production wells through a network of high density polyethylene (HDPE) and steel pipes either to process water tanks or to a 72-inch diameter gravity-flow pipeline. Approximately 4,000 to 8,000 gpm of water are delivered to Barrick for mining and milling uses, to Barrick's Meikle Mine, or to Newmont for mining and milling use. Mining and milling uses of water include process make-up water for mill ore slurry or heap leach solution, road dust control watering, exploration drilling, and sanitary uses.

Water that is not used for mining or milling purposes is delivered to the gravity flow pipeline. Barrick is authorized by a discharge permit issued by the NDEP, Permit NEV89068, to discharge water produced by its ground water pumping operations to ground waters of the state via percolation, infiltration, and irrigation. Initially, all water was delivered to the West No. 9 Pit where a portion of the water was treated to remove naturally occurring arsenic using a ferric sulfate process. The water was discharged from the West No. 9 pit to an unnamed drainage to the TS Ranch Reservoir. A gravity flow pipeline (Figure 1-4) was installed in 1993, and discharges to the unnamed drainage were discontinued permanently in 1997 when Barrick extended the existing waste rock disposal area across the upper reach of the unnamed drainage. Barrick anticipates that the present practice of delivering water from the well field to the TS Ranch Reservoir area through the gravity flow pipeline will continue throughout the remaining life of the mine. If necessary to ensure compliance with arsenic water quality limits in Barrick's discharge permit, Barrick will relocate the arsenic treatment plant to the vicinity of the gravity flow pipeline. A more complete description of Barrick's water collection system is provided in Section 2.2.2.6 of the Betze Draft EIS.

1.4.3.2 TS Ranch Reservoir

Construction of a reservoir at the lower end of the unnamed drainage, referred to as the TS Ranch Reservoir (Figure 1-4), began in 1989. Initially, the impoundment structure was to be built in four stages to provide an ultimate storage capacity of 20,000 acre-feet of water. Stage II of the impoundment structure was completed and the State Engineer authorized Barrick to begin impounding water in the TS Ranch Reservoir in March 1990. Construction of the impoundment continued to Stage III. Stage IV of the impoundment structure, including installation of the permanent spillway, was not completed due to the appearance of a naturally occurring permeable fracture in the reservoir floor. The State Engineer approved operation of the TS Ranch Reservoir as built to the Stage III level.

Barrick began delivering water to the TS Ranch Reservoir via the unnamed drainage in May 1990. Monitoring of discharge quantities and reservoir levels indicated that the reservoir was not filling as initially anticipated due to the appearance of the fracture. The State Engineer's Office requested information from Barrick on the fracture and water levels in the area. Barrick responded to the State Engineer's request and has incorporated updates of the hydrographs requested by the State Engineer in the BVMP.

Barrick continued to deliver water to the TS Ranch Reservoir, and the majority of the water infiltrated into the rhyolite formation underlying the reservoir until April 15, 1996, when in compliance with a temporary restraining order, Barrick limited pumping to no more than 8,000 gpm. From April 1996 until April 1997, Barrick pumped an average of 5,680 gpm. All of the water produced during this period was used for mining and milling purposes by Barrick and Newmont. During this period, water levels in the highly transmissive carbonate rocks in the area of the mines rose by 225 feet, and water levels in the area of the TS Ranch Reservoir declined by 58 feet. Based on an agreement between Barrick and Newmont, the temporary restraining order was dissolved, and Barrick constructed facilities to treat and discharge water produced by its ground water pumping operations to the Humboldt River in compliance with Barrick's NPDES Permit.

The construction projects included installation of an impermeable liner along the cooling channel and the coffer dam area of the TS Ranch Reservoir to preclude infiltration of ground water from pumping operations into the rhyolite formation. Subsequent agreements between Barrick and Newmont have relieved Barrick of the obligation to maintain the liner along the cooling channel and, subject to certain conditions, under the coffer dam area. Descriptions of the water treatment and discharge facilities and Barrick's water management program are provided in the following sections.

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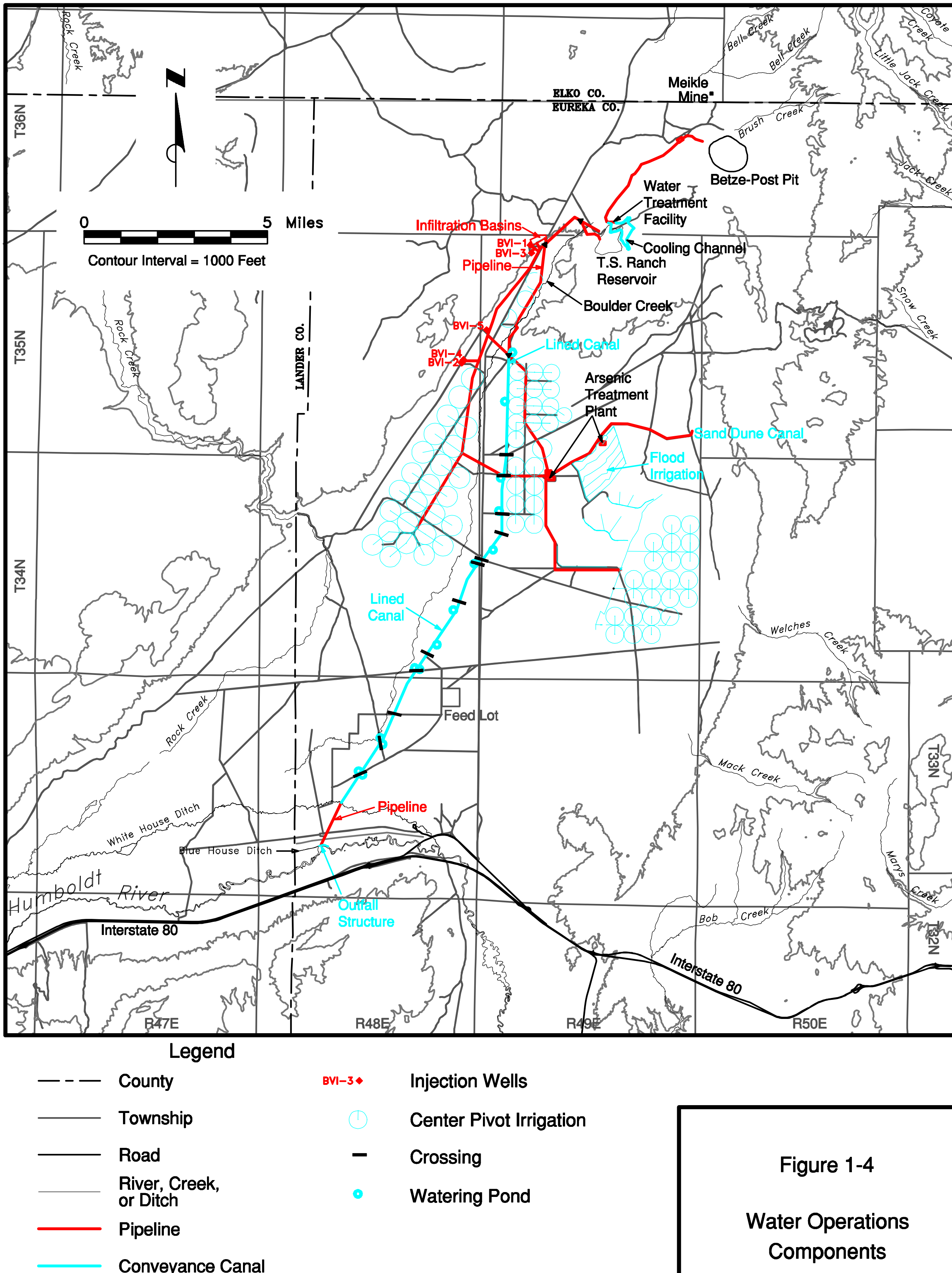

Figure 1-4

Water Operations Components

1.4.3.3 Springs and Sand Dune Canal

Water flowed from the TS Ranch Reservoir through the fracture in the reservoir floor into the rhyolite formation. In March 1992, water was observed emanating from the ground at a rhyolite outcrop approximately 5.5 miles south of the TS Ranch Reservoir. This spring is referred to as the Sand Dune Spring due to its proximity to nearby sand dunes. In June 1992, a second spring area, referred to as Knob Spring, was observed at a rhyolite knob approximately a mile northwest of Sand Dune Spring. In March 1993, a third spring area was detected northwest of Knob Spring and is referred to as Green Spring. The locations of these springs are shown in Figure 1-5. Barrick began regular sampling of the springs and has included water quantity and quality data collected from the spring areas in the BVMP since the second quarter of 1992. By the end of 1998, flows from the springs had diminished to about 5,000 gpm from a peak of approximately 30,000 gpm in 1996.

Initially, water from the springs flowed across the ground surface and infiltrated into the alluvium south of the springs. As spring flows increased over time, Barrick constructed a series of ditches to distribute the water. In 1993, the Sand Dune Canal was constructed to collect the water flowing from the springs. Water was diverted from the canal to the flood irrigation area developed by Barrick for ELLCO and to additional upland areas south of the canal. Water that was not diverted along the length of the canal was delivered to a pond at the end of the canal. In November 1994, Barrick commissioned a pumpback system to deliver water flowing from the canal pond to the irrigation areas, the injection wells, the infiltration area, and the TS Ranch Reservoir. A second pond, pumping station, and pipeline were installed by Barrick in the fall of 1995. 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. In 1995, Barrick also installed and commissioned an arsenic treatment plant at the end of the Sand Dune Canal to remove naturally occurring arsenic from the canal flows prior to infiltration or injection. These facilities are shown in Figure 1-5. Operation of the Sand Dune Canal and the recirculation system is regulated by the NDEP under Water Pollution Control Permit NEV95114.

1.4.3.4 Irrigation in Boulder Valley

In 1990, Barrick, Newmont, and ELLCO signed and presented to the Nevada State Engineer a Water Management Plan that described the manner in which water produced by Barrick's ground water pumping operations would be used in Boulder Valley. The 1990 Water Management Plan envisioned that Barrick would provide water to ELLCO to irrigate more than 5,000 acres of lands on the TS Ranch. Barrick purchased and installed 15 center-pivot irrigation sprinklers in Boulder Valley and began delivering water from the TS Ranch Reservoir to these pivots in 1991. Since then, ELLCO has used the water delivered by Barrick to grow alfalfa and grass that it uses in its ranching operations or sells. In addition, ELLCO has used some water for livestock on the TS Ranch.

Since 1991, Barrick has developed additional irrigation areas on the TS Ranch. In 1993, an 830-acre flood irrigation field was commissioned. An additional 8 center-pivot irrigation sprinklers were installed and commissioned in 1995, and in 1996 an additional 48 center-pivot irrigation sprinklers were installed on ELLCO property, and 2 center-pivot irrigation sprinklers were installed on land owned by Dean and Sharon Rhoads. At present, approximately 10,000 acres on the TS Ranch and Rhoads' land have been developed for irrigation. During the irrigation season, which typically extends from April through September, an average of approximately 46,000 gpm (60,000 gpm maximum) of dewatering water has been delivered 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 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. The locations of the irrigation facilities are depicted in Figures 1-4 and 1-5.

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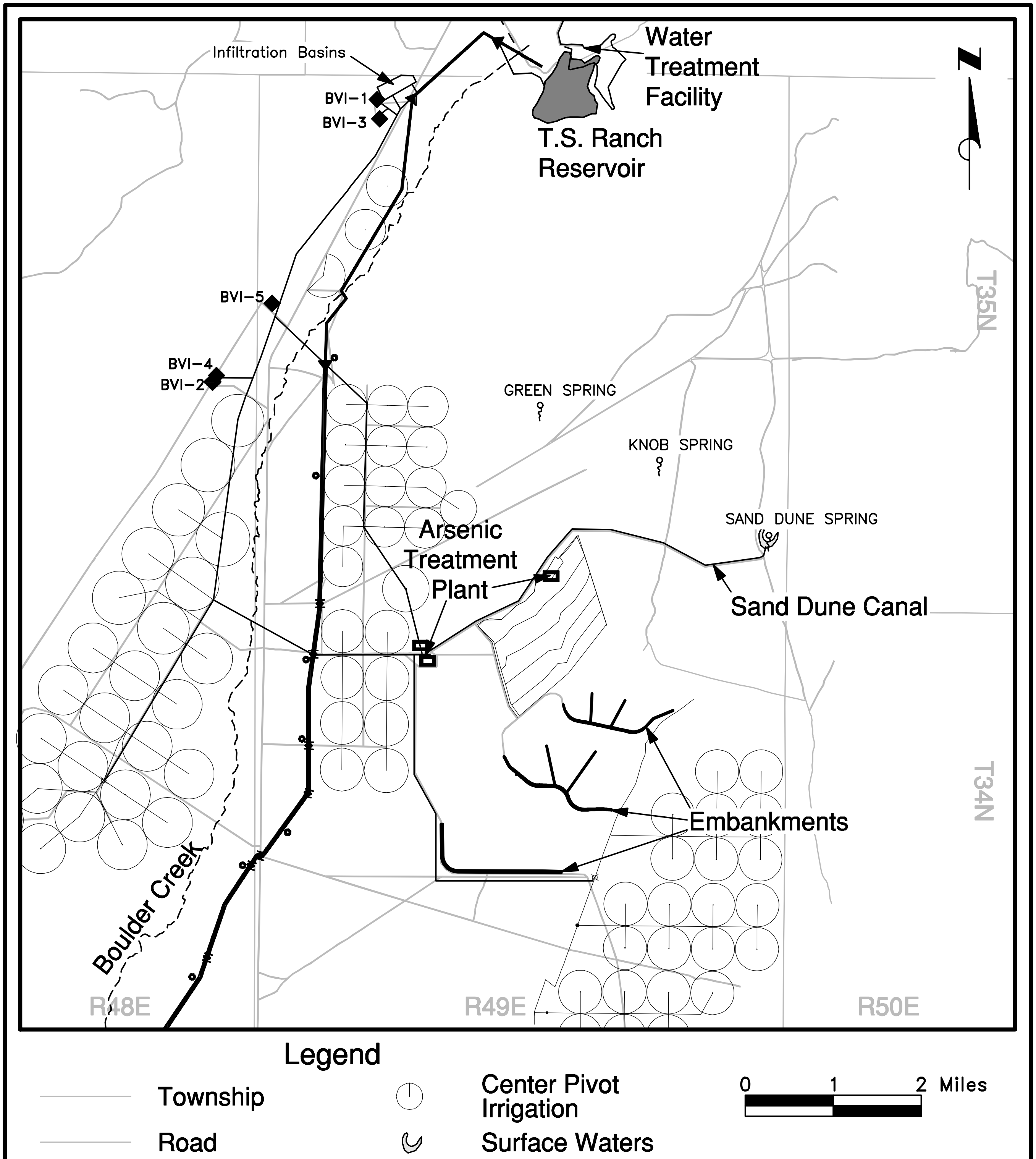

Figure 1-5

Recent Springs and Associated Wetlands

1.4.3.5 Infiltration

In 1993, Barrick identified an outcrop of rhyolite in upper Boulder Valley that was determined to be an effective infiltration area. Barrick initially developed a 4-acre infiltration basin and began delivering water to the basin in April 1994. In the fall of 1995, Barrick expanded the basin to 6 acres, which increased the infiltration capacity of the basin to approximately 15,000 gpm. 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. The location of the infiltration basin is depicted in Figure 1-4.

As part of a 1999 asset exchange, Barrick and Newmont agreed on a water management protocol governing infiltration into the rhyolite formation in Boulder Valley and an allocation of the available infiltration capacity between the parties. The protocol establishes a maximum infiltration rate (20,000 gpm annual average) subject to limits based on water levels in a monitoring well (TS-2) and flow rates in the Sand Dune Canal. The objective is to maximize infiltration of water produced by dewatering operations consistent with prudent and sound environmental practices and water management objectives for Boulder Valley. Barrick resumed infiltration of water to the rhyolite under this protocol in February 1999. Barrick anticipates that water will be infiltrated to the rhyolite under the protocol during the non-irrigation season.

1.4.3.6 Injection

In 1993, Barrick applied to the NDEP for an underground injection control (UIC) permit to authorize Barrick to drill wells in upper Boulder Valley and to inject water from Barrick's ground water pumping operations into the rhyolite formation through the wells. The UIC permit, NEV93207, was issued and Barrick installed the first of five injection wells in April 1994. The permit authorizes Barrick to drill up to 11 injection wells in the injection area and to inject water from the TS Ranch Reservoir or the Sand Dune Canal, so long as the water injected meets the water quality criteria established by the permit. At present, Barrick estimates the capacity of the five existing injection wells at approximately 28,000 gpm on an instantaneous basis.

Operating experience indicates that the wells need to be cleaned every 3 to 4 months to remove scale that inhibits injection flows. The locations of the five injection wells are depicted in Figure 1-4.

1.4.3.7 Sand Dune Drainage Embankments

In 1995, Barrick entered into an agreement with the U.S. Natural Resources Conservation Service to develop a temporary managed wetland area in the Sand Dune drainage. The temporary managed wetlands project consists of three embankments constructed across the Sand Dune drainage downgradient of the Sand Dune Canal. The embankments were designed and constructed with 3:1 slopes and a 15-foot crest width. The embankments range in maximum height from 8 to 13 feet and in length from approximately 7,600 feet to 9,650 feet. During a projected 25-year, 24-hour storm event, the north embankment would impound a maximum of 244 acre-feet of water creating a pool with a surface area of 155 acres, the middle embankment would impound a maximum of 1,045 acre-feet of water creating a pool with a surface area of 361 acres, and the south embankment would impound a maximum of 2,153 acre-feet of water creating a pool with a surface area of 589 acres. Each of the embankments has spillways that are designed to safely pass the flows that would result from a 100-year, 24-hour storm event.

The temporary managed wetlands provide storage capacity south of the Sand Dune Canal for spring flows and other surface flows during precipitation events or periods of snowmelt. Development of a temporary managed wetlands area was expected to enhance wildlife use and support wetland functions comparable to those supported by the area around the springs in which wetland vegetation has emerged. Following discussions with the NDEP, Barrick submitted a storm water management plan for the Sand Dune Drainage embankments to the NDEP in November 1996. The plan provides that until flows from the springs cease, Barrick will operate its recirculation facilities in Boulder Valley to control the quantity of water equal to the surface flow from the springs. To the extent that the capacity of the recirculation system allows, Barrick also will manage surface runoff from precipitation events and snowmelt. Excess precipitation and snowmelt will flow to the embankments. Barrick will monitor flows into the embankments and will not release from the embankments a quantity of water in excess of the total precipitation and snowmelt flows as determined by runoff modeling using actual precipitation data collected at the site. The NDEP approved the storm water management plan in December 1996. The temporary managed wetland area will be maintained until flows from the springs diminish due to the dissipation of the ground water mound in the rhyolite formation. Since 1996, only minor quantities of runoff from snow and rain events collected in the impoundments, and no water has been released from the south embankment. The embankments were dry during the summer and fall of 1996, 1997, and 1998. The locations and orientation of the three embankments are depicted in Figure 1-5.

1.4.3.8 Humboldt River Discharge

In June 1995, Barrick submitted an application to the NDEP for an NPDES permit to authorize Barrick to discharge water produced by ground water pumping operations to the Humboldt River. The application was modified in December 1995 to increase the quantity of the discharge to 70,000 gpm and to provide for compliance with all Humboldt River water quality standards, except dissolved oxygen and temperature, at the outfall from the treatment facility. The NDEP issued an NPDES permit, NV0022675, to Barrick on July 10, 1996. Barrick and Newmont concluded an agreement allowing Barrick to construct the treatment facility and conveyance system on land owned by Newmont and ELLCO in October 1996, and Barrick initiated construction of the facilities in January 1997. Construction was completed in August 1997 and discharge commenced as irrigation use declined in September 1997.

The treatment facility uses lime treatment and pH adjustment to lower the naturally occurring levels of total dissolved solids, fluoride, and boron in the ground water to levels that are below the Humboldt River water quality standards. The sludges from the treatment process are used as an alternative feedstock for the autoclave neutralization process. Cooling towers are used to lower the water temperature so that the Humboldt River temperature standards and dissolved oxygen standards are met in the river. The NPDES permit authorizes Barrick to discharge to the Humboldt River via Boulder Creek, the White House Ditch, and Rock Creek or upland canals and pipelines. Barrick sought concurrence from the USCOE that construction of an outfall structure to the Humboldt River and stabilization of the Humboldt River bank up- and downstream of the outfall structure comply with the provisions of Nationwide Permits 7 and 13. The Corps issued a concurrence letter with conditions on July 31, 1996.

Barrick constructed a conveyance system composed of buried pipelines and a synthetically lined upland canal from the treatment plant to an outfall at the Humboldt River that is adequate to discharge up to 65,000 gpm of treated water from the ground water pumping operations. Water is diverted from the existing cooling channel at the TS Ranch Reservoir to the treatment plant. Water is conveyed via a buried steel pipeline from the treatment plant to a lined upland canal extending from upper Boulder Valley to the White House Ditch in lower Boulder Valley. The lined canal is approximately 13 miles long and is fenced along the entire length to exclude livestock and wildlife from access to the canal. Wildlife/livestock crossings are provided at 14 sites along the canal, and escape ramps are placed within the canal. Fourteen watering devices for livestock and wildlife are located outside the fenced area along the length of the canal. From the end of the canal, the water flows by gravity through another pipeline to the outfall structure at the Humboldt River. The treatment plant and conveyance systems are depicted in Figure 1-4.

After reaching an agreement with Newmont regarding infiltration at the TS Ranch Reservoir, Barrick suspended operation of the Boulder Valley water treatment plant and discharges to the Humboldt River in early February 1999. Barrick anticipates that use of infiltration and irrigation will be sufficient to manage its dewatering flows without the need for discharge to the Humboldt River, at least until Newmont begins producing water from the Leeville Project. Water management practices at that time will depend on Barrick's dewatering objectives, Newmont's dewatering objectives, and actual pumping experience at the Leeville Project. While Barrick's priority will be to avoid discharges to the Humboldt River if practicable, discharges to the Humboldt River remain a viable water management alternative that may be used in the future.

1.4.3.9 Monitoring

In 1990, Barrick established the BVMP in support of the Water Management Plan submitted by Barrick, Newmont, and ELLCO to the Nevada State Engineer. The BVMP currently monitors water levels at 104 ground water monitoring locations and water quality at 22 wells (see Section 3.2). The BVMP also includes monitoring of 19 surface water monitoring locations. The data collected as part of the BVMP are compiled and reported quarterly in tabular and graphic formats. Copies of the quarterly BVMP reports are provided to the BLM and the Nevada State Engineer. As of the end of 1998, Barrick's ground water pumping operations had drawn ground water levels down by approximately 1,500 feet in the mining area. Water management operations have raised ground water levels in an area around the TS Ranch Reservoir a maximum of 110 feet. Data collected by the BVMP are used by Barrick to calibrate the mathematical model developed to simulate the effects of ground water pumping and water management operations.

In addition to the BVMP, Barrick also conducts monitoring as required by various permits issued by the NDEP and the BLM. This monitoring includes annual site visits to 36 seeps and springs located in the Tuscarora Mountains. During each of the seep and spring inventories, site conditions are evaluated, flows are measured, vegetation transects are monitored and water samples are collected for analysis. The data collected during the annual monitoring are compiled and presented in a report submitted to the BLM. The location of the seeps and springs monitored by Barrick are described in Section 3.2.

As provided in the USCOE's concurrence with Nationwide Permit coverage for the outfall structure to the Humboldt River, Barrick has agreed to cooperate with the U.S. Fish and Wildlife Service's (USFWS's) efforts to implement an aquatic biota monitoring study on the Humboldt River. The monitoring program provides for collection of aquatic biota samples (including bird eggs, juvenile bird livers, fish, and invertebrates) from a series of monitoring locations beginning near Elko and extending to the Humboldt Sink. In addition, water quality and quantity data will be collected and provided to the USFWS by Barrick, the Nevada Department of Conservation and Natural Resources, and the USGS. The USFWS will analyze the data collected and prepare a report by the year 2000.

1.4.3.10 Water Management Plans

Based on present mine plans, Barrick's objective is to lower the ground water levels in the area of the Betze-Post and the Meikle mines to 3,576 feet amsl (Barrick 1998c). Once this target ground water level is attained, Barrick intends to reduce ground water pumping rates to a level that will maintain the ground water level at that elevation. Barrick projects that the pumping rate to maintain this ground water level will be approximately 40,000 gpm diminishing to approximately 15,000 gpm. Barrick will continue to pump at the maintenance rate until mining of the Betze-Post and Meikle mines is completed; current mine plans project mining to be completed by approximately 2010. Following completion of mining, Barrick will pump at rates ranging from 2,000 to 4000 gpm to supply milling and processing needs for up to 10 additional years to complete milling and beneficiation of stockpiled ore (Barrick 1999b).

Barrick presently anticipates that water will continue to be used for mining and milling purposes, and delivered to Boulder Valley for irrigation during the irrigation season. Water that is not used for mining, milling, or irrigation purposes would be infiltrated. If excess dewatering water could not be infiltrated, it would be treated and discharged to the Humboldt River through 2006. The capacity of infiltration, injection, irrigation, and other beneficial uses to receive ground water produced by Barrick may be limited by Barrick's delivery of ground water flows from the springs in Boulder Valley to those uses, by regulatory and other legal restrictions, and by other binding obligations to third parties. As a result, the water management operations described in this section are likely to be used concurrently, and in varying combinations, as circumstances require.

Barrick is continuously updating its water management plans and operations, based on its ongoing ground water monitoring program; the hydrologic model used to refine the water management plan is updated at least annually. Therefore, although the operations are continuously refined, the impact analysis in this SEIS is considered a realistic scenario of ground water pumping and disposal of excess mine dewatering water.

1.5 Water Management Alternatives

Several alternative water management options have been identified by the BLM and Barrick. Due to the extent and diversity of the water management operations presently employed by Barrick, the alternatives considered tend to involve similar management methods, but applied in different locations.

1.5.1 Additional Irrigation

Additional arable land exists in Boulder Valley, some of which has been subject to pivot irrigation in the past (e.g., Mack Farms). Development of additional irrigation would require the consent of the landowner. Also, Barrick's projected ground water production indicates that the capacity of the existing irrigation system in Boulder Valley will exceed projected ground water production during the summer of 2000 and in subsequent years. As a result, development of additional irrigation capacity in Boulder Valley would not be practical unless water produced during the winter could be stored for summer delivery to irrigation.

Barrick has acquired arable land outside of Boulder Valley that is presently irrigated using flood irrigation methods. However, this land is located more than 20 miles from the Goldstrike property, at a higher elevation and in a different hydrologic basin. The cost of constructing a pipeline and operating a pumping system to this land would be prohibitive, and the potential use of the land is limited by projected water production and potential water rights and permitting issues.

1.5.2 Additional Infiltration or Injection

Barrick evaluated the potential to infiltrate water in areas of Boulder Valley that are not thought to be hydrologically connected to the Boulder Valley springs. The primary area investigated was along the Sheep Creek Mountains on the western border of Boulder Valley. Based on several wells drilled in the area, Barrick determined that ground water levels and permeability of the rock made the area unsuitable for additional infiltration or injection of water.

Barrick also determined that infiltration of water upgradient of the area being dewatered is not practical. The hydrologic characteristics of the rocks situated east of the Post Fault are very different than the hydrologic characteristics of the rocks in the highly transmissive area between the Post and Siphon Faults. Pumping experience demonstrates that wells in the highly transmissive area can produce from 2,500 to 3,000 gpm, while wells in the area to the east of the Post Fault produce only 50 to 300 gpm. Within the highly transmissive area, the hydraulic gradients are virtually flat throughout the hydrologic compartment. As a result, infiltration of water into rocks outside of the highly transmissive area is not practical because the rocks are not able to take water at a rate comparable to the rate of production from the highly transmissive area. Infiltration of water in the highly transmissive rocks is not practical because it would almost immediately flow back to the pumping center, requiring substantially higher pumping rates, and the related energy and equipment costs, to achieve and maintain the target ground water elevations.

1.5.3 Discharge to Other Surface Waters

All surface waters in the Boulder Valley basin ultimately drain to the Humboldt River. The surface water drainages typically have greater channel capacity in the upper reaches, but tend to lose channel definition as the creeks cross the alluvium in Boulder Valley due to infiltration to the alluvium. As a result, there are no natural surface drainages that have adequate capacity to carry the quantity of discharge authorized by Barrick's

NPDES Permit. In any event, any water that would be discharged to these surface waters would ultimately drain to the Humboldt River.

1.5.4 Other Water Uses

Barrick has been approached by various entities and agencies regarding other potential beneficial uses of the water produced by the ground water pumping operations. For example, the Pershing County Water Conservation District has contacted Barrick to determine whether delivery of the water to the Argenta Pasture, which is presently owned by the U.S. Bureau of Reclamation and leased to the District, would be feasible. The District has not developed any specific plans for the Argenta Pasture at this time. Thus, while delivery of the water to the pasture is possible, there are numerous land use, land ownership, water rights and permitting issues that would need to be addressed before a plan could be implemented. The Bureau of Reclamation is preparing an environmental impact statement to evaluate the potential transfer of the Rye Patch Project, including the Argenta Pasture, to the Pershing County Water Conservation District. Information on that process can be obtained from the Bureau of Reclamation, Carson City, Nevada.

1.6 Existing Mitigation Commitments - Betze Record of Decision

The Record of Decision for the Betze Project Plan of Operations, issued on June 14, 1991, contained monitoring and mitigation stipulations. The stipulations described in this section were developed to monitor and mitigate the potential effects of Barrick's water management operations. These mitigation measures are considered in assessing the potential environmental effects of Barrick's ground water pumping and water management operations in this Supplemental EIS. Additional mitigation measures are identified and evaluated, as appropriate.

1.6.1 Monitoring Programs

In 1990, Barrick established the BVMP in support of the Water Management Plan submitted by Barrick, Newmont, and ELLCO to the Nevada State Engineer. The BVMP includes water level measurements at 104 ground water monitoring locations and water quality sampling at 22 wells. The BVMP also includes monitoring of 19 surface water monitoring locations. The BVMP data are compiled and reported quarterly to the BLM and the Nevada State Engineer. BVMP data are also used by Barrick to calibrate the mathematical model developed to simulate the effects of ground water pumping and water management operations.

In addition to the BVMP, Barrick also monitors surface and ground water quantity and quality as required by NDEP and the BLM. Barrick initially identified 19 seep and spring sampling locations that have been monitored annually since 1991 to evaluate flow rate, water quality, and vegetation. These sampling locations are situated along the crest and flanks of the Tuscarora Mountains to the east of the Goldstrike property. In addition, beginning in 1995 Barrick initiated monitoring of an additional 17 stream, seep, and spring sampling locations that are situated north and west of the Goldstrike property. The results of each year's monitoring are compiled in a written report and presented to the BLM. Barrick will continue the seep and spring monitoring program during the period of active mine operations until the year 2030, 20 years after mining is projected to be completed.

As provided in the USCOE's concurrence with Nationwide Permit coverage for the outfall structure to the Humboldt River, Barrick has agreed to cooperate with the USFWS's efforts to implement an aquatic biota monitoring study on the Humboldt River. The monitoring program provides for collection of aquatic biota samples (including bird eggs, juvenile bird livers, fish, and invertebrates) from a series of monitoring locations beginning near Elko and extending to the Humboldt Sink. In addition, water quality and quantity data are collected and provided to the USFWS by Barrick, the Nevada Department of Conservation and Natural Resources, and the USGS. The USFWS will analyze the data collected and prepare a report in the year 2000.

Barrick agreed to conduct monitoring of surface waters, ground water observation ports, process solutions as required by other permits and approvals granted by state agencies, and to provide the results of this monitoring to the BLM. In order to ensure that the BLM had adequate funding for monitoring following closure of the Betze-Post Pit, Barrick established a $250,000 trust fund in 1991 to pay for monitoring of potential environmental impacts of operations at the Betze-Post Pit after December 31, 2030. In the year 2080, or earlier if the BLM determines that long-term monitoring is no longer required, the remaining funds are to be transferred to the long-term mitigation fund (see below).

1.6.2 Mitigation Measures

The Record of Decision for the Betze Project Plan of Operations (BLM 1991d) and the Meikle Mine EA Finding of No Significant Impact and Decision Record (BLM 1994c) contain the following environmental protection measures developed to mitigate the potential effects of Barrick's water management operations.

- Wetland Mitigation Fund and Monitoring. In 1991, Barrick established a trust fund of $660,000, which has grown to over $890,000, that is available to the BLM to pay for the onsite or offsite protection or enhancement or replacement of riparian and wetland areas.

- Riparian Vegetation. In addition to the mitigation fund and monitoring of seeps and springs, Barrick committed to spend up to $40,000 to purchase and plant seedlings or container plants in riparian or wetland areas to accelerate revegetation of areas adversely affected by Barrick's ground water pumping and water management operations. These committed funds have not been spent and are still fully available

- Wildlife Water Sources. Barrick committed to contribute up to $50,000 to assist the BLM and the Nevada Division of Wildlife (NDOW) in acquiring and installing alternative sources of water for wildlife in the area that may be affected by Barrick's ground water pumping and water management operations. To date, $50,000 has been spent to purchase and install guzzlers for wildlife use.

- Sage Grouse Habitat Improvements. Barrick agreed to contribute up to $50,000 to assist the BLM with habitat improvement projects for sage grouse to mitigate potential impacts from Barrick's mining or ground water pumping and water management operations. To date, $1,500 has been invested in seeding burn areas to maintain the native grasses and avoid cheatgrass invasion.

- Mule Deer Habitat Improvements. Barrick agreed to contribute up to $125,000 to assist the BLM with habitat improvement projects for mule deer to mitigate potential impacts from Barrick's mining or ground water pumping and water management operations. To date, approximately $123,000 has been invested in seeding, overseeding, and fencing specified areas in order to improve mule deer habitat.

- Pit Water Studies. Barrick committed to fund research of issues related to postmining pit water quality at $50,000 per year for 10 years. The BLM solicited research proposals and funded a 3-year study by the University of Nevada-Reno that was completed in 1995. The BLM recently selected a second research proposal from the University of Idaho.

- Long-term Mitigation Fund. In 1991, Barrick established a $1 million trust fund, which has grown to over $1,535,000, that is available to the BLM to pay for the review, monitoring, or mitigation of potential impacts from Barrick's operations that were not specifically addressed in the mitigation stipulations or reclamation plan for the Betze Project. To date, none of these funds have been expended.

1.7 Interrelated Projects

Interrelated projects are defined in this Supplemental EIS as those activities that could interact with Barrick’s water management operations or Barrick’s proposed buried pipeline (the Proposed Action) in a manner that would result in cumulative impacts. Cumulative impacts are those effects on the environment that result from the incremental impact of Barrick’s operations when added to the impacts of past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or private entity undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7). As specified in the document Considering Cumulative Effects under the National Environmental Policy Act (Council on Environmental Quality 1997), cumulative effects must be evaluated along with direct and indirect effects. BLM Instruction Memorandum NV-90-435 specifies that impacts must first be identified for Barrick's projects before cumulative impacts with interrelated projects can occur.

The geographic area for cumulative impacts is determined primarily by the location of the projects that are being considered in the analysis as well as the type of resource potentially affected. In the case of this Supplemental EIS, the interrelated projects associated with Barrick's water management operations comprise other projects with the potential for cumulative hydrologic or water quality impacts associated with ground water drawdown, ground water mounding, and/or surface water discharge. The interrelated projects associated with the buried pipeline (Proposed Action) would comprise surface-disturbing actions; no interrelated projects were identified for the Proposed Action.

Under the direction of the BLM, a technical report was prepared that analyzes the potential cumulative impacts of the water management operations of the Goldstrike Mine (including the Betze-Post Pit and the Meikle Mine); the South Operations Area Project Amendment (SOAPA), which is an expansion of the Gold Quarry Mine; and the proposed Leeville Mine. The analysis is based on projections of the Newmont (Hydrologic Consultants, Inc.) and Barrick (McDonald Morrissey Associates, Inc.) hydrogeological models, as well as the effects of other past, present, and reasonably foreseeable future actions potentially affecting ground water and surface water resources within the area of effect, including the Humboldt River.

Resources addressed in the cumulative analysis include geology, ground and surface water resources, riparian areas and wetlands, terrestrial wildlife, aquatic habitat and fisheries, special status species, livestock grazing, socio-economics, and Native American religious concerns. This report is on file at the BLM Field Office in Elko, Nevada, and the results are summarized in this Supplemental EIS.

1.7.1 Water Management Operations

Interrelated projects are defined in this Supplemental EIS as those activities that could interact with water management operations of the individual projects in a manner that would result in cumulative impacts. Interrelated mining projects are summarized below and in Tables 1-4 and 1-5; project locations are shown in Figure 1-6.

1.7.1.1 Mining Operations

The Carlin Trend mining area of Nevada extends from the Hollister Mine, approximately 38 miles northwest of Carlin, to the Rain Mine, approximately 10 miles southeast of Carlin (see Figure 1-6). Mineral exploration and development has been ongoing within the Carlin Trend since the 1870s, with most of the activity occurring since approximately 1980 (BLM 1993b).

Based on past and planned future dewatering activities, and the ground water modeling conducted for the Goldstrike, Gold Quarry, and proposed Leeville mines, these three operations would have potential cumulative ground water and surface water impacts associated with ground water drawdown and mounding. Four mining operations would have potential cumulative impacts associated with dewatering discharges to the Humboldt River; these operations are the Goldstrike Mine, Gold Quarry Mine, Lone Tree Mine, and the proposed Leeville Mine. The locations of these projects are shown in Figure 1-6. The operation of these mines together with continuing irrigation and other demands for Humboldt River water comprise past, present, and reasonably foreseeable future actions with potential cumulative impacts. These projects are summarized in the following sections and in Tables 1-4 and 1-5. Project locations are shown in Figure 1-6.

Table 1-4
Dewatering and Water Management Summary Table
(summary of historic and projected future maximum dewatering rates and drawdown from the Goldstrike Mine, Gold Quarry Mine, and proposed Leeville Mine)

		Goldstrike Mine		Gold Quarry Mine		Leeville Mine
	Units	**Betze Project EIS (1991)**	**Most Recent Estimates**	**SOAP EIS (1993)**	**Proposed Action**	**Proposed Action**
Pumping Periods and Rates						
Start Year (Pumping for Water Supply)	Year	~1988	1987	1988	1988	2000
Start Year (Active Dewatering)	Year	N/A	1990	1994	N/A	2000
Planned End Year (Active Dewatering)	Year	2000	2010	2001	2012	2018
Maximum Projected Dewatering Rate	gpm	29,300	69,000	42,000	25,000	25,000
Planned Post Mining Pumping Period (for Water Supply)	StartYear/EndYear	2000-2010	2010-2020	2002-2009	2012-2017	None
Average Post Mining Pumping Rate	gpm	4,500	2000	N/A	2,500	None
Drawdown						
Estimated Premining Ground Water Surface at Mine	Feet amsl	~5,300	5,265	~5,050	5,100	5,267
Ground Water Elevation End of 1998 at Mine	Feet amsl	N/A	3,738	N/A	4,442	4,907
Maximum Drawdown End of 1998	Feet	N/A	1,527	N/A	658[1]	360[2]
Projected End of Mining Ground Water Surface Elevation	Feet amsl, at mine	4,140	3,576	4,275	3,725	3,800
Maximum Planned Drawdown	Feet, at mine	1,160	1,689	775	1,375[1]	1,467
Pumped Volume						
Pumped Volume as of End of 1998	Acre-feet	N/A	621,000	N/A	156,000	0
Total Projected Future Pumped Volume 1999 through End of Mine[3]	Acre-feet		464,000		439,000	306,000
Total Planned Pumped Volume At Closure[3]	Acre-feet	285,000	1,085,000	~500,000	595,000	306,000
Reinfiltration Volume (injection, infiltration at ponds and during irrigation)						
Project Reinfiltration Volume End of 1998	Acre-feet	N/A	391,000	N/A	N/A[4]	0

Table 1-4 (Continued)

	Units	Goldstrike Mine		Gold Quarry Mine		Leeville Mine
		Betze Project EIS (1991)	Most Recent Estimates	SOAP EIS (1993)	Proposed Action	Proposed Action
Total Projected Future Infiltration Volume 1999 through End of Mine	Acre-feet	N/A	173,000	N/A	N/A[4]	212,000
Total Project Reinfiltration Volume	Acre-feet	N/A	564,000	18,500	N/A[4]	212,000
Pit Lake						
Projected Water Level of Recovered Pit lake	Feet amsl	N/A	5,196	5,050	5,091	N/A
Predicted Area of Recovered Pit Lake	Acres	N/A	985	190	400	N/A
Predicted Volume at Recovery	Acre-feet	N/A	405,000	N/A	175,000	N/A
Estimated Avg. Evaporation at Recovery	Acre-feet/year	N/A	2,900	627	1,117	N/A

Sources: Barrick 1998c, 1999b; Newmont 1999a, 1998; HCI 1999b; MMA 1998; Radian International and Baker Consultants, Inc. 1997a; BLM 1991a, 1993b.

[1]Includes approximately 76 feet of drawdown that occurred from pumping between 1988 and 1992.

[2]Drawdown has resulted from pumping at the Goldstrike and Gold Quarry mines.

[3]Includes postmining pumping.

[4]Reliable estimates are not available; preliminary estimates suggest volumes on the order of 4,700 (through the end of 1998), 12,000 (1999-End of Mine), and a total volume of 16,700 acre-feet.

N/A = Not applicable or not available.

Table 1-5
Humboldt River Discharge Summary
(summary of historic and projected Humboldt River discharge from the Goldstrike Mine, Gold Quarry Mine, proposed Leeville Mine, and Lone Tree Mine)

		Goldstrike Mine		**Gold Quarry Mine**		**Leeville Mine**	**Lone Tree Mine**
	Units	**Betze Project EIS (1991)**	**Most Recent Estimates**	**SOAP EIS (1993)**	**Proposed Action**	**Most Recent Estimates**	**Most Recent Estimates**
Discharge Summary							
Discharge Location		None	Humboldt River	Lower Maggie Creek	Lower Maggie Creek	Humboldt River (Barrick Discharge Outfall)	Iron Point Relief Canal to Herrin Slough Tributary to Humboldt River
State Date	Month/Year	N/A	Sept. 1997	April 1994	April 1994	9/2000	May 1992
Planned or Projected End Date	Year	N/A	March 1999[1]	2002	2011	2003[1]	2006
Discharge Rate							
Estimated Maximum Rate	gpm	0	56,810	46,500	23,800	25,000	70,400
Permitted Rate	gpm	0	70,000	46,500	46,500	[2]	75,000
Period of Peak Discharge	Year, Month(s)	N/A	4th Quarter 1997	Fall, Winter 1999-2001	2000	2001	2006
Discharge Volume							
Total Discharge Volume through 1998	Acre-feet	0	72,000	N/A	77,000	0	243,000
Total Projected Future Discharge Volume 1999 through End of Mine	Acre-feet	N/A	9,000	N/A	365,000	47,000	686,000
Total Planned Discharge Volume	Acre-feet	0	81,000	~300,000	442,000	47,000	929,000

Sources: Barrick 1998c, 1999b; Newmont 1999a, 1998; HCI 1999b; MMA 1998; Radian International and Baker Consultants, Inc. 1997a; BLM 1991a, 1993b.

[1]Based on most recent projection; discharge could occur after this date.

[2]Leeville discharge will be at the Barrick outfall, under Barrick's discharge permit.

N/A = Not Available or Not Applicable.

Table 1-5 summarizes both the historic and projected future dewatering and water management activities for the Goldstrike Mine, Gold Quarry Mine, and proposed Leeville Mine. The historic activities extend from the initiation of ground water pumping for the mines through the end of 1998. The projected future dewatering and water management activities extend from 1999 through the currently projected end date forground water pumping and water management activities for each operation. The values presented under the columns labeled "Most Recent Estimates" and "Proposed Action" represent the current estimates presented in the source documents listed at the bottom of the table. These estimates and the associated development of these projects are subject to economic and other future variables.

Table 1-5 summarizes the historic and projected future Humboldt River dewatering discharge activities from the Goldstrike Mine, Gold Quarry Mine, Lone Tree Mine, and proposed Leeville Mine. For the Humboldt River, the historic period includes all discharge activities that have occurred through the end of 1998. The projected future discharge information for these four projects is based on recently revised estimates provided by Barrick and Newmont for the Goldstrike, Gold Quarry, Leeville, and Lone Tree mines (Barrick 1999b, 1999c; Newmont 1999a, 1999b). It is important to understand that the analysis of potential future dewatering discharge impacts to the Humboldt River presented in this document is based on earlier estimates of mine dewatering discharge (Riverside Technology, inc. [RTi] 1998). Compared to the earlier estimates (RTi 1998), the current mine discharge scenarios indicate that: (1) the Goldstrike Mine would no longer discharge to the Humboldt River after the first quarter of 1999 (earlier estimates assumed Goldstrike would discharge from 1999 through 2011); (2) the average annual discharge from Gold Quarry would be up to 24 percent greater than earlier projections; the period of discharge (1999-2011) would be unchanged; (3) Leeville would discharge at a similar range of rates for 4 years (through 2003) instead of 19 years; and (4) Lone Tree would discharge for the same period and at similar average rates. Overall, the current scenarios represent a reduction of total future discharge (1999-2018) of approximately 16 percent over the period of 1999 to 2018 compared to earlier estimates. For the purposes of estimating potential impacts to the Humboldt River, this analysis used the slightly higher discharge scenario based on the information provided in the RTi 1998 report. This discharge scenario is considered to be environmentally conservative, since it accounts for higher cumulative discharge rates and a higher cumulative discharge volume.

Mineral exploration is ongoing in the Humboldt River basin, and future project development is subject to the uncertainties of ore body definition and the international gold marketplace. If such projects become more firmly anticipated and planned, their proposed actions and alternatives would likely be subject to appropriate site-specific and cumulative NEPA compliance as determined by lead agencies at that time.

Gold Quarry Mine

The Gold Quarry Mine is located in the Maggie Creek basin on the eastern slope of the north-south trending Tuscarora Mountains. Gold Quarry is located within Newmont's South Operations Area, approximately 6 miles northwest of the Town of Carlin (Figure 1-6). Newmont submitted an application to amend their operating plan to allow expansion and deepening of the Gold Quarry Mine, and expansion of leaching and waste rock disposal facilities. The BLM is preparing an EIS for the SOAPA; approval of the SOAPA would allow continued mining at Gold Quarry, and continued mine dewatering and discharge to Maggie Creek. Dewatering and discharge activities for the Gold Quarry Mine are summarized in Tables 1-4 and 1-5.

Key elements of Newmont's proposed amendment for water management include:

- Continued ground water pumping to maintain a ground water level below the mine floor at approximately 3,725 feet amsl. Dewatering rates of up to 25,000 gpm are forecast until the year 2011. Following completion of Gold Quarry mining operations, pumping would continue for approximately 5 years at a rate of 2,500 gpm to support process operations.

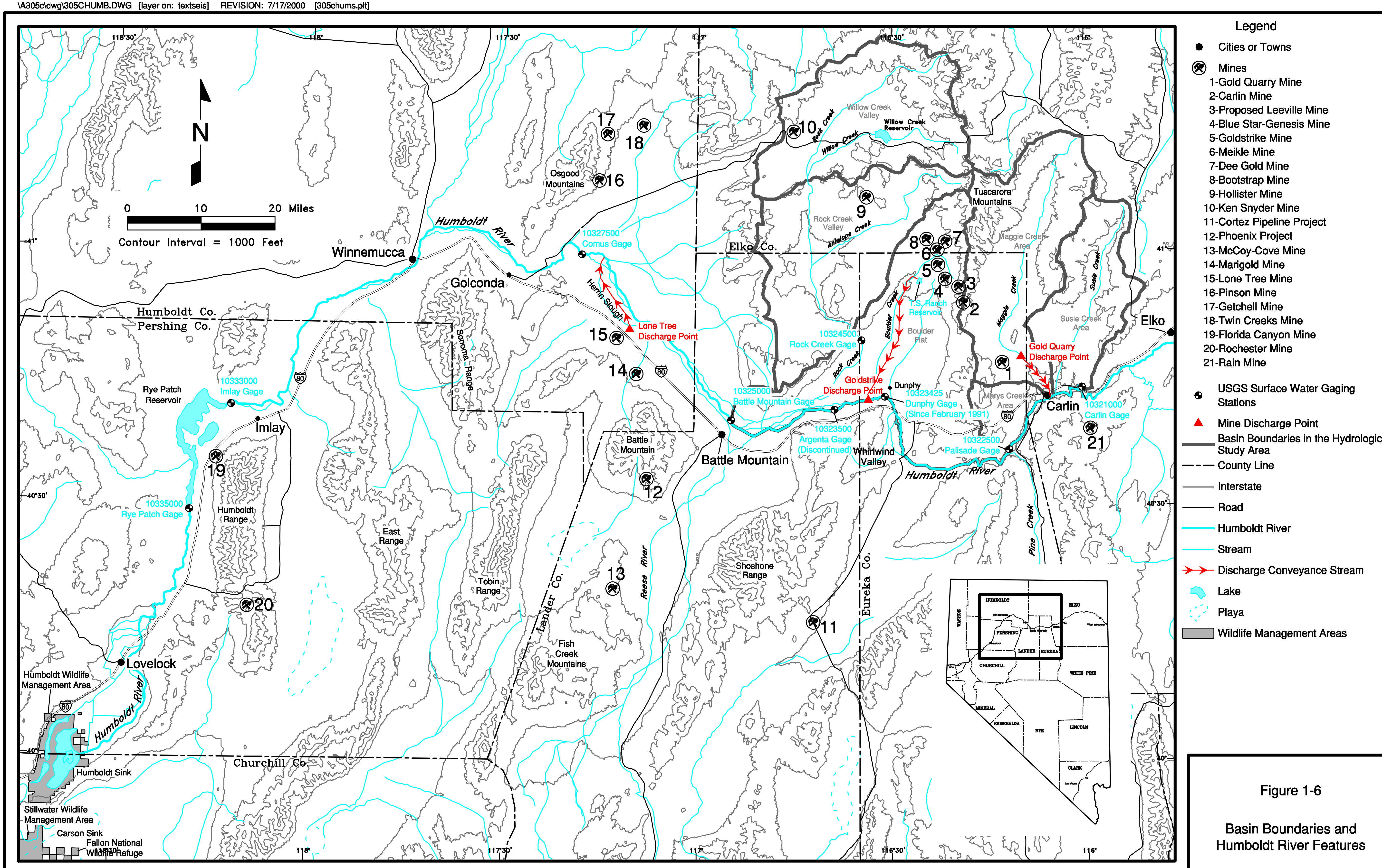

Figure 1-6

Basin Boundaries and Humboldt River Features

- Continued discharge of water into Maggie Creek at a rate of approximately 20,000 gpm in compliance with Newmont's NPDES permit. Maggie Creek drains to the Humboldt River.

- Continued irrigation of Hadley Field.

Leeville Mine

Newmont's proposed Leeville Mine is located within the Little Boulder basin on the western flank of the Tuscarora Mountains (Figure 1-6). The Leeville Mine would include development and operation of an underground mine and mine dewatering system, and installation of a water pipeline from the Leeville Mine dewatering well system to the TS Ranch Reservoir. The BLM is currently preparing an EIS for this proposed project. As described in Section 1.2.1, Barrick and Newmont have agreed on the allocation of infiltration capacity and the parameters for infiltration management of water in Boulder Valley, subject to limits based on monitored ground water levels and flow rates in the Sand Dune Canal. If excess water requires discharge to the Humboldt River, Newmont would use Barrick's Boulder Valley discharge outfall. The Leeville Mine is projected to begin mine dewatering in 2000 and continue through an 18-year mine life. The dewatering and discharge activities for the Leeville Mine are summarized in Tables 1-4 and 1-5.

Lone Tree Mine

Cumulative impacts to the Humboldt River would result from discharge of dewatering water from the Lone Tree Mine. The Lone Tree Mine is located approximately 34 miles east of Winnemucca south of Interstate 80 (Figure 1-6). Dewatering water that is not consumed is treated to reduce arsenic and is discharged to the Humboldt River via the Iron Point Relief Canal and Herrin Slough, which enters the Humboldt River approximately 11 miles northwest of the Lone Tree Mine. The Lone Tree Mine discharge activities are summarized in Table 1-5.

1.7.1.2 Other Projects and Activities

In addition to mining projects affecting water resources in the Humboldt River basin, the agricultural, domestic, and municipal demands will continue. These sectors comprise the dominant water uses within the basin, and predictions of their needs have varied (Nevada Division of Water Planning 1992a, 1992b, 1998). If demand (water withdrawn for use) or consumption (water not returned to the system after use) increases from these sectors, then the potential for additional impacts on water resources of the basin would occur.

The potential restoration of the Argenta Marsh area is an additional project along the river that would use water resources in the basin. The project is in a preliminary conceptual stage, but it has support from a number of public and private organizations. Water supply, habitat, and land ownership issues need to be examined and resolved before the marsh restoration project can become a reality. During the life of the mines described herein, it is conceivable that additional flows from the mine dewatering discharges of the upstream operations could contribute to the water necessary to reestablish wetland habitats in the Argenta area. Long-term water supply to the marsh restoration project after the cessation of mine dewatering discharges is an issue that remains to be examined. The potential impacts from the restoration project are not further analyzed in this assessment, given that the project is in early conceptual stages and has a number of issues to be resolved before implementation can proceed. If work proceeds on the Argenta Marsh restoration, appropriate environmental analyses will be conducted.

1.7.2 Proposed Action

The Proposed Action comprises the construction, operation, and abandonment of Barrick's proposed 4,000-foot buried water pipeline (see Section 2.1). Due to the limited area (18 acres) and short-term disturbance associated with the proposed pipeline, no interrelated projects have been identified as having the potential for cumulative impacts.

1.8 Relationship to Policies, Programs, and Plans

As part of the SEIS, the Proposed Action has been evaluated for its conformance with existing land use restrictions imposed by Elko and Eureka counties, the State of Nevada, and minerals decisions in the BLM's Elko Resource Management Plan.

1.9 Organization of this Supplemental EIS

The Supplemental EIS is organized to provide both a description of Barrick's existing water management operations and the proposed buried pipeline (Proposed Action), with descriptions of the affected environment and environmental consequences associated with each. Chapter 1 provides the background for the Supplemental EIS, the purpose and need of the Proposed Action and this Supplemental EIS, a description of Barrick's continuing operations, Federal and state authorizing actions associated with the operations, and water management alternatives. Chapter 2 describes the Proposed Action, expansion of an existing right-of-way to accommodate a proposed 3,936-foot buried pipeline. Chapter 3 presents a description of the affected environment and environmental consequences of the ongoing water management operations. Chapter 4 presents a description of the affected environment and environmental consequences associated with the Proposed Action. Chapter 5 summarizes the cumulative impacts identified in the technical report, *Cumulative Impact Analysis of Dewatering Operation for the Betze Project, South Operations Area Project Amendment, and Leeville Project*. Chapter 6 summarizes the consultation and coordination for preparation of the Supplemental EIS; Chapter 7 identifies the list of preparers; and Chapter 8 is a list of references.