



U.S. Department of the Interior
Bureau of Land Management

Lakeview District Office
1000 South 9th Street
Lakeview, Oregon 97630

October 1995



DRAFT ENVIRONMENTAL IMPACT STATEMENT

ATLAS PERLITE, INC.
TUCKER HILL PERLITE PROJECT

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Lakeview District Office
P.O. Box 151 (1000 Ninth Street S.)
Lakeview, Oregon 97630

IN REPLY REFER TO:
1793 (O15)

October 6, 1995

Dear Concerned Citizen:

Thank you for your interest in the proposed perlite mining operation at Tucker Hill. Enclosed you will find a draft environmental impact statement (DEIS) analyzing the impacts of the preferred mineral development alternative and three other alternatives on approximately 37 acres of lands administered by the Bureau of Land Management in central Lake County, Oregon. This analysis will be used as the basis for approval or modification of the claimant's proposed mining plan of operation. I would appreciate your comments on the adequacy of this analysis.

The following types of comments would be the most helpful in the decision-making process; comments that 1) are as specific as possible, 2) address the appropriateness of the alternatives, 3) identify unaddressed issues, 4) provide new information or data, 5) address the adequacy of the analysis, or 6) identify errors in the data or analysis.

A 60-day review period is being provided on this DEIS. At this time, no public meeting/hearing is planned. However, a public meeting/hearing may be held during the review period if there is sufficient interest. Any person desiring a public meeting/hearing must request one in writing and provide sufficient reason(s) for the need for such a meeting/hearing.

Comments on the DEIS must be submitted in writing by Dec. 5, 1995 to me at:

Bureau of Land Management
Lakeview District
P.O. Box 151
Lakeview, Oregon 97630

Questions concerning the proposal may be directed to Mr. Ted Davis or Mr. Paul Whitman at the address above, or by telephoning (503) 947-2177. I appreciate your interest in the management of these public lands.

Sincerely,

Scott R. Florence
Acting District Manager

Enclosure (as stated)

DRAFT ENVIRONMENTAL IMPACT STATEMENT
for the Tucker Hill Perlite Project
Lake County, Oregon

Cover Sheet

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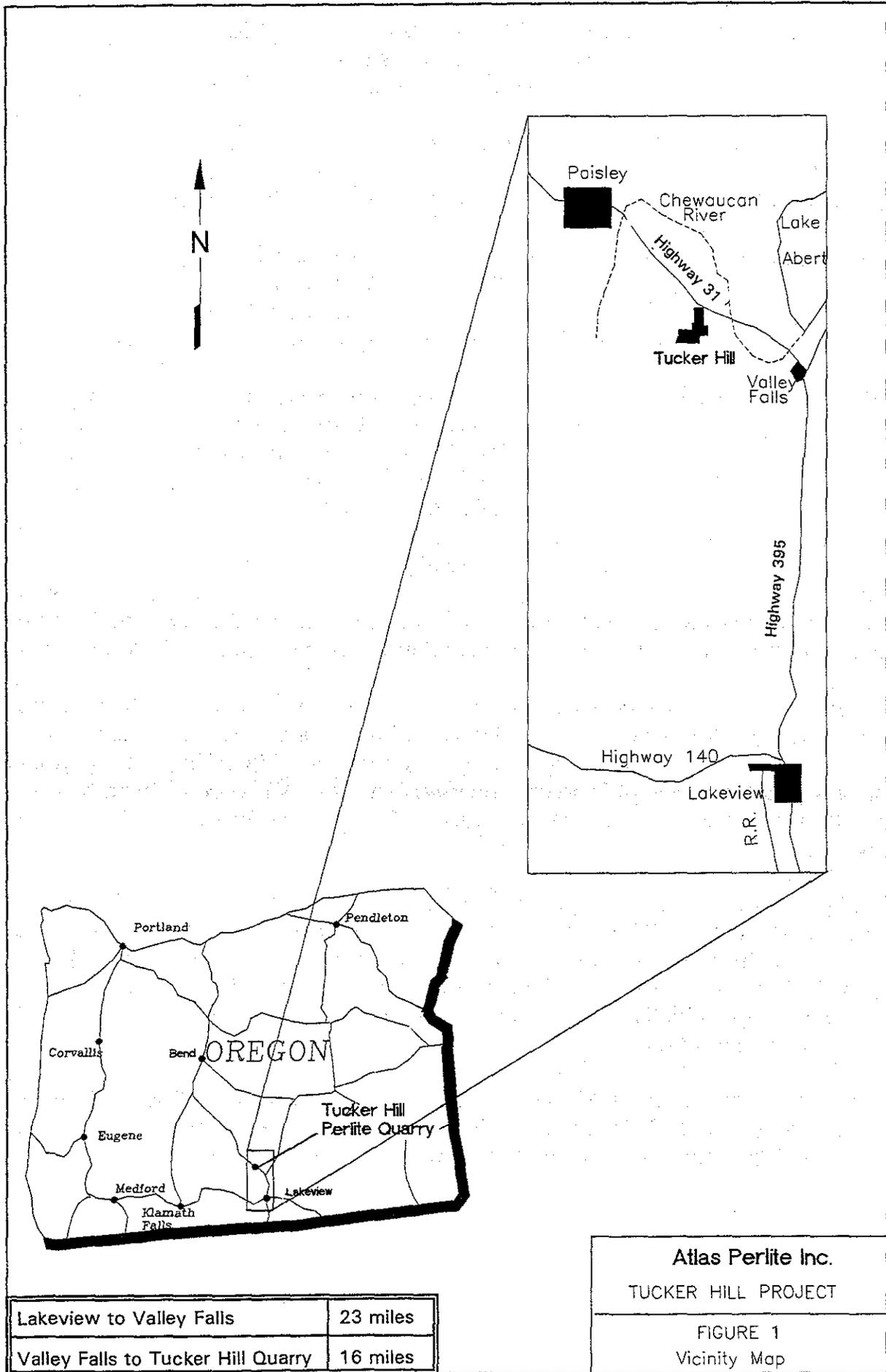
Abstract

This Draft Environmental Impact Statement (DEIS) is prepared in compliance with the National Environmental Policy Act (NEPA) and U.S. Bureau of Land Management (BLM) NEPA procedures.

Atlas Perlite, Inc. (Atlas) is proposing to develop a 15 to 20-acre perlite quarry with an associated waste rock dump and access road on Tucker Hill which is located approximately 35 miles northwest of the town of Lakeview, Oregon. The ore would be mined at Tucker Hill and hauled to Lakeview for processing and shipment. A Preferred Alternative (Alternative C) has been identified which requires the hauling of the waste rock to the existing Lake County gravel pit adjacent to Oregon State Highway 31.

This DEIS analyzes the impacts of Atlas' Proposed Action and four alternatives (including the No Action Alternative). The DEIS focuses on Native American concerns, archaeological, visual, and economic issues that have been raised by the public through scoping and consultation with four recognized tribal governments. The DEIS also evaluates the potential of Tucker Hill to be nominated for listing on the National Register of Historic Places as an Archaeological District and a Traditional Cultural Property.

Reviewers should provide the BLM with comments during the designated review period of the DEIS. Comments on the DEIS should be specific and should address the adequacy of the statement or the merits of the alternatives discussed (40 CFR 1503.3).



Atlas Perlite Inc.

TUCKER HILL PROJECT

FIGURE 1
Vicinity Map

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SUMMARY

This Draft Environmental Impact Statement (DEIS) evaluates the impacts of the development of a proposed 15 to 20-acre perlite quarry on Tucker Hill approximately 35 miles northwest of the town of Lakeview, in Lake County, Oregon. Atlas Perlite, Inc. is proposing to develop the quarry with an associated waste rock dump and access road. A total of 37.7 acres would be disturbed. The ore would be hauled from Tucker Hill to Lakeview where it would be crushed and sorted and shipped to markets in the northwest.

The proposed project would be located in Sections 23 through 26 and 35, T34S, R19E, Willamette Baseline and Meridian, in Lake County, Oregon. Approximately 36 of the acres to be disturbed are located on lands administrated by the Lakeview Resource Area of the Bureau of Land Management (BLM). The remaining acres (approximately two acres) are on private lands. Atlas proposes to operate the quarry for 10 years, and this analysis is based on the effects of a 10-year operation. Any extension beyond 10 years would require a modification of the Plan of Operations and a new environmental study. Although Tucker Hill contains an extensive supply of perlite, the demand for the product is limited and is not expected to expand significantly.

Tucker Hill has been explored for minerals since 1949 with intensive exploration beginning in 1982. The landscape on Tucker Hill has been somewhat modified as the result of the construction of four to five miles of road, drilling of over 100 exploration holes, and mining of about 50 tons of perlite ore. Between 1987 and 1990, an additional 18 exploration holes were completed and a number of samples were collected for testing. Much of the previous exploration has been rehabilitated, but there is clear evidence of past and current exploration.

PURPOSE AND NEED

The purpose of the proposed action is to develop and operate a perlite quarry operation to meet demands for products made from perlite in the northwest. Perlite is used for the manufacture of ceiling tiles for building construction, as a filter aid, and for a variety of agricultural purposes, including potting soil. There is one producing perlite mine on Dooley Mountain near Baker City, Oregon. However, this mine produces such a small quantity of perlite (less than 5,000 cubic yards) that it is not required to be permitted by the State of Oregon. The development of the Tucker Hill quarry would provide a close and relatively inexpensive source of perlite resulting in less cost to the consumer and less use of fossil fuels. Most of the perlite markets in the northwest are currently being supplied from sources in New Mexico.

PLANNING ISSUES

Public scoping and consultation with four federally recognized Native American tribal governments resulted in the identification of 13 planning issues. The planning issues include:

Native American Concerns

- What are the impacts from the project to past and current traditional and religious uses of the area by Native Americans?

Cultural Resources

- What are the impacts from the project on specific cultural resource sites?
- What is the potential of the area for designation as an Archeological District?
- What is the potential of the area for designation as a Traditional Cultural Property?
- What is the potential of the area for designation as a Cultural Landscape?

Visual Resources

- What are the impacts on visual quality as viewed directly from Highway 31?
- What impacts would the project have on the use of the area for Native American traditional or religious purposes?

Soils

- What impacts would the project have on long-term soil productivity and surface erosion?
- What is the potential or limitations of the soils for reclamation?

Vegetation

- What impact would the project have on native plants and communities?
- What impact would the project have on native plants of importance to Native Americans?
- What is the potential for increasing or introducing noxious weeds?

Air Quality

- What impact would the project (quarry operation) have on existing air quality and visual quality within the Tucker Hill area?
- What impact would the project (trucking and milling operation) have on the transportation route and community of Lakeview?

Wildlife

- What impact would the project have on the use of the area by raptors?

Threatened, Endangered, and Candidate Wildlife Species

- What impact would the project have on potential habitat or populations of the following TEC species: bald eagles, pygmy rabbits, western sage grouse, northern sagebrush lizards, Pacific western big-eared bats, long-eared Myotis (bats), Preble's shrews, and peregrine falcons?

Land Uses/Access

- What rights-of-way for access across private lands would be needed and how is the road to be managed while the quarry is operating and after the quarry ends operation?
- Could the roads stand the additional truck traffic and who would maintain the roads?
- What impact would the project have on public land access?

Socioeconomic Impacts

- What impact would the project have on the local economies of Lake County and the town of Lakeview?

Noise

- What would be the impacts of noise on Lakeview from the trucking and processing plant?

Groundwater and Water Quality

- What would be the indirect impacts related to the use of groundwater for dust control at the Lakeview processing plant?
- What impact would there be on private wells in the area?
- Would the project comply with Oregon State Water Quality Standards (point and non-point)? What effect would the project have on surface and subsurface waters?
- Would the waste rock contain any hazardous components such as heavy metals and what are the potential impacts of precipitation percolating through the waste rock?

Health and Safety

- What are the human health risks associated with the mining, hauling, milling and crushing of perlite?

Other issues discussed in the DEIS include recreation and range resources. Although all the issues were analyzed in the DEIS, four major issues emerged from the scoping and consultation related to the project. These were concerns raised by some of the Native Americans who have declared the Chewaucan River Basin, including Tucker Hill, as a sacred area; concern over potential impacts to the extensive archaeological resources on Tucker Hill; the need to maintain the integrity of the area for religious uses including potential impacts on visual quality; and interest in the economic issues or benefits that would accrue from the project to Lakeview and Lake County.

The archaeological survey indicates that the Chewaucan River Basin has been used by humans for thousands of years. The earliest period of human occupation was identified as Pre-Archaic or 11,000 to 7,000 years from the present. Occupation appears to be continuous up through the early 1900s when Native Americans felt closed out of the area by private landowners. The area was evidently

used for a variety of traditional uses including hunting, gathering of food and fiber, as well as religious or spiritual purposes. There is at least one burial site on the Tucker Hill formation and there may be others indicated from oral interviews with Native Americans. The identified burial site would not be physically affected by the proposed project. Based on the archaeological evidence and the interviews with the Native Americans, it has been determined that Tucker Hill appears to be eligible for listing on the National Register of Historic Places as both an Archaeological District and as a Traditional Cultural Property.

Although the DEIS evaluates the effects of the project as it potentially affects all of the issues, the focus is on the potential impacts of the project on the Traditional Native American values identified for Tucker Hill, the archeology resources, visual impacts, and economic impacts/benefits.

ALTERNATIVES

The alternatives considered in this DEIS were developed to respond to key planning issues and are based on potential impacts associated with the Proposed Action. A major concern identified by the Interdisciplinary Team (IDT) was the potential impacts on the integrity of the formation as it relates to Native American cultural values present, visual quality and vegetation of Tucker Hill. In reviewing possible options to minimize impacts from the proposed action, the best opportunity appeared to be to review alternative sites for the storage of the waste rock associated with the quarrying operation, as options to change the quarry pit are minimal. Possible alternatives for location of the haul road were considered and rejected as described below. This led to development of Alternatives B and C. The BLM is also required to analyze the No Action Alternative, which describes the environmental consequences that would occur if the project is not implemented and is the baseline for the impact analysis.

Alternative A - The Proposed Action includes a 20-acre perlite quarry, a six acre waste rock dump site on Tucker Hill and upgrading of 3.3 miles of an existing road to haul the ore. The bulk of the quarry operation would take place during two campaigns per year (early summer and late fall, to avoid conflicts with wildlife), each approximately 45 days long. There may be a need for a blasting operation during the spring (February 1 - June 30) for the project start-up year only. This blasting operation would last approximately seven days, not necessarily consecutively, and would be authorized by the BLM's Lakeview Resource Area Wildlife Biologist in accordance with the Blasting Schedule described in Appendix IV. The quarried material would be stockpiled in place on the quarry floor for hauling. The stockpiled ore would be hauled via the existing upgraded access road to Highway 31 and then south to the town of Lakeview for processing. There would be two trucks averaging 10 trips per day per truck working a five day work week (normally Monday through Friday, 6 a.m. to 6 p.m.) delivering ore to the processing facility in Lakeview. Hauling would occur year round. Processed perlite product would then be shipped in bulk to manufacturers or end users by rail or truck, with an average of five truckloads being shipped each week.

Alternative B - (Alternative Tucker Hill Waste Rock Dump Location) - This alternative is the same as the Proposed Action except for a different location of the waste rock site to be located directly southwest of the quarry. The quarry, access road, service road, service areas, mining

operation and reclamation are the same as Alternative A. This alternative was developed in response to a concern of the potential impacts on visual quality when viewed by people traveling along Highway 31.

Alternative C - (Alternative County Gravel Pit Waste Rock Dump Location) - This alternative is a variation of Alternative B. It is the same as Alternative A except for the alternative waste rock dump site. This alternative provides that the waste rock generated by the quarrying operations would be hauled off Tucker Hill and placed in the existing gravel pit located adjacent to Highway 31 and operated by Lake County.

Alternative D - (No Action) - This alternative is described as no project, or no perlite quarry. Current management provided by the High Desert Management Plan would continue. The current disturbance from previous exploration would be rehabilitated. The No Action Alternative is not a viable option available to the BLM due to the proposal being a non-discretionary action under the 1872 Mining Law. This alternative is included only as a baseline for comparison of environmental impacts of the other alternatives. This alternative also assumes that exploration activity would continue as described on page S-1.

AGENCY PREFERRED ALTERNATIVE

The Agency Preferred Alternative is Alternative C which is a modified version of the Proposed Action (Alternative A). This action would include all components of Atlas' Proposed Action except for the location of the waste rock dump site. The Preferred Alternative stipulates that the waste rock would be hauled off Tucker Hill and deposited in the existing Lake County gravel pit, adjacent to Highway 31, where it will be used either as road maintenance material or by the County to aid in final reclamation when the pit is exhausted and closed out.

ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Alternative Haul Road Location

Atlas considered construction of a new road on a new location across BLM administered public lands early in the process. However, in reviewing the potential for impacting archeological, visuals, and geologic resources with a new road location, it was decided to limit construction along the existing access road.

Alternative Processing Sites in Lakeview

Atlas evaluated a number of processing sites in Lakeview including a site on the south end of town and the selected site on the north end of Lakeview. This review was done in consultation with Lakeview and Lake County officials. The south site was eliminated based on access to the quarry, the fact that perlite ore would not have to be hauled through town, and accessibility to the railroad.

Withdrawal of Tucker Hill from Mineral Entry

As the current land use plan provides for development of the mineral resources, an action to withdraw the area from mineral entry would require a Plan amendment. Any Plan amendments would require an evaluation of all resource and land use values including mineral values, existing

claims and rights of the claim owners. Implementation of this alternative would prohibit the location of new mining claims, but would be subject to valid existing rights. Based on several analyses done on the Tucker Hill perlite deposit (Peterson, 1961, and Wilson and Emmons, 1985) there is a high potential for the occurrence of a high grade perlite deposit, therefore, the withdrawal alternative was eliminated from further consideration.

Designation of Tucker Hill as an Area of Critical Environmental Concern (ACEC)

It appears that Tucker Hill may likely meet the requirements of a cultural Area of Critical Environmental Concern (ACEC) as defined in the Federal Land Policy and Management Act (FLPMA). Designation of the area as an ACEC would formally recognize the special cultural values of Tucker Hill, but would require an amendment to the existing land use plan.

This alternative was dropped from further evaluation as formal ACEC designation is outside the scope of analysis and would not, in and of itself, preclude mineral development or provide any additional protection to cultural resources above that provided by existing laws, regulations or policies.

ENVIRONMENTAL CONSEQUENCES

Table S.1 provides a summary of the Environmental Consequences of the Proposed Action and the Alternatives. The greatest potential impact of the project appears to be the effect of the project on the sacred area as viewed by some Native Americans. The actual impacts on Native American Traditional uses of the area are difficult to measure. However, in the view of some Native American consultants, the project would have a major impact on their use of Tucker Hill.

TABLE S-1 SUMMARY COMPARISON OF IMPACTS BY ALTERNATIVE

ALTERNATIVES				
	A	B	C	D
Disturbance				
Existing	8.4 acres	8.4 acres	8.4 acres	8.4 acres
New	29.3 acres	28.3 acres	23.3 acres	0.0 acres
Total Disturbance	37.7 acres	36.7 acres	31.7 acres	8.4 acres
Native American Traditional Values (plants, hunting, visual integrity and religious)	Impact to plants and hunting considered minimal. Impact to visual integrity is considered strong to moderate. Impacts to religious uses is considered major by some tribal consultants.	Same as Alternative A.	Impacts to plants, hunting and visual integrity are less than that described for Alternative A as the waste rock dump (6 acres) is removed from Tucker Hill resulting in less disturbance. Impacts to religious uses are the same as Alternative A.	No change
Archaeological Resources	Potential physical impact to 10 cultural sites including two stacked stone features. No physical impact to known burial sites petroglyphs, petroglyphs, caves or rock shelters.	Potential to physically impact an additional stone stacked feature. Other impacts the same as Alternative A.	Same as Alternative A, except the elimination of waste rock dump on Tucker Hill would minimize potential impact on one site with a large lithic scatter.	No change
Recreation	No impact	No impact	No impact	No change

ALTERNATIVES

	A	B	C	D
Visual Quality *				
KOP # 1	Quarry and haul road are not visible, Waste rock dump is visible.	Quarry, road, and waste rock dump are not visible.	Quarry, road, and waste rock dump are not visible.	No change
KOP #2	Quarry and haul road are visible. Waste rock dump is not visible.	Quarry, road and waste rock dump are visible.	Quarry and road are visible. Waste rock dump is not visible.	
KOP #3	Quarry and road are visible. Waste rock dump is not visible.	Quarry, road and waste rock dump are visible.	Quarry and road are visible. Waste rock dump is not visible.	
	Meets VRM III Objectives	Meets VRM III Objectives	Meets VRM III Objectives	Meets VRM III Objectives
Range	No impact	No impact	No impact	No change
Vegetation/Soils	Permanent loss of 20 acres (quarry) Temporary loss of 17.7 acres	Permanent loss of 20 acres Temporary loss of 16.7 acres	Permanent loss of 20 acres Temporary loss of 11.7 acres	No change
Threatened, Endangered & Sensitive Plants	No impact	No impact	No impact	No change
Noxious Weeds	low risk for invasion	low risk	low risk	No known populations
Air Quality	low impact - meets State Standards	low - meets State Standards	low - meets State Standards	Meets State Standards
Wildlife	Permanent loss of 20 acres (quarry) of habitat. Temporary loss of 17.7 acres. Minimum to low impact on raptors	Permanent loss of 20 acres of habitat. Temporary loss of 16.7 acres. Minimum to low impact on raptors	Permanent loss of 20 acres of habitat. Temporary loss of 11.7 acres. Minimum to low impact on raptors	No change

ALTERNATIVES

	A	B	C	D
Threatened, Endangered & Sensitive wildlife	No Effect Determination on Bald Eagles	Same as Alt A	Same as Alt A	No change
Health and Safety	Minimum to low risk	Minimum to low risk	Minimum to low risk	No change
Land Use & Access	Road would be improved. Public access needs would be determined through reclamation planning	Same as Alt A	Same as Alt A	No change
Social Economics	18 direct & indirect jobs provided. Some increase in tax revenues to local governments	Same as Alt A	Same as Alt A	No change
Groundwater/Water Quality	low if any	low if any	low if any	none
Noise	low	low	low	none

CHAPTER 1 INTRODUCTION

Atlas Perlite, Inc. (Atlas) is proposing to develop a 15 to 20 acre perlite quarry with an associated waste rock dump and access road on Tucker Hill, approximately 35 miles northwest of the town of Lakeview, in Lake County, Oregon. The proposed quarry can be reached by traveling north on U.S. Highway 395 to the junction with Oregon State Highway 31, west on Highway 31 to the Tucker Hill Road, then south on the Tucker Hill Road for three miles (see Figure 1).

A small portion of the Tucker Hill perlite deposit was originally discovered and staked by a group of local prospectors in 1949. Mining operations ceased in 1954. A number of mining companies owned the property from 1981 through 1987 when Atlas acquired the property from HOMEX.

The proposed project would be located in Sections 23 through 26 and 35, T34S, R19E, Willamette Baseline and Meridian, in Lake County, Oregon and includes public lands administered by the Lakeview Resource Area of the Bureau of Land Management (BLM) as well as private lands. Atlas proposes disturbance on approximately 38 acres (of which approximately 8 acres is currently disturbed due to past exploration activity) over the course of 10 years within the Tucker Hill complex. Of this disturbance, approximately 36 acres would be disturbed on public lands, and approximately two acres would be disturbed on private lands. Figure 2 depicts the land status in the proposed project vicinity.

Approximately 1.5 million short tons of perlite ore would be mined over the next 10 years. Although there is a reserve potential of between 50 and 100 million tons of commercial grade perlite on Tucker Hill, the demand for perlite in the U.S. is limited. Total production of perlite in the U.S. in 1992 was only 625,000 tons, and future demand is not expected to significantly change. Atlas anticipates securing contracts to provide a five year supply to markets in the northwest. There is a possibility that Atlas' contract could be extended for an additional five years, assuming a stable demand. The markets in the northwest are currently supplied from sources in New Mexico.

Although the amount of perlite ore on Tucker Hill is extensive, the perlite operation is limited by the demand for the product. If future demand increases beyond that projected over the next ten years, Atlas would amend their Plan of Operations and a new environmental analysis would be initiated.

Since most of the proposed operations are located on public lands administered by the BLM, review and approval of Atlas' Proposed Plan of Operations are required by BLM pursuant to 43 CFR 3809, "Surface Management Regulations."

LEAD AGENCY RESPONSIBILITY

The BLM is the lead agency in preparing this Draft Environmental Impact Statement (DEIS) for the proposed Tucker Hill Perlite Quarry. This document follows regulations developed by the Council of Environmental Quality (CEQ) for implementing the procedural provisions of the National Environmental Policy Act (NEPA) (40 CFR 1000-1508) and BLM's NEPA Handbook (H-1790-1).

PURPOSE AND NEED

The purpose of the Proposed Action is to develop and operate a perlite quarry operation to meet demands for products made from perlite in the northwest. Perlite is used for manufacture of ceiling tiles for building construction, as a filter aid, and for a variety of agricultural purposes, including potting soil. There is one producing perlite mine on Dooley Mountain near Baker City, Oregon. However, this mine produces such a small quantity of perlite (less than 5,000 cubic yards) that it is not required to be permitted by the State of Oregon. Development of the Tucker Hill Quarry would provide a relatively inexpensive source of perlite closer to some markets resulting in less cost to consumers and less use of fossil fuels.

The question of other potential sources of perlite on non-public lands in the Pacific northwest was raised during public scoping. Although other perlite is present in Oregon on both public and private lands, there are no other reported perlite deposits in the Pacific Northwest which could provide materials of the quality and quantity located at Tucker Hill. Transportation costs can more than double the cost of perlite to users (Kadey, 1983), and providing a Pacific northwest regional source for perlite would likely benefit consumers and would lower shipping energy requirements. In 1982, New Mexico accounted for 83 percent of the US perlite production (Kadey, 1983). Remaining production was from smaller deposits in Arizona, California, Nevada, and Colorado.

Perlite is a volcanic rock which possesses unique characteristics which allow it to expand into a lightweight material upon heating. The expandability of perlite is due to its glassy character and a small quantity of contained water. Upon heating the material to its softening temperature (typically between 1400°F and 2100°F), the water volatilizes and expands the rock. Many inferior perlite deposits exist which have insufficient water or overly viscous rock which result in "dead" perlite with no commercial value. Alternatively, too much contained water will result in excessive expansion which results in the production of excessive, non-commercial fines. Specialty products which can be created with perlite (filters, light weight aggregates, insulation, or horticultural additives) may require rigid specifications which can only be met with very specific rock types (Kadey, 1983). Test evaluations of bulk samples from Tucker Hill perlite indicate that the perlite

is of the universal variety suitable for a wide variety of expanded perlite products, and that it performs as well as, or better than, other perlite ores currently being processed (Atlas Perlite, Inc., 1994).

CONFORMANCE WITH FEDERAL, STATE, LOCAL, AND TRIBAL LAND USE PLANS AND POLICIES

Federal

A number of other land use or resource management plans and associated NEPA documents have been developed by the BLM which relate to or otherwise govern how the project area is currently managed. The BLM is responsible for determining if the proposed action is in conformance with these plans. The following Federal plans have been identified as applicable and with which, unless otherwise noted, the project is believed to be in conformance. When appropriate, the management direction and previous management decisions set forth by these documents, and the impacts outlined therein, are used to tier analyses performed in this DEIS, or are incorporated by reference, and therefore, are not repeated in detail. Pertinent decisions already established by these documents are not being revised here, but are merely mentioned to give the reader a broad perspective of all management activities occurring within the project area.

This document was prepared and the consultation process was conducted in accordance with the provisions of the National Historic Preservation Act (NHPA), the American Indian Religious Freedom Act (AIRFA), the Native American Graves Repatriation Act (NAGRA), and the Religious Restoration Act.

"High Desert Management Framework Plan" (BLM, 1983) A summary of current management applicable to general management or Tucker Hill specifically is as follows:

General Management Direction

Range. RM-1.8 - Allow fire to burn with limited suppression over the entire resource area if life or property are not in jeopardy, and if the fire meets the fire prescription..... However, since no fire prescription has been developed for the area, fire management defaults to BLM's full suppression strategy, i.e., action would be taken to put out any fire that occurs as soon as it is discovered.

Recreation. R-3.1 - Allow seedings, plantings, fires, insect infestations and other vegetation alterations to occur along major travel routes in low-quality scenic areas.

Management Direction Specific to Tucker Hill

Minerals. M-2.5 - The MFP lists an initial recommendation to keep Tucker Hill open to mineral entry. However, the District Manager modified the recommendation to include provisions for conducting a minerals survey and if significant minerals were located, to close those portions of the area to mineral entry needed to protect raptor eyries. Mineral entry closure requires a withdrawal. No withdrawal has ever been proposed or implemented.

Wildlife. WL-10.2 - Do not allow mining activities which would disturb raptor nesting sites, as determined by site-specific environmental analysis. Tucker Hill was identified as one of four major raptor nesting areas known at the time the MFP was developed.

WL-10.3 - Prohibit off-road vehicle use in raptor nesting areas of Tucker Hill between February 1 and June 30. Seasonal closures in this area have not been implemented to date.

Cultural Resources. CR-3.3 - Complete controlled surface collection and/or excavation of sites threatened with immediate destruction or severe loss of site data that cannot be protected by other means. The intent of this recommendation was to salvage unique site information before it was lost to collectors, erosion or mineral entry. This recommendation specifically identified the Tucker Hill quarry and workshop within this category.

Recreation. R-1.7 - Keep all public lands within the resource open to off-road vehicles except limit use at the following locations:

- 1) Raptor nesting areas on Tucker Hill between February 1 and June 30 constitutes a seasonal closure which has never been implemented.
- 2) Potential National Register sites - use would be limited to existing roads and trails. Though Tucker Hill was not specifically mentioned at the time the MFP was developed, it could fall into this category based on more recent evaluations.

Range. RM-1 - Improve, develop and maintain the livestock forage resource... and allocate forage to livestock. Currently, the Tucker Hill area is part of allotment #0409 (Tucker Hill). All livestock animal unit months (AUMs) have been transferred to allotment #0427. No livestock grazing occurs; however, 20 AUMs are still allocated to wildlife use within the allotment.

“Integrated Noxious Weed Control Program Environmental Assessment (OR - 013-93-03), Lakeview Resource Area” (BLM, 1994) - covers the environmental impacts of conducting an integrated noxious weed control plan throughout the Lakeview Resource Area. The decision resulting from the EA is currently under appeal, however, a request for a stay of the action was denied by the Interior Board of Land Appeals. This document is, in turn, tiered to the following programmatic Environmental Impact Statements and subsequent Records of Decision:

- 1) “Vegetation Treatment on BLM Lands in Thirteen Western States Final Environmental Impact Statement” (BLM, 1991).
- 2) “Northwest Area Noxious Weed Control Program Final Environmental Impact Statement” (BLM, 1985).
- 3) “Supplement to the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement” (BLM, 1987).

Appropriate Federal agencies are being provided with an opportunity to review this DEIS and provide comments on its consistency with their plans, policies, and directives.

State

The State of Oregon uses “Oregon’s Statewide Planning Goals” to guide land use planning within the state (Department of Land Conservation and Development, 1994). This requires local governments to develop their own comprehensive plans which are consistent with and implement, on the local level, the state’s goals. One of the most pertinent planning goals in this plan is Goal 5, relating to open spaces, scenic and historic areas, and natural resources. This goal states that “programs shall be provided that will protect scenic and historic areas and natural resources for future generations.” Further, “where no conflicting uses for such resources have been identified, such resources shall be managed so as to preserve their original character. Where conflicting uses have been identified the economic, social, environmental, and energy consequences of the conflicting uses shall be determined and programs developed to achieve the goal.”

One other goal applicable to the proposed project is Goal 9, dealing with economic development. This goal statement states land use plans should “provide adequate opportunity throughout the state for a variety of economic activities vital to the health, welfare, and prosperity of Oregon’s citizens.”

One other document which is applicable to the study area is the "Oregon Natural Heritage Plan" (Natural Heritage Advisory Council to the State Land Board, 1993).

The State of Oregon will be given an opportunity to review the DEIS and comment on its consistency with state goals, policies, and plans.

Regional

A consortium of county and local governments in south central Oregon and northern California have recently drafted a plan which is currently under review titled "Ore-Cal Resource Conservation and Development Council Area Plan" (Ore-Cal RC&D; 1995). The Proposed Action would conform to many of the plan's goal statements related to multiple use of public lands, mining practices, noxious weed control, maximizing use of natural resources, and promoting value added goods and services.

Lake County

Lake County has an existing Land Use Plan. The plan was developed in response to the State of Oregon's requirement for local governments to develop land use plans consistent with the statewide planning goals. The plan consists of a number of reports, ordinances, and subsequent amendments governing land use practices and policies within the county (Lake County, 1979; 1983; 1989a; 1989b; 1989c; 1992). The plan classifies Tucker Hill and the lands surrounding it primarily as Agricultural.

In 1992, the county passed an "Emergency Ordinance and Interim Public Land Management Plan" (Lake County, 1992) to supplement the existing Land Use Plan, as amended. The section of the ordinance pertinent to the Proposed Action encourages exploration and development of mineral resources and continuing noxious weed control.

The proposed action is consistent with some aspects of Lake County's plan. However, conflicts may occur in meeting the state's planning Goal 5, related to protecting natural, cultural, historical, and scenic resources. The plan policy #8 (p. 35; Lake County, 1989a) states "that sites or structures that have local, regional, statewide, or national significance will be protected to the extent practical." However, this same plan policy #9 (p. 35; Lake County, 1989a) also states "that quarried mineral and aggregate resources will be protected from encroaching incompatible uses that might likely limit development of those resources."

Plan policy #13 (p. 36; Lake County, 1989a) states "that the county will determine support of habitat and nesting site preservation of endangered, threatened, or vulnerable animal species only after consideration of economic and environmental consequences of both protection and non-protection." Plan policy #18 (p. 36; Lake County, 1989a) states "implementing regulations shall recognize all type of mining activities identified by ORS 517."

Conflicts may also occur in meeting Goal 6, related to maintaining and improving the quality of air, water and land resources. The plan policy #1 (p. 37; Lake County, 1989a) requires "the compliance with all applicable state and Federal air, water, land quality, and noise regulations as "conditions of approval." Plan policy #2 (p. 37; Lake County, 1989a) requires compliance with noise standards administered by the DEQ to be a condition of approval. Plan policy #3 states (p. 37; Lake County, 1989a) "that planning decisions will recognize immediate and long-range effects on the quality of natural resources, and those uses which may likely have an adverse affect on resource quality may be prohibited." Plan policy #16 (p. 38; Lake County, 1989a) states "land use decisions by the county shall avoid creating additional conflicts over inadequate supplies of water from all sources..."

The Proposed Action would be in conformance with implementation of state planning Goal #9 dealing with economic development and plan policies outlined in Lake County's Land Use Plan (p. 42; Lake County, 1989a). The Proposed Action would also be in conformance with Goal 1 of Lake County's Strategic Plan for Economic Development (Lake County Community Response Team, 1994) which relates to diversifying the economic base.

The Lake County Commissioners are being provided with an opportunity to review this DEIS and comment on its consistency with the county's approved plans and policies.

Lake County reviewed Atlas' proposed plan for the Tucker Hill Quarry Project and the Lakeview processing plant and approved a Conditional Use Permit (File No. 531) on February 21, 1995. A Land Use Compatibility Statement was signed by the Lake County Planning Director and sent to the Oregon Department of Environmental Quality on March 2, 1995.

Tribal Governments

Four recognized tribal governments are known to have an interest in the Lakeview Resource Area in general and have expressed interest in Tucker Hill specifically: The Klamath Tribes, Confederated Tribes of the Warm Springs Reservation, Burns Paiute Tribe, and Fort Bidwell Tribe. It is unknown if any of these government bodies have a formal land, resource or economic

development plan which would be consistent or in conflict with the Proposed Action. However, the Klamath Tribes do have a policy calling for no surface disturbance of their ceded lands. The Proposed Action would be in conflict with this policy.

These tribal governments have been consulted several times during the preparation of this DEIS. These tribes are being provided the opportunity to review the DEIS and provide a consistency determination with respect to meeting the goals of any tribal plans.

AUTHORIZING ACTIONS

A substantial portion of Atlas' facilities would be located in whole or in part on unpatented mining claims administered by the BLM; such operations must comply with BLM regulations for mining on public lands (43 CFR 3809, Surface Regulations), the Mining and Mineral Policy Act of 1970, and the Federal Land Policy and Management Act of 1976. These laws and regulations recognize the statutory right of mining claim holders to develop Federal mineral resources under the General Mining Law of 1872. The preparation of this NEPA document will aid the BLM in assuring that the statutory right of the mining claimant to develop a mine in the Tucker Hill area would not result in unnecessary and undue degradation of public lands and resources.

The BLM may approve a submitted proposal only after an environmental analysis is completed as required by NEPA. However, these statutes, in combination with other BLM policies (i.e., the Management Framework Plan) also require the BLM to analyze proposed mining operations to ensure that:

1. Adequate provisions are included to prevent undue or unnecessary degradation of public lands;
2. Measures are included to provide for acceptable and reasonable reclamation of disturbed areas; and,
3. Proposed operations would comply with other applicable Federal, state, and local laws and regulations.

In addition to BLM, other Federal, state, and local agencies have jurisdiction over certain aspects of the proposal. Table 1-1 provides a listing of these agencies and identifies their respective permit/authorizing responsibilities.

DECISION TO BE MADE

The decision to be made on this proposal is to approve or modify the claimant's mining Plan of Operation.

PUBLIC INVOLVEMENT AND PLANNING ISSUES

The BLM Interdisciplinary Team reviewed a number of issues identified by the public and agency personnel. These issues were identified as a result of individual mailings, newspaper articles, and meetings. The BLM filed a Notice of Intent to prepare an Environmental Impact Statement on February 2, 1995, in the Federal Register. Public notice that a NEPA document was planned or underway was also provided in the October 1994 Fremont Frequent Flyer, and the May 1995, Lakeview District Planning Update publication.

PERSONS, GROUPS, AND AGENCIES CONSULTED

Initial Scoping

A letter was mailed to 80 individuals or agencies known to have an interest in the project on January 30, 1995, initiating the scoping/consultation process. This list included Federal, state, and local agencies, tribal representatives, conservation organizations, and individuals who have expressed an interest in projects in Lake County.

Atlas' representatives have made presentations to the Lake County Board of Commissioners, the communities of Lakeview and Paisley, and to representatives of the Klamath and Burns Paiute Tribes.

Individual contacts and interviews have been made with individuals of the Klamath Tribe, Burns Paiutes, Warm Springs Paiutes, and the Fort Bidwell Paiutes. The results of these Native American consultations are described in a report prepared by Dr. Robert Winthrop titled *Tucker Hill Quarry Project, Tribal Consultation* and is incorporated by reference into this report (Winthrop, 1995).

Several individual contacts and meetings have taken place between individuals and groups of these same tribes, and members of BLM Lakeview District Staff. A government to government meeting was held with the Burns Tribe on June 30, 1995 and the Klamath Tribe on July 11, 1995. Also, an open tribal meeting and field trip to Tucker Hill was held on August 11, 1995. Both the governments of the Warm Springs Paiute and Fort Bidwell Paiute have stated that they consider Tucker Hill outside of their tribal areas and wish only to be kept informed of the decisions being made. Two individuals, however (one from each tribe), have expressed an interest in the area and

have participated in the consultation process. Notes of all of these meetings are on file at the Lakeview District Office.

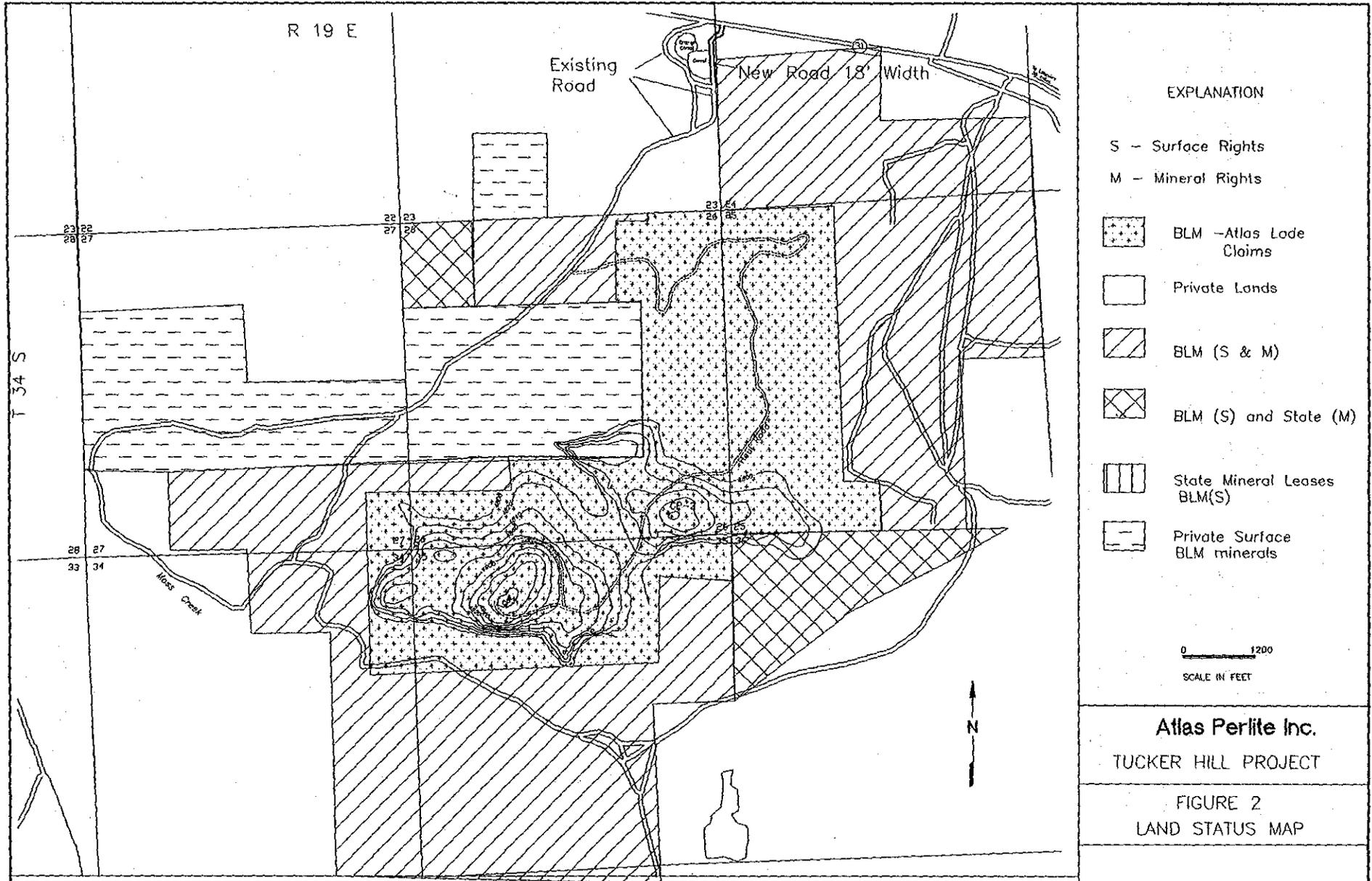
TABLE 1-1 KNOWN PERMIT AND COMPLIANCE REVIEW REQUIREMENTS

Permitting Agency	Requirements
Federal Agencies BLM Bureau of Alcohol, Tobacco and Firearms	Approval of Plan of Operations National Historic Preservation Act Assessment Purchase, Transport, Manufacture or Storage of Explosives
Oregon State Agencies Department of Environmental Quality Department of Geology and Mineral Industries Department of Transportation State Historic Preservation Office (SHPO) Water Resources Division	Air Quality Registration Certificates and Permit to Operate Storm Water Discharge Permit Septic System Approval Operating/Reclamation Permit Transportation of Materials National Historic Preservation Clearance State Antiquities Permit Water Appropriations Permit
Local Agencies Lake County	Review and Compliance with State/county Land Use Plan Goal 5 Special Use Permit Building Permit

COMMENTS RECEIVED DURING THE PUBLIC SCOPING PERIOD

Five letters with comments concerning the project were received during the scoping period. The U.S. Environmental Protection Agency, the Oregon Natural Resources Council, the Native Plant Society of Oregon, and the Concerned Citizens for Responsible Mining, along with several individuals, provided comments.

The specific concerns expressed by the public are described in the Planning Issues and are evaluated in this DEIS. Concerns ranged from interest in providing new jobs to environmental concerns over potential impacts to water resources, visual quality, protection of soil, native plants, air quality, wildlife, increase of noxious weeds, Native American uses of the area, archeological resources, and reclamation of the project upon closure of the quarry. The list of planning issues are described in detail in the Summary starting on page S-1.



R 19 E

Existing Road

New Road 18' Width

T 34 S

EXPLANATION

S - Surface Rights
M - Mineral Rights

-  BLM -Atlas Lode Claims
-  Private Lands
-  BLM (S & M)
-  BLM (S) and State (M)
-  State Mineral Leases BLM(S)
-  Private Surface BLM minerals

0 1200
SCALE IN FEET

Atlas Perlite Inc.
TUCKER HILL PROJECT

FIGURE 2
LAND STATUS MAP

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

DEVELOPMENT OF ALTERNATIVES

This chapter provides a description of Atlas' Proposed Action to develop the Tucker Hill Perlite Quarry and reasonable Alternatives to the Proposed Action.

Alternatives considered in this DEIS were developed to respond to issues raised by the public or the Interdisciplinary Team (IDT). Alternatives selected by BLM for consideration in this DEIS are based on potential impacts associated with the Proposed Action. One concern was raised early by the IDT over the location of the waste rock dump based on the potential to impact visual quality as seen from Highway 31 and the desire to minimize the disturbance to existing vegetation. BLM is required to analyze environmental effects resulting from the Proposed Action and to identify reasonable Alternatives that would mitigate or eliminate potential impacts. This led to the development of Alternatives B and C. The BLM is also required to analyze the No Action Alternative, which describes the environmental consequences that would result if the proposed project is not implemented. Other issues raised during the scoping process have been addressed through mitigation measures common to Alternatives A, B and C.

ALTERNATIVES CONSIDERED IN DETAIL

Alternative A - Proposed Action

The Proposed Action includes a 20-acre perlite quarry, a six acre waste rock dump site on Tucker Hill and upgrading of 3.3 miles of an existing road to haul the ore. The bulk of the quarry operation would take place during two campaigns per year (early summer and late fall, to avoid conflicts with wildlife), each approximately 45 days long. There may be a need for a blasting operation during the spring (February 1 - June 30) for the project start-up year only. This blasting operation would last approximately seven days, not necessarily consecutively, and would be authorized by the BLM's Lakeview Resource Area Wildlife Biologist in accordance with the Blasting Schedule described in Appendix IV. The quarried material would be stockpiled in place on the quarry floor for hauling. The stockpiled ore would be hauled via the existing upgraded access road to Highway 31 and then south to the town of Lakeview for processing. There would be two trucks averaging 10 trips per day per truck working a five day work week (normally Monday through Friday, 6 a.m. to 6 p.m.) delivering ore to the processing facility in Lakeview. Hauling would occur year round. Processed perlite product would then be shipped in bulk to manufacturers or end users by rail or truck, with an average of five truckloads being shipped each week.

The proposed acreage of disturbance for this project is given in Table 2-1.

TABLE 2-1 SURFACE DISTURBANCE, PROPOSED ACTION

Disturbance Component	Existing Acres	Proposed Acres		Total Acres	
		5 year	10 year	5 year	10 year
Main Haul Road	3.7	3.5	4.0	7.2	7.7
Quarry Area	0.0	13.8	20.0	13.8	20.0
Waste Rock Dump	0.0	2.5	6.0	2.5	6.0
Growth Medium Stockpiles	0.0	0.5	0.5	0.5	0.5
1994 Drill Access*	0.4	-0.4	-0.4	0.0	0.0
Exploration Roads	2.2	0.0	0.0	2.2	2.2
Bulk Sample Sites*	2.1	-0.8	-0.8	1.3	1.3
Total	8.4	19.1	29.3	27.5	37.7

* There are 0.4 acres of existing disturbance associated with drilling access and 0.8 acres of disturbance from bulk sample sites from previous exploration. The Proposed Action would reclaim the 1.2 acres of existing disturbance as part of the reclamation of the mining operation.

Quarry Development

The Tucker Hill perlite deposit would be quarried using conventional methods consisting of drilling, blasting, loading, and hauling. The rock would be drilled with diesel-powered blast hole drills using 10- to 12-foot drill hole centers depending on material. The holes would be loaded with a blasting agent and blasting performed in a typical mining industry method and in accordance with regulations of the federal Mine Safety and Health Administration. The Lakeview Interagency Fire Center would be notified of the Tucker Hill blasting schedule a minimum of two days prior to any blasting.

Figure 3 shows the proposed disturbance including the mine configuration, haul road, waste rock dump, and growth medium stockpiles over a 10 year period. A cross-section of the quarry as it is exposed at one, five and 10 year intervals is shown in Figure 4.

The blasted rock would be loaded with front-end loaders into haul trucks (22 to 25 ton capacity). Waste rock would be hauled to the waste rock dump site. Ore would be hauled over the upgraded existing access road to Highway 31 and then south to the process facility in Lakeview where it would be screened, sized and transloaded for rail or truck shipment.

Based upon the current mine plan, the estimated quantity of perlite ore that could be extracted over a 10 year period would be approximately 1.5 million short tons. The estimated waste tonnage associated with this ore production would be 72,000 tons.

TABLE 2-2 PRODUCTION SCHEDULE

Year	Annual Ore Production*	Annual Waste Production*
1	50,000	25,100
2	50,000	4,500
3	75,000	2,500
4	75,000	2,500
5	100,000	2,500
6-10	250,000	7,100

*In nominal short tons (ST)

Waste Rock Dump

The waste rock dump would be constructed by first developing a wide section at the dump location so the trucks can turn around. The waste rock would be dumped to the east of the pit. The top of the dump would be generally flat with a three to five foot high berm around the edges. The outer slope of the dump would be constructed to approximately an overall slope angle of 1.5 horizontal to 1.0 vertical (1.5h:1v) during operations and graded to a final slope of 2.5h:1v upon final reclamation. The size of the dump would be approximately 10 feet high, 400 feet wide and 630 feet long.

Operations

After the initial start up period in 1996, the bulk of the proposed quarry operations would take place during two campaigns per year, each approximately 45 days during early summer and late fall to avoid conflicts with wildlife. In the unlikely event that a short blasting period (approximately

seven days, not necessarily consecutively) between December and January 31 and/or July 1 through 31 is needed blasting would be scheduled as described in Appendix IV. Quarried material would be stockpiled in place on the quarry floor. There would be two trucks averaging 10 trips per day per truck working a five day work week (normally Monday through Friday) from approximately 6 a.m. to 6 p.m. daily. The hauling would be done year round and there would be an average of two people at the quarry while hauling. During the quarry campaigns, there would be three to four people on site during the work day. The equipment and facilities Atlas plans to use at the quarry include:

- 2 - 25 ton Dump Trucks
- 1 - D9 or equivalent Dozer
- 1 - 980 or equivalent Front End Loader
- Drill Rig
- 1 - 3,000 gallon Water Truck
- Light Vehicles (pick-up trucks)
- Office Trailer

The expected mine life based on the minable reserves and projected production rates would be a minimum of five years. It is conceivable that given market conditions might allow the opportunity to extend the operations under this plan up to an additional five years.

Growth Medium Management

Prior to construction of the quarry and waste rock dump and upgrading of the haul road, the available growth medium (soil material) that can feasibly be obtained with standard equipment would be removed and stockpiled. Growth medium material would be removed from all disturbed areas, except the growth medium stockpile locations, by either bulldozing the existing growth medium material and vegetation into piles along the slopes and near the reconstructed haul road or by loading into trucks and hauling the material to designated stockpile locations. It is possible that very little growth medium would be available for reclamation. If this proves to be the case, then obtaining growth medium from another source would be evaluated. Any off-site growth medium would be free of noxious weed seeds.

The growth medium stockpile would be constructed like a waste rock dump. The material would be end-dumped to its angle of repose and then regraded to slopes of about 2.5h:1v. The completed stockpile would be stabilized during the operational phase by seeding with a seed mix to be

determined through consultation with the BLM. The application of seed would be following stockpile construction at a time conducive to seed germination.

Monitoring of disturbed and reclaimed areas would include the detection and appropriate removal of any invader species. Specific invader species and their control would be determined through consultation with representatives of the BLM. The possibility of ground-disturbing projects that alter plant communities has been evaluated in accordance with BLM Manual 9015 to determine the risk of introducing noxious weeds.

Access (Haul Road)

The project site would be accessed using the existing 3.3 mile road. The existing road would be resurfaced with crushed stone or gravel, where necessary, to provide for an all weather travel surface. Turn-outs would be constructed where appropriate to provide for safety. During operations, the road would be graded and watered to maintain the surface and control fugitive dust. The existing road would be expanded to an approximate running width of 18 feet with total disturbance width not to exceed 30-32 feet and a maximum cutbank height of approximately six feet. A new road would be constructed on the private lands directly south of Highway 31 to the east of the existing corrals. The new route would follow a previously existing roadbed site.

Access Control

Public access to the quarry area would be restricted for the duration of the operation. This would be accomplished administratively and by the posting of warning signs located in strategic areas and marked with words of "warning" applicable to the danger associated with the operations.

Access would be provided to individuals or groups requiring access to or through the quarry area for such purposes as education, research and/or cultural/religious practices. However, there is no public access on that portion of the haul road which crosses private land.

Reclamation Plan

Reclamation plan will consult BLM Handbook 3042-1, "Solid Minerals Reclamation Handbook". Prevention of Unnecessary or Undue Degradation. Design and construction of the project facilities would be conducted in a manner which prevents unnecessary or undue degradation of the environment.

Project Schedule

The project life through completion based on the current plan is 10 years. The schedule could be affected if conditions change sufficiently. As a result of the modest size and nature of the project, concurrent reclamation for the waste rock dumps, haul road and quarry is not practicable. Reclamation would be performed upon termination of operations. Reclamation of existing exploration-related disturbances outside of the proposed quarry area would be reclaimed during the life of the proposed quarry operations.

Post Operational Land Uses

The objectives of the reclamation plan include preventing or minimizing safety hazards, stabilizing disturbed areas, and providing for a post operation surface condition that would be consistent with the long-term land uses as specified by the BLM.

Reclamation of Waste Rock Dump

The proposed waste rock dump would not be used for reclamation. It would be designed to conform to the natural surrounding topography where possible. The proposed regraded dump slopes (2.5h:1v) would provide for a long-term stable environment and would allow growth medium placement and operation of reclamation equipment.

The last material placed on the dump would be purposely left on the dump tops in the form of irregular ridges, hills and valleys to break up the final top surface. This irregular topography would result in microclimates more conducive to revegetation. The final topography of the dump top would also provide sufficient low areas for runoff accumulation to prevent the discharge of runoff onto the outer slopes of the dump.

The reclamation of the waste rock dump would commence at the end of the operational period of the project. Dump top surfaces would be scarified to decrease erosion potential and facilitate revegetation. Seed bed preparation and seeding would take place during the fall season; seeds of native plants would be free of noxious weed seeds and would be obtained from commercial sources or from a local native seed bank created in cooperation with the BLM. Seedings would be timed to optimize existing and anticipated growth medium moisture as well as in accordance with the natural phenology for maximum germination.

Road Reclamation

Long-term management of the access road would be determined as part of the reclamation process. Possible options include:

- Permanently close the road, bring the road bed back to the original contour as closely as possible, and revegetate the road corridor. Regrading and recontouring of the existing haul road could be done to approximate the existing road configuration. Fill material, enhanced with available growth medium, would be pulled onto the roadbed to fill against new road cuts and restore the slope to its existing contour as needed. Compaction would be relieved during excavation by ripping and smoothing the surface with the excavator bucket. This process would help inhibit soil loss from runoff and provide a suitable seedbed. Revegetation of the regraded area would be consistent with methods described under Revegetation;
- Stabilize the road as needed for protection of the watershed and road bed. Maintain existing access for BLM administrative purposes; or
- Maintain the road for both public and administrative use. This option would require an easement or right-of-way for the portion of the road across private lands.

Drainage and Sediment Control

The goal of the drainage and sediment control plan is to convey runoff from reclaimed areas and up-gradient undisturbed areas through the project site in a manner which would protect the reclaimed areas and prevent degradation of down-gradient water quality. The drainage and sediment control plan has been designed to require no maintenance.

The main method of drainage and sediment control at the project site would be revegetating all disturbed areas, with the exception of the quarry. Drainage on roads would be by ditching, installation of waterbars and, where appropriate, culverts. Road running surfaces would be rocked to reduce sediment runoff. Drainage facilities would be designed to accepted road engineering standards.

Upon reclamation, the Tucker Hill quarry would remain as a potential impoundment area. However, no groundwater would be ponded, as demonstrated by test drilling, to depths below the planned quarry bottom. The small amount of runoff entering the quarry from up-gradient areas and the

runoff from the quarry walls themselves would rapidly evaporate and/or infiltrate through the porous rock so standing water would not be expected. Based on available data (see New Mexico Bureau of Mines and Mineral Resources or BMMR data in Appendix V), there does not appear to be any sulfides present in the ore or waste rock to contribute to acid rock drainage in the event there was standing water for a brief period. The BMMR data reflect the total metal content of the materials tested and indicate that none of the metals tested show any mobility during the test procedure. The test for acid-base potential indicates there is a substantial excess of neutralization potential of the material which suggests that the potential for the generation of acidic conditions, and potential mobilization of metals, would be very low.

Table 2-3 provides a general lab analysis of the material sampled from Tucker Hill.

TABLE 2-3 TYPICAL CHEMICAL ANALYSES (PERCENT)

SiO ₂	74.2%	CaO	1.3%
Al ₂ O ₃	12.6%	Na ₂ O	3.8%
Total Fe	0.5%	K ₂ O	4.5%
Fe ₂ O ₃	0.52%	LOI	3.3%
TiO ₂	0.06%	Moisture	0.2%
MgO	0.10%		

Revegetation

The revegetation methods described at this time are generally based on common industry practices. Further refinement is anticipated as site specific results are derived from future test plot and seed bank programs.

The seed mix included in this proposal is based on known soil and climatic conditions and was selected to establish a plant community which would support post-mining land uses as prescribed by the BLM. The present seed mix is designed to provide species that can become established in the environment of southcentral Oregon, are proven species for revegetation, and/or are native species found in the plant communities prior to disturbance.

Of the seeds listed in Table 2-4, a minimum of seven species, including grasses, forbs, and shrubs, would be seeded based on seed availability at the time of planting and the success of species concluded from the test plots and concurrent reclamation. The test plots would be designed, monitored and analyzed by the mining company in conjunction with the BLM and the Oregon Department of Geology and Mineral Industries (DOGAMI).

The specific seeding rates, mulch type and application rates, fertilizer requirements, and revegetation techniques would all be established through the test plot program.

Seeding activities would be timed to take advantage of optimal climatic windows and would be coordinated with other reclamation activities. In general, earthwork would be completed in the summer or early fall. Seed bed preparation would be done in the fall, either concurrent with or immediately prior to seeding. Seeding would be done in mid to late fall, taking advantage of winter and spring precipitation and optimum spring germination.

Squirreltail grass would be used for temporary stabilization of soil and to prevent weeds from invading disturbed soil areas.

Reclamation of Quarry

The quarry would be left in its final quarried configuration. The quarry walls would be left with overall slopes of approximately 22 degrees.

There would be no surface discharge from the quarry. The relatively small amount of runoff from the surrounding land surfaces and precipitation directly into the quarry would either evaporate or percolate into the exposed bedrock in the quarry bottom.

TABLE 2-4 REVEGETATION SEED MIXTURE

Species	Common Name	Pounds Per Acre*
<i>Agropyron spicatum</i>	Bluebunch Wheatgrass	5.0
<i>Danthonia unispicata</i>	Single Spike Oat Grass	3.0
<i>Leymus cinereus</i> (<i>Elymus cinereus</i>)	Basin Wildrye	2.0
<i>Atriplex confertifolia</i>	Shadscale	3.0
<i>Poa sandbergii</i>	Sandberg Bluegrass	1.0
<i>Elymus elymoides</i> (<i>Sitanion hystrix</i>)	Bottlebrush Squirreltail	1.0
<i>Astragalus</i> sp.	Astragalus	1.0
<i>Trifolium</i> spp.	Clover	1.0
<i>Artemisia tridentata</i>	Great Basin Sagebrush	2.0
<i>Purshia tridentata</i>	Antelope Bitterbrush	1.0

*Seeding rate is for hand broadcasting of pure live seed (PLS). The seeding rate for each species would be adjusted to result in a total of 20.0 PLS pounds per acre.

The proposed operation involves the quarrying of a uniformly high-grade perlite deposit. The geologic setting of the deposit allows for the extraction of ore from a single open pit quarrying operation. As multiple adjacent quarries would not be developed, sequential back-filling is not possible. Further, placing the excavated waste from the waste rock dump into the quarry would not result in an improved backfill condition since the bulk (99 percent) of the excavated matter removed would be perlite ore. Backfill would create an economic obstacle should the quarry be re-opened.

Prior to final reclamation, public safety concerns would be evaluated with the BLM and the DOGAMI. If determined to be necessary by the agencies, the company would construct a rock or waste material safety berm approximately five feet high with a one foot wide top and 1.5h:1v side slopes along the margin of the pit about 25 feet back from the highwall edge. This berm would be posted with warning signs located in front of the berm and spaced every 200 feet. The permanent waste material berm and/or weather resistant metal signs would provide for public safety for many years following mining. Safety berms would be seeded with the approved seed mix to reduce visual impacts of the quarry due to color contrasts.

Monitoring and Maintenance of Reclaimed Areas

Environmental monitoring of the project area would consist of both operational and post-reclamation monitoring. Operational monitoring would extend for the duration of operations and would cease when operations are terminated. Post-reclamation monitoring would commence on any reclaimed area following completion of the reclamation work for the area and would occur along with, and/or following operational monitoring until the project's reclamation bond is released by the BLM. Annual reports on the progress of the reclamation would be submitted to BLM and DOGAMI. Reclamation would be considered successful when the disturbed sites are stabilized, secondary plant succession is established, and the conditions are set to realize the post-mining land use objectives. The type and frequency of monitoring is described in Table 2-5.

TABLE 2-5 MONITORING PROGRAM

Type of Monitoring	Operational Frequency	Post-Operational Frequency
Condition of drainage and sediment control	Monthly	Annually until released
Condition of reclaimed areas	Annually	Annually until released

Drill Hole Plugging

All exploration drill holes at the project site have been plugged according to the State of Oregon requirements. Although no additional drilling is currently planned, any additional holes resulting from future development drilling within or adjacent to the quarry would also be plugged according to these requirements.

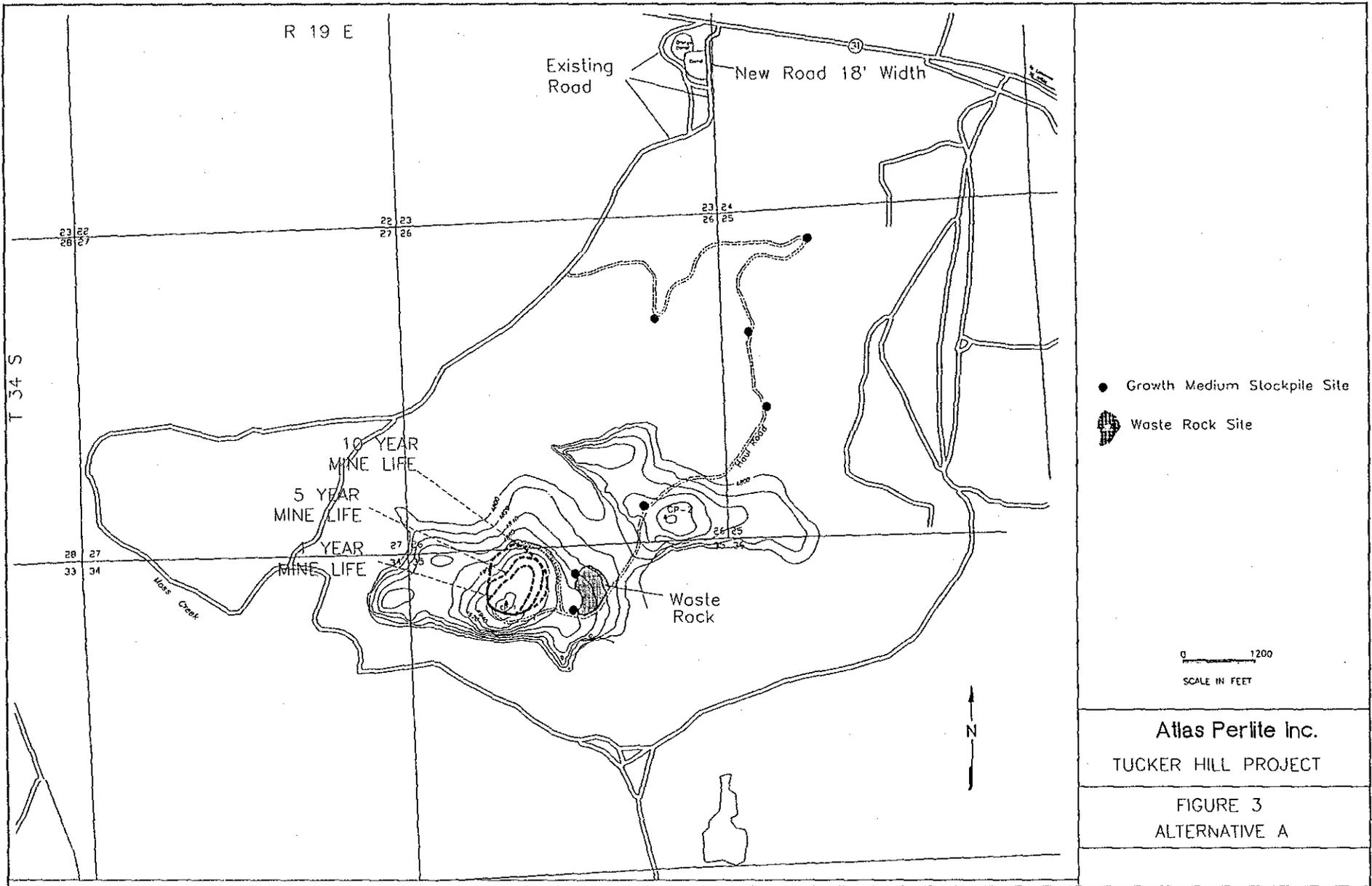
Concurrent Reclamation

Revegetation of exploration roads and pads not located within the mining component boundary would take place during the mining of the project. Reclamation would be considered successful when the disturbed sites are stabilized, secondary plant succession is established, and the conditions are met to realize the land use objectives.

Processing Site

The processing site for the perlite ore would be on the north end of Lakeview in an existing industrial site. The site is located just west of U.S. Highway 395 and adjacent to the Goose Lake Lumber Company to the south. Access to the property is provided by County Road 2-18c and the

Dusenbury Logging Road. The ore would be stockpiled on the site where it would be crushed and then loaded on either railroad cars or trucks for delivery to markets in the northwest.



- Growth Medium Stockpile Site
- Waste Rock Site

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SCALE IN FEET

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TUCKER HILL PROJECT

FIGURE 3
ALTERNATIVE A

Alternative B - Alternative Tucker Hill Waste Rock Dump Location

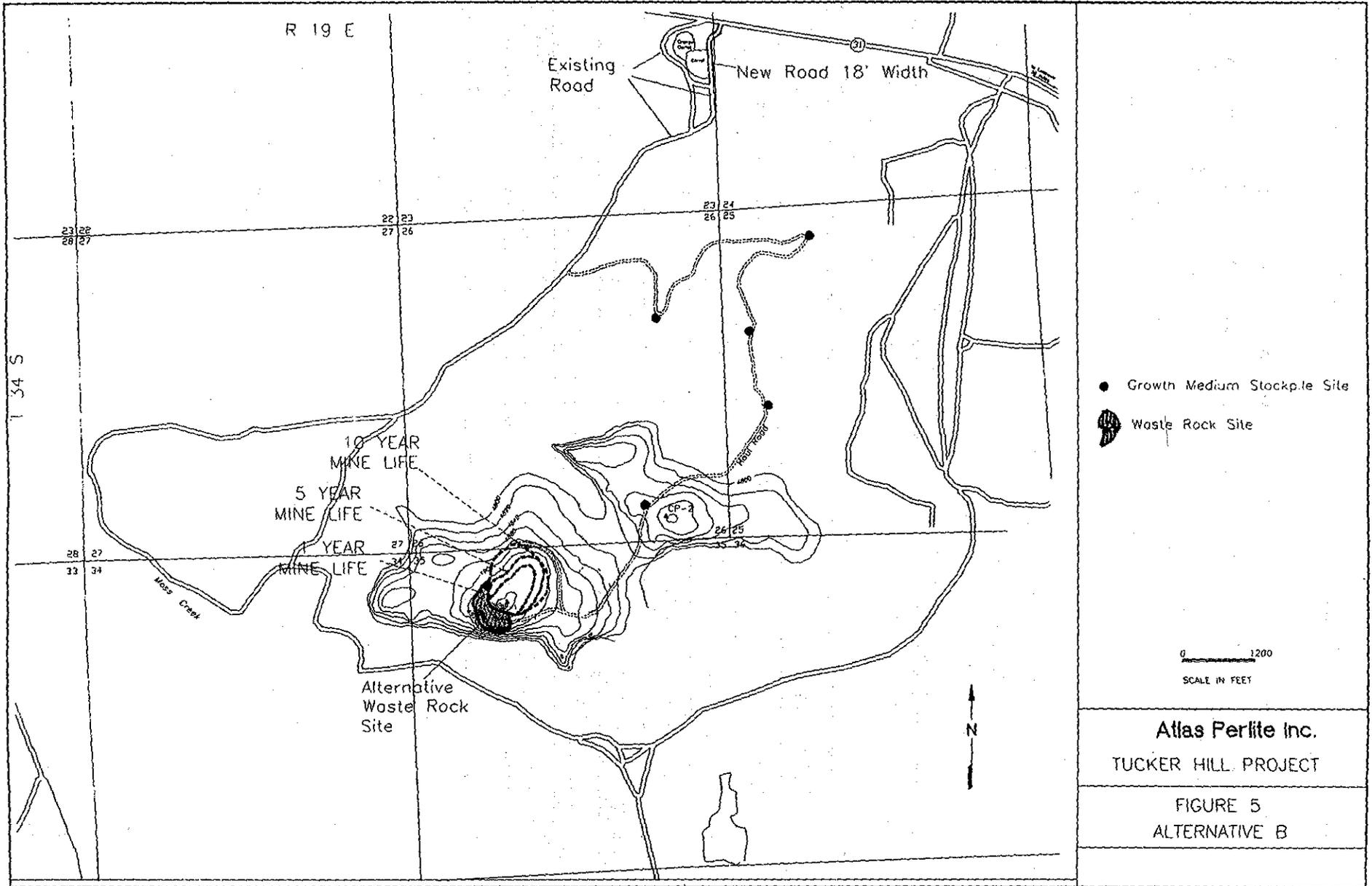
This alternative is the same as the Proposed Action except for the alternative waste rock site shown in Figure 5. The quarry, access road, service areas, mining operations and reclamation strategies are the same as described in the Proposed Action. This alternative was developed in response to a concern over the potential impacts on visual quality when viewed by people traveling along Highway 31.

The alternative represents a change in surface disturbance of approximately 5.0 acres which would be disturbed by the alternative waste rock site as compared to 6.0 acres in the Proposed Action.

TABLE 2-6 SURFACE DISTURBANCE, ALTERNATIVE B

Disturbance Component	Existing Acres	Proposed Acres		Total Acres	
		5 year	10 year	5 year	10 year
Main Haul Road	3.7	3.5	4.0	7.2	7.7
Quarry Area	0.0	13.8	20.0	13.8	20.0
Waste Rock Dump	0.0	2.0	5.0	2.0	5.0
Growth Medium Stockpiles	0.0	0.5	0.5	0.5	0.5
1994 Drill Access	0.4	(0.4)	(0.4)	0.0	0.0
Exploration Roads	2.2	0.0	0.0	2.2	2.2
Bulk Sample Sites	2.1	(0.8)	(0.8)	1.3	1.3
Total	8.4	18.6	28.3	27.0	36.7

The parentheses indicate a reduction in existing acres.



- Growth Medium Stockpile Site
- Waste Rock Site

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FIGURE 5
ALTERNATIVE B

Alternative C - Alternative County Gravel Pit Waste Rock Dump Site

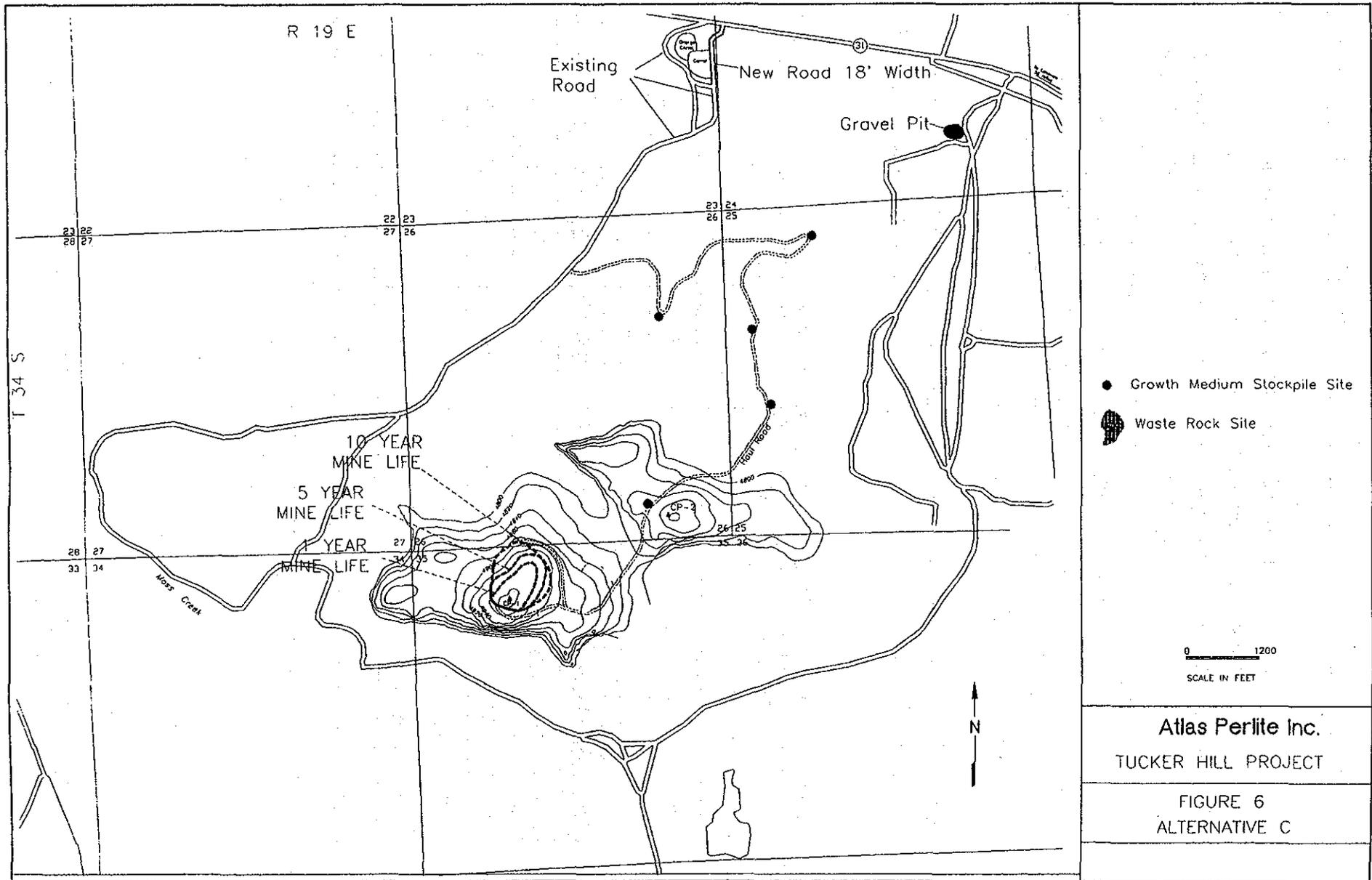
This alternative is the same as the Proposed Action except for the alternative waste rock site shown in Figure 6. The quarry, access road, service areas, and mining operations are the same as described in the Proposed Action. Reclamation of the waste rock dump located within the existing county gravel pit would not be required as part of this proposal. Lake County would develop appropriate reclamation needs as part of the county's overall road maintenance program. This alternative waste rock dump site was also developed in response to a concern over the potential impacts on vegetation and visual quality. There is an opportunity to utilize the waste rock material as either road surfacing material or as fill for reclamation of the gravel pit.

There would be no new acres of surface disturbance associated with the waste rock dump with this alternative as compared to 6.0 acres in the Proposed Action (Alternative A) and 5.0 acres in Alternative B.

TABLE 2-7 SURFACE DISTURBANCE, ALTERNATIVE C

Disturbance Component	Existing Acres	Proposed Acres		Total Acres	
		5 year	10 year	5 year	10 year
Main Haul Road	3.7	3.5	4.0	7.2	7.7
Quarry Area	0.0	13.8	20.0	13.8	20.0
Waste Rock Dump	0.0	0.0	0.0	0.0	0.0
Growth Medium Stockpiles	0.0	0.5	0.5	0.5	0.5
1994 Drill Access	0.4	(0.4)	(0.4)	0.0	0.0
Exploration Roads	2.2	0.0	0.0	2.2	2.2
Bulk Sample Sites	2.1	(0.8)	(0.8)	1.3	1.3
Total	8.4	16.6	23.3	25.0	31.7

The parentheses indicate a reduction in existing acres.



- Growth Medium Stockpile Site
- Waste Rock Site

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SCALE IN FEET

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TUCKER HILL PROJECT

FIGURE 6
ALTERNATIVE C

Alternative D - No Action Alternative

The No Action is described as no project, or no perlite quarry. The No Action Alternative assumes a continuation of the current uses and management provided by the High Desert Management Framework Plan and that exploration activity would continue as described on page S-1. The No Action Alternative provides a baseline from which environmental, social and economic effects are evaluated. The existing exploration activities (bulk sample sites and drill access roads) would be rehabilitated under provisions of the existing exploration Plan of Operations. The No Action Alternative is not a viable option available to the BLM due to the proposal being a non-discretionary action under the 1872 mining law.

TABLE 2-8 SURFACE DISTURBANCE, NO ACTION ALTERNATIVE

Disturbance Component	Existing Acres	Proposed Acres		Total Acres	
		5 year	10 year	5 year	10 year
Main Haul Road	3.7	3.7	3.7	3.7	3.7
Quarry Area	0.0	0.0	0.0	0.0	0.0
Waste Rock Dump	0.0	0.0	0.0	0.0	0.0
1994 Drill Access	0.4	0.0	0.0	0.0	0.0
Exploration Roads	2.2	0.0	0.0	0.0	0.0
Bulk Sample Sites	2.1	0.0	0.0	0.0	0.0
Total	8.4	3.7	3.7	3.7	3.7

DIRECTION COMMON TO ALTERNATIVES A, B, AND C

The Proposed Action (Alternative A) and Alternatives B and C would be implemented in compliance with the following direction:

Land Management Plan Direction:

Alternatives A, B, and C would be implemented in accordance with the Land Management Plan Direction described on Page 2.

Mitigation Measures Specific to Alternatives A, B, and C:

- An initial one-week (seven day) blasting period, not necessarily consecutively, would be permitted immediately after project approval, which is expected in the spring of 1996. This would provide sufficient perlite to meet market demands during the spring period of the first year of operations. The blasting operation would be coordinated with the BLM's Lakeview Resource Area Biologist to minimize possible impacts to wildlife, and would utilize blasting techniques that minimize impacts on wildlife. After the first year, the following requirements would be followed: (See Appendix IV for the Blasting Schedule)

No blasting during raptor nesting season, (February 1 through June 30) to protect nesting raptors, late wintering bald eagles, and potential bat nurseries.

Blasting between December 1 and January 31, if needed, would be coordinated/authorized by the BLM Lakeview Resource Area biologist to protect wintering bald eagles and maintain the No Effect Determination.

Blasting during the month of July, if needed, would be coordinated/authorized by the BLM biologist to minimize impacts to late fledging raptors.

- Sufficient water for dust abatement would be provided on the haul road to reduce any dust plumes and minimize impacts on air quality and visual quality.
- Implementation of the project would be in accordance with provisions of the Historic Properties Treatment Plan (HPTP) to mitigate, to the extent possible, impacts to cultural resources.
- Should any additional archeological discoveries be encountered during ground disturbing activities, all such activities shall halt within a 50 meter radius of the discovery, and the BLM shall be contacted to determine the nature of the find, evaluate its significance, and, if necessary, suggest preservation or mitigation measures.
- The haul road would be relocated near the corral on private lands to minimize potential impacts on the livestock operation.

- Long-term management of the Tucker Hill access road would be determined as a component of the Reclamation Plan.
- The project area would be monitored for noxious weed invasions throughout the life of the mine operation and reclamation activities.

AGENCY PREFERRED ALTERNATIVE

The Agency Preferred Alternative is Alternative C which is a modified version of the Proposed Action (Alternative A). This action would include all components of Atlas' Proposed Action except for the location of the waste rock dump site. The Preferred Alternative stipulates that the waste rock would be hauled off Tucker Hill and deposited in the existing Lake County gravel pit which is adjacent to Highway 31 where it will be used either as road maintenance material or will be used by the county to aid in final reclamation when the pit is exhausted and closed out.

ALTERNATIVES ELIMINATED FROM DETAILED STUDY

Alternative Haul Road Location

Atlas considered construction of a new road on a new location across BLM administered public lands early in the process. However, in reviewing the potential for impacting archeological, visual, and geologic resources with a new road location, it was decided to limit construction along the existing access road.

Alternative Processing Sites in Lakeview

Atlas evaluated a number of processing sites in Lakeview including a site on the south end of town and the selected site on the north end of Lakeview. This review was done in consultation with Lakeview and Lake County officials. The south site was eliminated based on access to the quarry, the fact that perlite ore would not have to be hauled through town, and accessibility to the railroad.

Withdrawal of Tucker Hill from Mineral Entry

As the current Land Use Plan provides for development of the mineral resources, an action to withdraw the area from mineral entry would require a Plan amendment. Any Plan amendments would require an evaluation of all resource and land use values including mineral values, existing claims and rights of the claim owners. Implementation of this Alternative would prohibit the location of new mining claims, but would be subject to valid existing rights. Based on several analyses done on the Tucker Hill perlite deposit (Peterson, 1961, and Wilson and Emmons, 1985)

there is a high potential for the occurrence of a high grade perlite deposit, therefore, the withdrawal alternative was eliminated from further consideration.

Designation of Tucker Hill as an Area of Critical Environmental Concern (ACEC)

It appears that Tucker Hill may likely meet the requirements of a cultural Area of Critical Environmental Concern (ACEC) as defined in the Federal Land Policy and Management Act (FLPMA). Designation of the area as an ACEC would formally recognize the special cultural values of Tucker Hill, but would require an amendment to the existing Land Use Plan.

This Alternative was dropped from further evaluation as formal ACEC designation is outside the scope of analysis and would not, in and of itself, preclude mineral development or provide any additional protection to cultural resources above that provided by existing laws, regulations or policies.

SUMMARY COMPARISON OF IMPACTS BY ALTERNATIVE

See Table S-1, page S-6 in the Summary for "Summary Comparison of Impacts by Alternative".

CHAPTER 3 AFFECTED ENVIRONMENT

AFFECTED ENVIRONMENT OF THE ALTERNATIVES

The Affected Environment chapter describes the environmental setting and provides a description of possible impacts from the project proposal as identified in the Planning Issues. The Affected Environment is the same for all of the alternatives.

The following resources and/or critical elements of the human environment as described in the BLM NEPA Handbook, H-1790-1, Appendix 5 are not present or are not affected by the Proposed Action or Alternatives:

- Areas of Critical Environmental Concern
- Aquatic Resources
- Farm Lands (prime or unique)
- Floodplains
- Forest Resources
- Hazardous Materials
- Other Minerals
- Paleontological Resources
- Wetlands/Riparian Zones
- Wild Horses
- Wild and Scenic Rivers
- Wilderness

Native American Concerns

Although the "Cultural Resources" section of this report addresses archeological values, the existence of numerous archeological sites is of direct interest and concern to Native American communities, both for historic preservation purposes and of socio-cultural interest. A separate detailed report entitled *Tucker Hill Quarry Project, Tribal Consultation* by Robert Winthrop, Ph.D., describes the Ethnographic Setting in the Chewaucan River Basin and is available for review at the Lakeview BLM office (Winthrop, 1995). Winthrop's report is incorporated into this analysis by reference.

Additional data was collected from tribal consultants by BLM staff and through government to government consultation between the BLM and the tribes. The BLM staff consultation records are located at the BLM Lakeview Office.

Tucker Hill is a relatively small feature (approximately 1,300 acres) located within the larger Lake Abert/Chewaucan River drainage that is considered important by some Native Americans. Within this area, the Tucker Hill formation has been identified as an area of importance. Archeological research and Native American consultation has indicated that the formation has seen many uses, some of which are associated with cultural traditions that may continue today (though there is no direct evidence of current use).

The existence of obsidian has long made the formation an important source of raw material for stone tool making. "Lithic scatters", largely composed of the waste material from stone tool making, cover large areas of the formation with sometimes extremely dense concentrations of flakes.

At least one burial site has been identified along the lower slopes of the formation. Oral history indicates that others are located in the formation.

Stacked stone features are found throughout the formation. There are four currently known rock art sites, including pictographs and petroglyphs around the base and lower slopes of Tucker Hill. At least one other rock art site is reported to be located on the north side of the formation.

There are at least four caves and one rockshelter on the formation which were used by past occupants of the area. Many types of materials appear to have been cached in these features.

There are currently some 39 archeological sites formally identified and recorded that are located on the Tucker Hill formation.

The Lake Abert/Chewaucan Marsh region, where Tucker Hill is located, appears to be a border zone in the culture-history of southeast Oregon, falling along a major physiographic and ecological boundary between the wooded foothills of the Cascades and the sagebrush/grasslands of the Great Basin. In the 19th century this biogeographic line was also an ethnic boundary, dividing the Klamath on the west from the Yahooskin Band of Paiutes on the east. Linguistic and ethnohistoric evidence suggests that Paiute peoples were relatively recent arrivals in this region, and may have been in competition with the Klamath for land. However, in the view of the Northern Paiutes, the

archaeological data is moot. In their view, they were created by the Creator and placed in the region. They feel that they have always been here and did not move here from somewhere else.

The question of Klamath/Paiute interaction in this region aside, the Chewaucan Marsh area has been within Northern Paiute territory for an appreciable time. Therefore, Tucker Hill is described from the perspective of traditional Paiute lifeways and social organization.

In anthropological terms, the traditional Northern Paiute inhabited the Great Basin area - a region extending from the eastern portions of California and Oregon through Nevada, Idaho, Utah, and western Wyoming. Much of this region can be characterized as a sagebrush/juniper desert/steppe. Hunting, gathering and, in certain areas, fishing provided the basis for subsistence throughout the aboriginal Great Basin. Technology was extremely well adapted to making a living in a somewhat harsh environment. In general, the lifeway of the Northern Paiute was characterized by sophisticated utilization of the environment. The diet typically included a broad range of seeds, roots, berries, fruits, tubers, insects and game.

The Northern Paiutes occupied a broad band within the western Great Basin, including areas of eastern Oregon, eastern California, and western Nevada. In aboriginal times, the Shoshone bordered the Northern Paiutes on the east, and the Klamath, Modoc, Achumawi, Atsugewi, Washoe, and Miwok on the west. The Northern Paiutes are distinguished by a common language, Paviotso, which belongs to the Western Numic (or Mono-Paviotso) branch of the Uto-Aztecan language family.

The traditional food quest for the Northern Paiutes was complex, involving many microenvironments and major shifts in elevation between mountains, foothills and valleys. The Northern Paiute came together in large groups primarily in the winter in village locations, in the spring and early summer at root camps, and at other times during festivals or during communal hunting activities such as rabbit or antelope drives. Often, but not invariably, the households were linked by close kin ties. During the spring, summer and fall, the family groups were mostly dispersed, but sometimes came together in large groups in specific resource areas such as the root camps. This semi-nomadic existence required a minimum of material possessions. Tools were often manufactured at the place of usage, with favorite or bulky tools stored at the winter habitation site. Shelters were ephemeral, consisting of brush windbreaks in the summer, and a structure of willows covered with matting of tule or grass in the winter.

As is characteristic of hunting-gathering groups existing within sparse environments, the social organization of the pre-reservation Northern Paiute was relatively informal. Political leadership in any formal sense appears to be a product of the post-contact period. Economic and social life was organized primarily on a family level.

Group membership as expressed by the Paiutes of southeastern Oregon was not static. Inter-marriage between these groups and those to the south in Nevada was common. The population was fluid, families of one band often becoming affiliated with neighboring groups.

The pivotal figure of Paiute religion was the individual shaman, an ambivalent character, whose abilities could be used for both good or ill. The shamanic vocation was (and is) essentially an individualistic quest for spiritual power which could variously confer capacities of healing, clairvoyance, invulnerability, control over weather, and control over animals in the collective hunts, as well as the malignant power of sorcery. In traditional Paiute communities the threat of sorcery, rather than any formal legal apparatus, served as the major force for social control. As is characteristic elsewhere of the shamanistic complex, the shaman's powers depended upon gaining the assistance of spiritual helpers, figures drawn from the Paiute life-world. These include chicken hawk, eagle, antelope, rain, fire, earth, lightning, and thunder.

For the Northern Paiutes, as for most Native American peoples, the specific features of their home territory have a sacred quality. Certain numerous places within the community's territory, for example: mountains, caves, or springs, served as a source of spiritual power which could be obtained through the spirit quest.

Based on interviews with a number of Native Americans associated with the Klamath Tribes, the Burns Paiute Tribe, Confederated Tribes of Warm Springs, and the Fort Bidwell Indian Community, and from archeological research, the following is known about the region and Tucker Hill specifically:

- The Lake Abert/Chewaucan Marsh area was used by many Paiute groups in the post-reservation period for plant gathering and hunting as part of a larger area including Fort Rock Basin and Summer Lake. Within this area, Tucker Hill has been identified as a specific area of importance.
- Tucker Hill was used traditionally for hunting bighorn sheep.

- Thirteen culturally significant plants were identified at Tucker Hill by tribal consultants and the BLM ethnobotanist. See Vegetation Section for a listing of the plants.
- Tucker Hill was used for the procurement of stone tools over a 10,000 year time period, as indicated by the archaeological material present. It was also an important occupation location for populations in the area, as indicated by the heavy concentration of artifacts which would indicate semi-sedentary occupation.
- Tucker Hill is a spiritual site located within a larger area recognized as having spiritual importance. The Burns Paiute Tribe and Klamath Tribe have recognized this in oral comments. The Burns Paiute Tribal Council issued a resolution (No. 95-04) recognizing the Chewaucan River Drainage and rim area as a sacred site which includes vision quest sites (Tucker Hill lies within the Chewaucan River Drainage).
- The rock cairns on Tucker Hill are recognized by some of the tribal consultants as being religious sites. Though these were not identified as currently being used by any of the consultants, they stated that the cairn sites retained their religious nature. Such sites are recognized as important for the long-term maintenance of their religious practices in the future.
- There was no evidence gathered that would indicate current or recent use of Tucker Hill by Native Americans. However, this lack of use is explained by pointing out the general prohibition/prejudice towards Native Americans using public lands. The belief that they were not allowed to use public lands stems from the doctrine of keeping the Indians on the reservations which were created for them in the early years. Some tribal consultants stated that they were aware of the importance of Tucker Hill, but had never used it, because of their perceived lack of access. Some individuals stated a desire to begin using the formation once it was pointed out that they did have legal access to the property.
- There is direct evidence for past use of Tucker Hill for religious purposes, based on the presence of pictographs/petroglyphs, stacked stone features, cache caves, burials, and the general setting of the formation. While some of the stone features on the formation have been assessed by archeologist as hunting related, these cannot be ruled out as also being religious. Some tribal consultants stated that even if they are hunting related, they were used

by spiritual leaders and are still sacred in either case. These tribal consultants have stated that the formation is a sacred area for them today. While the tribal consultants acknowledge that they have not been using it, they state that it is important for the continuation of cultural traditions. The religious issue is related to the conditions set forth in the American Indian Religious Freedom and the Religious Freedom Restoration Act as well as First Amendment rights expressed by the U.S. Constitution which guarantees the right to practice one's religion. These acts pertain to both tribal and individual rights.

Cultural Resources

An extensive cultural resources inventory of Tucker Hill was completed for the Tucker Hill complex by James Hutchins (Kautz Environmental Consultants or KEC) and the BLM and is described in a document entitled *A Cultural Resources Inventory of Tucker Hill, Lake County, Oregon* (KEC, 1995). The following summarizes key findings of the archeological report. The KEC Report is incorporated into this analysis by reference.

Based on the types of cultural resource sites found, it appears that the Chewaucan Lake Basin has been used by humans for thousands of years. The time period of human occupation is determined based on the types of artifacts found at a particular site. Specific types of worked points are diagnostic of specific time periods. The cultural chronology of the Chewaucan Lake Basin is shown in Table 3-1.

Tribal consultants have informed the BLM that they were using the formation in the early 1900s before they felt they were closed out of the area by private landowners. Several different families have indicated that they used the area. This would place the use and occupation of the formation into the early 1900s.

Euro-American explorers were known to pass through central Oregon as early as 1825 when Peter Skene Ogden, from the Hudson Bay Company, followed the Crooked River east during a trapping expedition. During the 1840's and 1850's, the westward expansion of emigrating pioneers began; however, as of 1866, the southcentral portion of Oregon was identified as "Klamath or Lutuama Indian Country" (KEC, 1995). Eventually, ranching became established in this portion of Oregon.

TABLE 3-1 CULTURAL CHRONOLOGY OF THE CHEWAUCAN LAKE BASIN

Period	Principal Associated Projectile Point Types	Age*
Pre-Archaic	Great Basin stemmed	11,000 to 7,000 years B.P.
Early Archaic	Northern side-notched	7,000 to 5,000 years B.P.
Middle Archaic (I and II)	II. Elko series	3,000 to 1,500 years B.P.
	I. Elko series/Gatecliff split stem	5,000 to 3,000 years B.P.
Late Archaic (I and II)	II. Rosegate series	1,500 years B.P. to historic
	I. Rosegate and Elko series	
Contact	NA (See discussion below)	1820s - 1830s

Source: KEC, 1995.

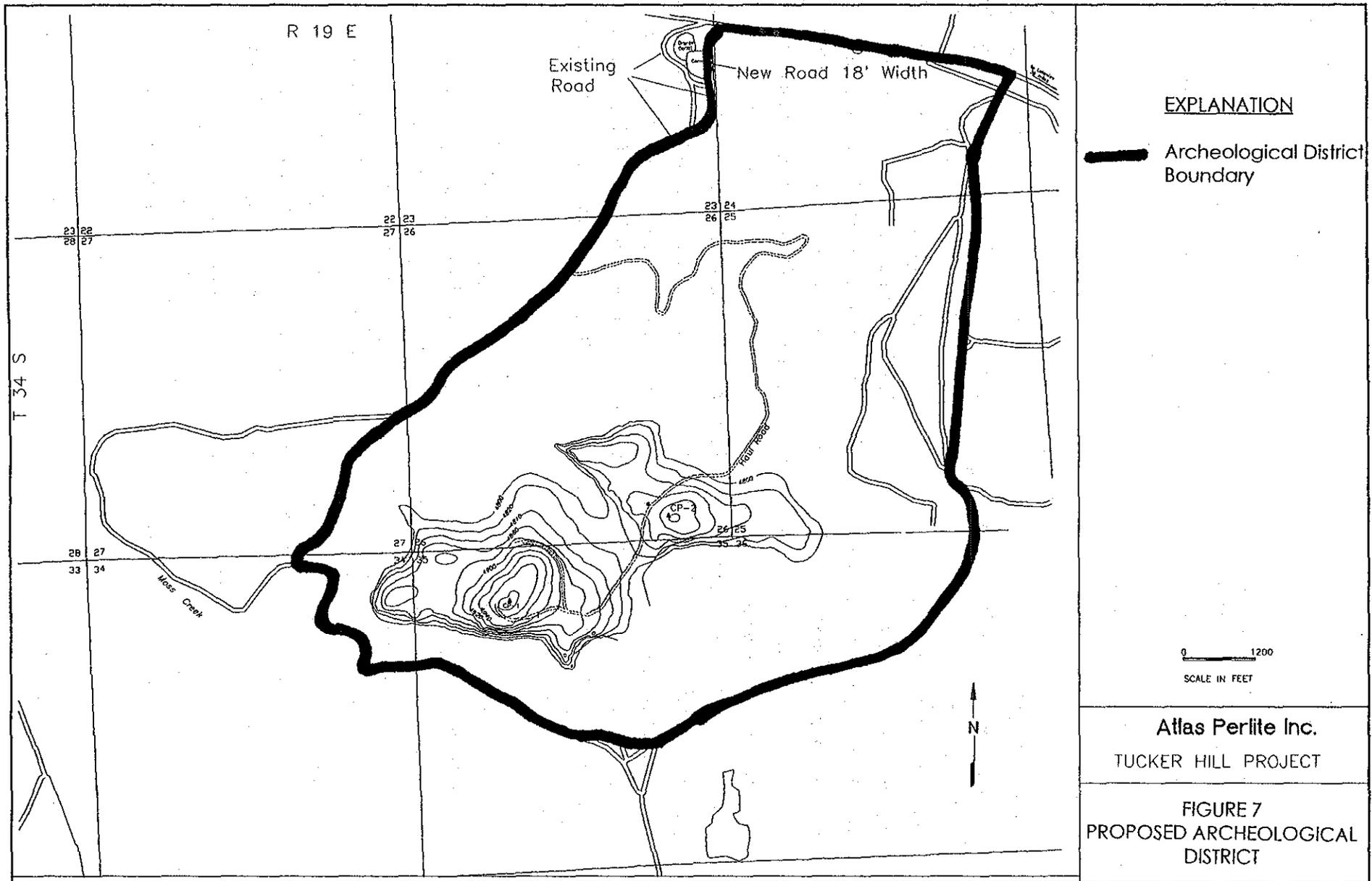
*B.P. = Before Present

During the course of the archeological survey conducted by both the BLM and KEC, numerous cultural resource sites were identified on the Tucker Hill formation. KEC identified 35 cultural resource sites on the top of Tucker Hill and along the access road to Highway 31. Along the bottom of the formation, the BLM survey indicated that the cultural materials are concentrated so densely that it is impossible to distinguish as individual sites. In the past, three archeological sites had been formally recorded around the base of the formation. These sites are within the area surveyed by the BLM. It has been determined that even though none of the sites has yet been formally evaluated for placement on the National Register of Historic Places, the formation of Tucker Hill appears potentially eligible as a National Register Archeological District and potentially eligible as a Traditional Cultural Property.

The Tucker Hill landform was an integral part of the Chewaucan Basin system of resources exploited by aboriginal peoples. One focus of exploitation was undoubtedly the Chewaucan Marsh (presently designated on maps as the Upper and Lower Chewaucan Marsh), including the Chewaucan River which once meandered through it. Available information suggests that one or more permanent villages were located along the Chewaucan River between the (then) western limit of the Chewaucan Marsh and the southern shore of Lake Abert. Numerous other sites have been recorded in the vicinity of the Chewaucan Marsh, and it seems that the sites at Tucker Hill are an important part of this system of aboriginal settlement patterns and subsistence activities.

The eligibility of the area for listing on the NRHP either as an Archeological District, Traditional Cultural Property, and/or Cultural Landscape was identified as an issue for evaluation by BLM staff.

Archeological District - Tucker Hill appears to qualify as eligible for nomination to the NRHP as an archeological district under criteria (d): History of yielding, or potential to yield, information important in prehistory or history as described in National Register Bulletin 38. A formal determination of eligibility will be made as part of the section 106 process as related to the National Historic Preservation Act. BLM policy is to treat potentially eligible properties as eligible until proven otherwise. See Figure 7 for a delineation of the eligible area. The actual nomination process requires a separate report which may be developed at some future time.



EXPLANATION

— Archeological District Boundary

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FIGURE 7
PROPOSED ARCHEOLOGICAL DISTRICT

Traditional Cultural Property - Tucker Hill was reviewed in light of the criteria established by the National Park Service (National Register Bulletin 38). A traditional cultural property is defined generally as one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the community.

Tucker Hill was evaluated against the criteria and appears to meet the test although there is an uncertainty concerning Criteria - Step 2 (1) Does the property have an integral relationship to traditional cultural practices or beliefs? (See Appendix I - Traditional Cultural Property Eligibility Analysis Worksheets 1 and 2.) The concept of integrity of relationship concerns the intrinsic association between the particular property (i.e., Tucker Hill) and a set of traditional beliefs or practices. It could be argued that since Tucker Hill has not been continuously used by the Native Americans that it does not meet this criteria. However, some of the tribal consultants have given reasons for discontinuous use. The formation is also found to be important for the maintenance of the cultural practices and beliefs of the Yahooskin Paiutes, the Klamath Tribe, and the Burns Paiutes and, while each of these groups indicated that the formation had various uses for each of the groups, they all agreed that the formation was a spiritual and religious location of importance for the future practice of their religious beliefs, the teaching of their culture to future generations and the maintenance of their culture. So, while the Native Americans could not show continuous use, they maintained that it was needed for future use within the re-establishment of their former religious practices upon the landscape. Therefore, Tucker Hill is considered to meet the criteria for a Traditional Cultural Property.

Cultural Landscape - The concept of Cultural Landscapes is described in National Register Bulletin 30 or Guideline for Evaluating and Documenting Rural Historic Landscapes. The potential for designation of the Chewaucan River area as a Cultural Landscape was evaluated in response to the proclamations from the Burns Paiute Tribe and the Klamath Tribe that the Chewaucan River Basin, including the marshes and Tucker Hill is sacred. The purpose of designating Cultural Landscapes is to identify areas of historical or cultural importance (i.e., Native American traditional use area) where the integrity of the existing landscape still provides a visual picture of the important historic and cultural features. The landscape of the Chewaucan River Basin has been significantly modified over the years as the marshes have been drained and the area extensively changed for agricultural uses. In reviewing the criteria in Bulletin 30, page 21, which describes the concept of landscape integrity, the area does not appear to meet the criteria or objectives for a National Cultural Landscape.

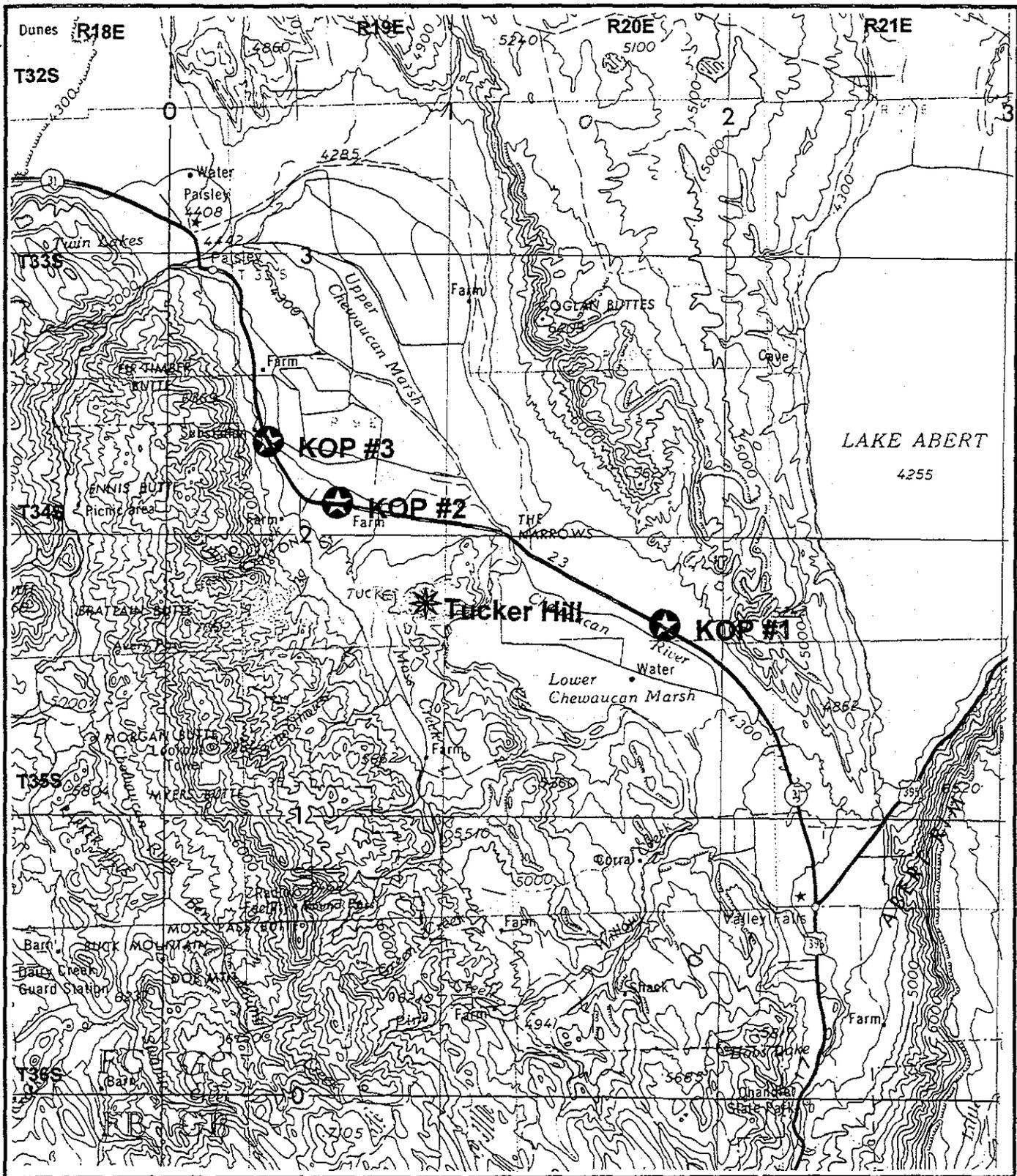
Recreation

Recreation is limited and there are no facilities specifically developed for recreation. Most of the recreation use that occurs in the area is hunting, primarily for upland game birds. There are no developed trails or campsites on Tucker Hill. There is some off highway use of the existing roads both on the Tucker Hill formation and along the base of the hill.

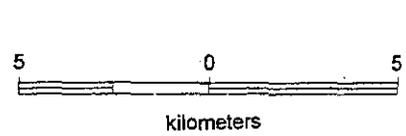
Visual Resources

The grey-green of the hill slopes of Tucker Hill is broken by the darker brown rock outcrops. The rock outcrops create a focal point when viewing the hill. From the east, the Paisley Hills in the background which are in a Class II VRM zone dominate the visual environment. In the foreground, the Lower Chewaucan Marsh is stippled with greasewood, creating a monotonous valley floor cover.

When approaching Tucker Hill from Highway 31 heading to the east, Abert Rim is distant, but visible, in the background. Tucker Hill is the predominant skyline feature. Incised canyons and rock outcrops on the hill provide contrast to the uniform grey-green of the vegetation on the hill. Scattered juniper on the top of the hill create a dotted texture. In the foreground, the agricultural fields and existing outbuildings are a dominant feature of the visual environment. There is an existing road to the top of the formation and test pits from previous exploration activity. Computer generated photographs from three Key Observation Points (KOPs) along Highway 31 are provided in Appendix II. Figure 8 shows the locations of the KOPs.



KOP - Key Observation Point



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FIGURE 8
VISUAL RESOURCES
KEY OBSERVATION POINTS

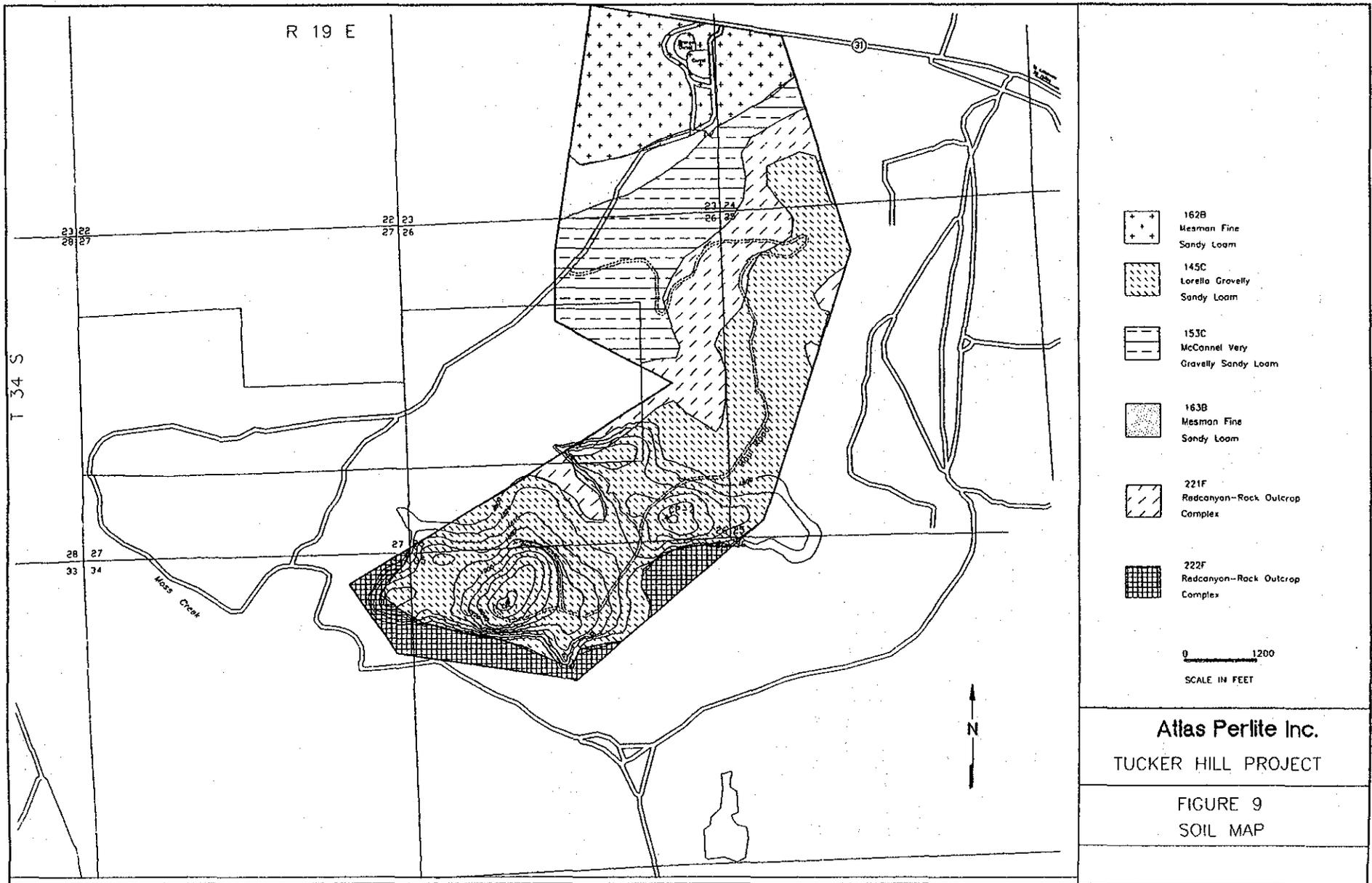
DESIGN BY	DRAWN BY	CH'D BY	SCALE 1" = 5 km	DATE DRAWN 8/95
				REVISION

The BLM has instituted the Visual Resource Management (VRM) system to classify public lands with regard to visual sensitivity. VRM classes describe the degree of modification that is allowed in the landscape. Tucker Hill is within an area that has been classified as a Class III VRM. The objectives of the Class III VRM are as follows:

The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM 1986).

Soils

Preliminary Order III soil survey data is available for the area from the Natural Resources Conservation Service (NRCS) Lakeview Field Office (USDA, NRCS, unpublished). Six soil types have been delineated in the proposed areas of disturbance. The boundaries of these types are shown in Figure 9.



The Lorella Gravelly Sandy Loam (soil 145C) occurs in areas of low precipitation on slopes of 2 to 15 percent. The Lorella series consists of shallow, well drained soils formed in colluvium and residuum from tuff and basalt. They are on sideslopes of hills and mountains. Typically the surface is very dark brown gravelly sandy loam about eight inches thick. The subsoil is dark brown very cobbly clay loam about four inches thick over bedrock. However, these soils over the proposed quarry are more shallow than the typical Lorella Gravelly Sandy Loam.

The McConnel Very Gravelly Sandy Loam (soil 153C) is also found on slopes of 2 to 15 percent. The McConnel series consists of very deep soils formed in gravelly alluvium. They are on fans and lake terraces. Typically the surface is brown very gravelly sandy loam ten inches thick. The upper part of the subsoil is light brownish gray very gravelly coarse sandy loam 12 inches thick. The lower part of the subsoil and substratum to a depth of 60 inches is multicolored stratified very gravelly coarse sand to extremely gravelly loamy sand.

The Mesman Fine Sandy Loam (162B) occurs on slopes from zero to five percent. The Mesman series consists of well drained soils formed in lacustrine sediments. Mesman soils are on low terraces in lake basins. Typically the surface is light brownish gray fine sandy loam about nine inches thick. The upper part of the subsoil is pale brown sandy clay loam about 11 inches thick. The lower part is pale brown silt loam and very fine sandy loam to 60 inches or more. The Mesman Fine Sandy Loam (soil 163B) is the same as soil 162b, but is mildly alkaline as well.

Redcanyon-Rock Outcrop Complex (soil 221F) is found on north slopes of 30 to 50 percent. The Redcanyon series consists of moderately deep, well drained soils formed in colluvium from basalt and tuff. They are on sideslopes of hills and mountains. Typically the surface is brown and dark brown extremely bouldery loam 18 inches thick. The upper part of the subsoil is pale brown extremely bouldery loam 11 inches thick over calcareous light yellowish brown extremely bouldery loam two inches thick.

Rock outcrops consist of exposures of bare, hard bedrock other than lava flows and rock lined pits. They consist mainly of unweathered basalt and andesite, but include some hard sedimentary rock such as sandstone and conglomerate. Some areas are nearly perpendicular cliffs. Rock outcrops have little or no vegetation.

Redcanyon-Rock Outcrop Complex (soil 222F) is the same as soil 221F above, except that it occurs on south slopes.

Table 3-2 shows erosion hazard, flooding frequency, permeability, and suitability for use as roadfill or topsoil.

TABLE 3-2 SELECTED SOIL CHARACTERISTICS

Soil Type	Erosion Hazard		Flooding Frequency	Permeability	Suitability as Roadfill	Suitability as Topsoil
	water	wind				
145C Lorella Gravelly Sandy Loam	very high	high	none	rapid to slow as depth increases	poor, due to depth to rock, shrink-swell	poor, due to depth to rock and small stones
153C McConnel Very Gravelly Sandy Loam	moderate	moderate	none	rapid to very rapid as depth increases	good	poor, due to too sandy, small stones, area reclaim
162B Mesman Fine Sandy Loam	moderate	high	none	rapid to slow as depth increase	fair, restricted by low strength	poor, due to excess salt, excess sodium
163B Mesman Fine Sandy Loam	moderate	high	none	rapid to slow as depth increases	fair, restricted by low strength	poor, due to excess salt, excess sodium
221F Redcanyon-Rock Outcrop Complex	moderate	low	none	slow	poor, due to depth to rock and slope	poor, due to small stones and slope
222F Redcanyon-Rock Outcrop Complex	moderate	low	none	slow	poor, due to depth to rock and slope	poor, due to small stones and slope

Source: NRCS Soil Interpretation Records and personal communication with Max Corning, Resource Conservationist, NRCS.

Range

The project area on Tucker Hill is within the 0409 Tucker Hill Allotment. The MFP and Record of Decision of 1983 allocates 136 AUMs of forage to livestock. In 1993, the permittee agreed to relinquish permitted use in the allotment in exchange for an equivalent increase in permit on another allotment. The Tucker Hill Allotment currently has no grazing preference allocated. Twenty wildlife AUMs are designated within the Tucker Hill Allotment.

Vegetation

At the beginning of the project, plant lists from previous BLM investigations (1991 and 1992) were reviewed. Due to different locations of the surveys, different times of the year when surveys were conducted, and different rainfall responses by the plants, the three separate plant inventories do not completely match. However, the plant list in Appendix III represents the total list from all known plant surveys on the formation.

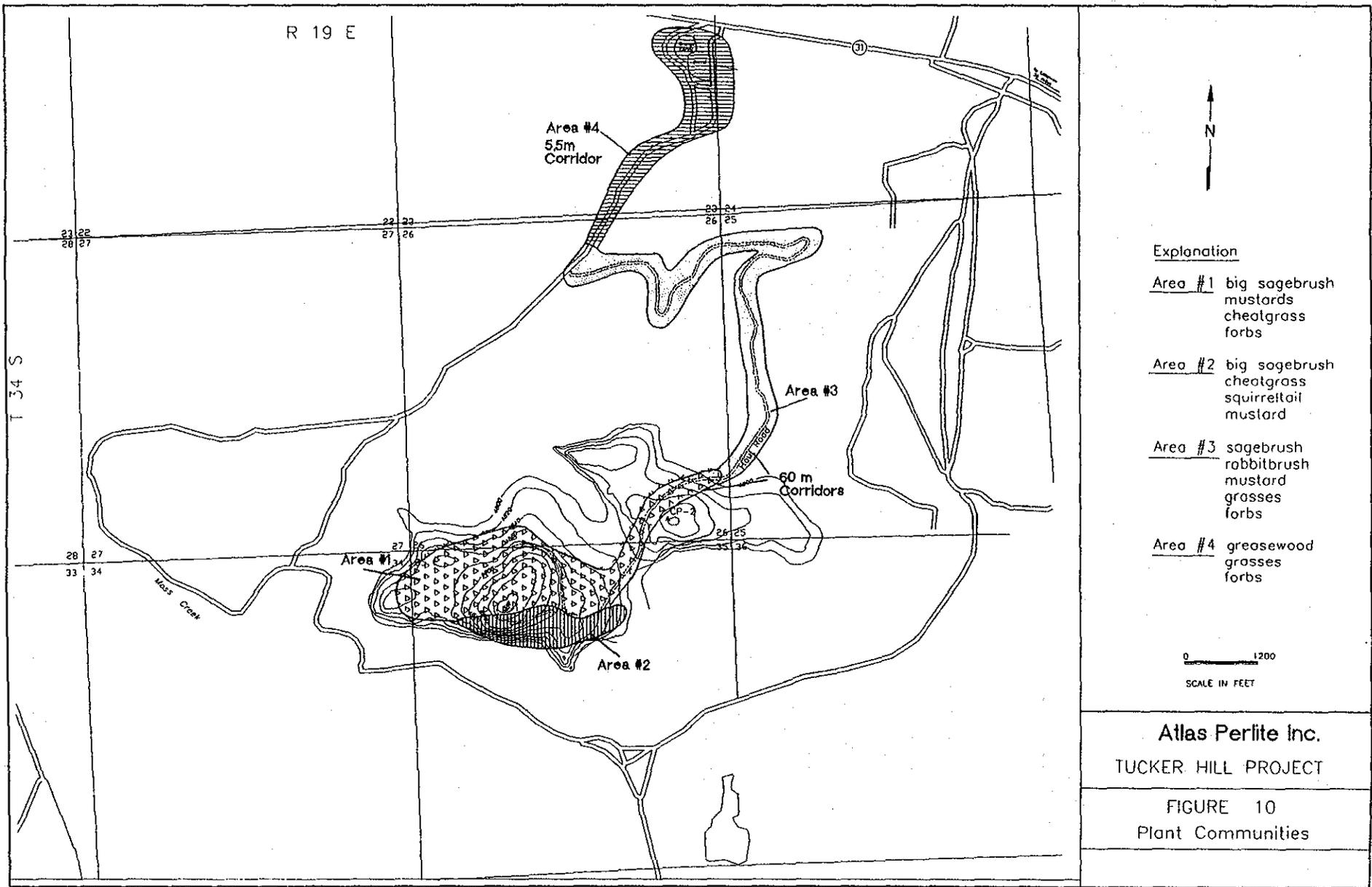
Before any site visits were performed, a search was conducted at the University of Nevada, Reno library for information on all sensitive species thought to be potentially in the area. On the day of the first site visit, the Lakeview BLM office herbarium was reviewed for specimens available for some of the sensitive species. On May 19, 1995 and June 19, 1995, the proposed project area was surveyed by foot and by vehicle. The areas of concern included the top of Tucker Hill and the road leading to Highway 31 (see Figure 10) including that part of the road on private land. Plant lists were compiled and maps were drawn for the plant communities (see Figure 10). A separate report entitled "Vegetation Resources for the Tucker Hill Area, Oregon," by JBR Environmental Consultants, Inc., dated July 7, 1995, is incorporated by reference and is available for review at the Lakeview BLM office. A list of the species found on Tucker Hill is included in Appendix III of this DEIS.

There are three basic plant communities in the area, each with some variation of understory. At the top of Tucker Hill (Area 1 on Figure 10), vegetation is dominated by big sagebrush with an understory of various forbs consisting of native plants and introduced weeds such as mustards and cheatgrass. On the east side, on the top of Tucker Hill (Area 2), vegetation is also dominated by big sagebrush, but the understory consists of more grass than mustard (primarily cheatgrass and squirreltail grass). Areas along previously disturbed roadways and test sites have a high percentage of introduced and weedy species. Located in the rock scree and along the steep, rocky hillsides are gooseberry species, basin wildrye, and *Thelypodium*; snowberry plants are found on an open, rocky slope near the top of the formation and near the south end, which is typical of snowberry locations elsewhere in the region. Due to the shallow depth of the soil on the formation, a large number of forbs would not be expected. However, in the wet springs of 1993 and 1995, a high number of annuals were found growing everywhere on the formation, and even in the roadways.

Closer to the lowlands of the project area (Area 3), sagebrush and rabbitbrush are dominant with an understory of mustards, grasses and a diverse forb cover. This forb cover changes as elevation

changes, with mustards and larkspur at the higher elevations, and white layia and *Astragalus* species at the lower elevations.

Area 4 is dominated by greasewood with an understory of grasses with few forbs.



R 19 E

T 34 S

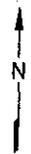
Area #4
5.5m
Corridor

Area #3

60 m
Corridors

Area #1

Area #2



Explanation

- Area #1 big sagebrush
mustards
cheatgrass
forbs
- Area #2 big sagebrush
cheatgrass
squirreltail
mustard
- Area #3 sagebrush
rabbitbrush
mustard
grasses
forbs
- Area #4 greasewood
grasses
forbs

0 1200
SCALE IN FEET

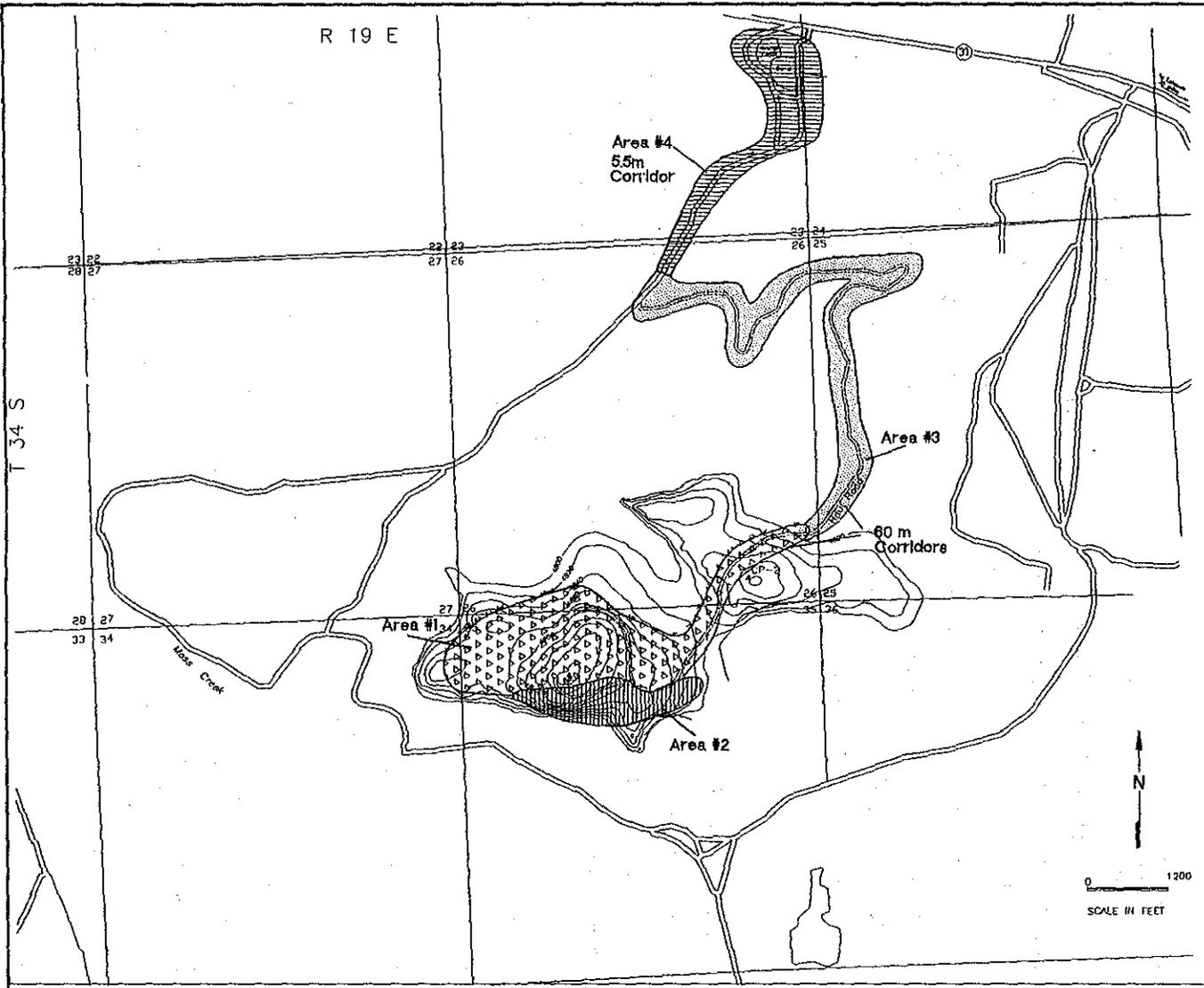
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FIGURE 10
Plant Communities

Culturally Significant Plants

Thirteen culturally significant plants were identified at Tucker Hill by tribal consultants and the BLM ethnobotanist. There is ethnographic documentation for all the listed plant species. Some of the plants occur only in the proposed quarry site, while others are scattered throughout the formation (see Figure 11). There is no evidence, however, that any of these plants has a limited range, or that Tucker Hill is a single source for these plants. Plants identified as culturally significant for food and fiber at Tucker Hill include:

Sego Lily	<i>Calochortus macrocarpus</i> Dougl.
gray desert parsley/biscuit root	<i>Lomatium macrocarpum</i>
desert celery	<i>Lomatium nevadense</i>
Canby's desert parsley	<i>Lomatium canbyi</i>
spiked wheat grass	<i>Agropyron spicatum</i>
Indian onion	<i>Allium parvum</i>
big sagebrush	<i>Artemisia tridentata</i>
Great Basin wild rye	<i>Elymus cinereus</i>
juniper	<i>Juniperus occidentalis</i>
Indian asparagus	<i>Orobanche fasciculata</i>
squaw currant	<i>Ribes cereum</i>
white-stemmed stickleaf	<i>Mentzelia albicaulis</i>
tumble mustard	<i>Sisymbrium altissimum</i>



Explanation

- Area #1** big sagebrush
 Canby's Desert Parsley
 desert celery
 gray desert parsley/
 biscuit root
 Great Basin wild rye
 Indian asparagus
 Indian onion
 western juniper
 Sego Lily
 squaw currant
 blue bunch\spiked
 wheat grass
 tumble mustard
 white stemmed stickleaf
- Area #2** big sagebrush
 Canby's Desert Parsley
 desert celery
 gray desert parsley/
 biscuit root
 Great Basin wild rye
 Indian asparagus
 Indian onion
 western juniper
 blue bunch\spiked
 wheat grass
 tumble mustard
- Area #3** big sagebrush
 Indian asparagus
 Indian onion
 Sego Lily
 tumble mustard
- Area #4** big sagebrush
 Indian asparagus
 tumble mustard
 white stemmed stickleaf

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FIGURE 11

Culturally Significant Plants

Threatened, Endangered and Sensitive Plant Species

Symphoricarpos longiflorus (fragrant snowberry) has been located on the south side of Tucker Hill, 1,200 feet south of the existing access road. The species is commonly associated with pinyon-juniper woodlands and limestone slopes. The species was found with scattered, sparse juniper (no pinyon), at an elevation of approximately 4,950 feet which would put it at the lower edge of its habitat range (4,500 to 7,000 feet). *Symphoricarpos longiflorus* is an Oregon Natural Heritage Program List 2 species (Threatened or Endangered in Oregon, more common or stable elsewhere).

Noxious Weeds

No noxious weeds were found on the site during site visits. BLM policy as described in BLM Manual 9015, *Integrated Weed Management*, requires that ground disturbing projects that alter plant communities be evaluated to determine the risk of introducing noxious weeds. The process as described in BLM Manual 9015 was followed, and a low probability of introducing noxious weeds was determined. This is based on the fact that no noxious weeds were identified during the plant surveys, there are no known populations of noxious weeds on the Tucker Hill formation, and the nearest known populations of noxious weeds are found six miles (Medusa head rye, Canadian and bull thistle) and eight miles away Mediterranean sage.

Air Quality

Tucker Hill Quarry Site

The air quality in undeveloped areas of Oregon is generally very good. EPA considers the air quality in the quarry area "unclassified" because no air quality data is available for this area. The Oregon Department of Environmental Quality (DEQ) considers the quarry area to be "in attainment" because there is no data suggesting non-attainment of any of the agency's defined air quality standards (personal communication, Larry Caulkins, DEQ). Neither agency expressed concern about air quality in the quarry area of the proposed operation.

Lakeview Processing Site

The air quality in the area of the proposed processing site north of Lakeview has been designated as the "Lakeview PM₁₀ Non-Attainment Area" by the EPA and the DEQ. A non-attainment area is an air quality control region in which the EPA has determined that ambient air concentrations exceed the National Ambient Air Quality Standards (NAAQS) for one or more criteria pollutants. The Lakeview area exceeds the NAAQS for particulates less than or equal to ten micrometers in size (PM₁₀). The NAAQS for PM₁₀ is 50 micrograms per meter on an annual average, and 150 micrograms per cubic meter on a 24 hour average. In the winter, much of the PM₁₀ pollution in the

Lakeview Non-Attainment Area is attributed to residential wood-burning stoves used as a source of heat. However, PM₁₀ pollution has been observed in levels exceeding NAAQS throughout the year as a result of industrial sources.

Atlas applied for and received the Air Contaminant Discharge Permit from the Oregon Department of Environmental Quality for this project. Permit No. 19-0001 was issued to Atlas Perlite, Inc. May 16, 1995.

Wildlife

Habitat present in the project area includes big sagebrush, rabbitbrush and greasewood. These vegetation communities represent breeding habitat for small birds, mammals and reptiles and foraging habitat for raptors and larger mammals. Mule deer (*Odocoileus hemionus*) utilize Tucker Hill as wintering habitat, and antelope (*Antilocapra americana*) may winter on the surrounding flats, particularly in the alfalfa fields to the west of the hill. Ten deer were observed and considerable deer sign was noted on or near the hill during a late February 1995 field visit. Sage grouse (*Centrocercus urophasianus*) utilize nearby areas, and may make infrequent use of the hill itself. However, no birds or pellets were found on the hill during these surveys. At least three strutting grounds exist within several miles of Tucker Hill. The closest of these is located approximately five miles south of the hill. Sage grouse are known to rear broods in and near the Chewaucan Marsh (personal communication, Larry Conn, Oregon Department of Fish and Wildlife).

Chukar (*Alectoris chukar*) have been heard calling on the hill, and two birds were observed on the hill in late February. Both of these species utilize wet meadows and riparian sites as brood rearing habitat. No water sources or wet meadow habitats occur on Tucker Hill.

Cliffs surrounding portions of Tucker Hill represent raptor and raven (*Corvus corax*) nesting habitat. Raptors known to nest locally include golden eagles (*Aquila chrysaetos*), prairie falcons (*Falco mexicanus*) and barn owls (*Tyto alba*). Canada geese (*Branta canadensis*) have also been recorded nesting on cliffs on Tucker Hill. Raptors may begin to frequent nest sites as early as mid-February, in the case of golden eagles. Prairie falcons usually arrive on territories by late February or March. In 1995, both these species were observed on or near nest sites on February 28. Northern harriers (*Circus cyaneus*) also hunted the hill and soared over the cliff faces. Northern harriers would be expected to nest in the nearby Chewaucan Marsh, as opposed to the cliffs of Tucker Hill. Large owl pellets, probably left by a great horned owl (*Bubo virginianus*), were found below one cliff face. As the year progresses, American kestrels (*Falco sparverius*) would also be expected to nest in the cliffs

and outcrops surrounding Tucker Hill. Red-tailed hawks (*Buteo jamaicensis*) may also nest on cliff faces of the hill. The raptor nesting season may extend through June, by which time young would fledge from nests. In most years, prairie falcons, for example, would be expected to establish territories by mid-March, and fledge young by approximately mid-June.

Consecutive raptor nesting surveys were conducted on Tucker Hill from 1978 through 1984. Based upon these data, a single golden eagle pair nests on the hill, though these birds may alternate between a nest on Tucker Hill and some other site. The Tucker Hill nest was active during four of the seven years between 1978 and 1984. The nest was not active in 1989 but a bird was observed on a nest in late February 1995. At least five prairie falcon nest sites have been found on cliffs bordering Tucker Hill. During the 1978 to 1984 surveys (excepting 1982, when not all nests were surveyed) an average of about two prairie falcon nests were active on the hill annually. Three barn owl (*Tyto alba*) nests were found on the hill in 1980.

Other wildlife present in the area includes small mammals and small and medium-sized carnivores. Coyotes were heard in the area, and two coyote and two bobcat skeletons were found in close proximity near the top of the hill. These remains may have been left by one of the area's fur trappers. The sagebrush and juniper habitats present on Tucker Hill represent potential nesting habitat for such passerine species as western meadowlarks (*Sturnella neglecta*), sage thrashers (*Oreoscoptes montanus*) and sage and Brewer's sparrows (*Amphispiza belli* and *Spizella breweri*, respectively). Most of these species would be expected to migrate out of the area during the winter season. Mountain bluebirds (*Sialia currucoides*), Townsend's solitaires (*Myadestes townsendi*) and northern flickers (*Colaptes auratus*) were present in the area in late February, particularly in association with juniper trees. In addition to raptors and Canada geese, rock doves (*Columba livia*) and cliff swallows (*Hirundo pyrrhonota*) also nest on the cliff faces bordering Tucker Hill. Rock wrens (*Salpinctes obsoletus*) frequent the cliffs and other outcrops.

In wet years, Chewaucan Marsh represents important waterfowl and shorebird nesting and foraging habitat. In these wet years, Canada geese, mallards, and cinnamon and blue-winged teal nest in the marsh. Shorebird species also nest in the marsh during wet years. American avocets, black-necked stilts and killdeer are common residents. The candidate, category 2 white-faced ibis nests in the marsh during wet years (see Threatened, Endangered and Sensitive Species, below).

Threatened, Endangered, and Candidate Wildlife Species

The federally listed bald eagle (*Haliaeetus leucocephalus*), currently listed as an endangered species (proposed for down-listing to threatened), occurs in the area. Three winter roosts exist several miles to the west of the project area. The nearest is located somewhat more than three miles from the area. Bald eagles forage in the Chewaucan Marsh. Bald eagle numbers usually peak in late winter or early spring, when up to 17 birds have been recorded in the marsh (personal communication, Vern Stofleth, BLM). Peak numbers recorded in 1995, as of late February, were eight adult and four young birds. The federally listed endangered peregrine falcon (*Falco peregrinus*) is known to nest to the north of the Tucker Hill area. Peregrine falcons have been hacked (raised and released to the wild) near Winter Rim, approximately 25 miles to the northwest of Tucker Hill. Peregrines may occasionally forage over the Chewaucan Marsh.

Habitat present in the Tucker Hill project area may support a small number of candidate, category 2 species (species which may warrant listing as threatened or endangered, but for which sufficient biological information necessary to support a rule to list is lacking). Pygmy rabbits (*Brachylagus idahoensis*) occur in tall or dense sagebrush and rabbitbrush growing in deep soils. Such habitat occurs around the base of Tucker Hill, though pygmy rabbits have not been recorded in the area. Inventory work on this species conducted in the early 1980s found pygmy rabbits occurred at several Lake County locations to the east and north of Tucker Hill (Weiss and Verts, 1984). The nearest of these locations are over 40 miles from Tucker Hill (in T28N R15E or in T35N R26E). Evidence of pygmy rabbits was not detected during late February 1995 surveys, and the sagebrush habitats present are relatively open. Preble's shrew (*Sorex preblei*) has been recorded in marshy habitats, particularly in association with willows. This shrew has also been found in moist and dry woodland habitats and in moist mixed conifer and sagebrush areas. Such habitats occur near, but not on, Tucker Hill. In 1980, the BLM analyzed prey remains present in 200 barn owl pellets collected on Tucker Hill. The remains of six Merriam's shrews (*Sorex merriami*) represent the only evidence of shrew species found in these pellets.

The western sage grouse (*Centrocercus urophasianus phaios*), a recent addition to the candidate list, occurs in the area. This species is discussed under wildlife, above. No evidence of sage grouse was found on Tucker Hill during February 1995 field surveys.

The northern sagebrush lizard (*Sceloporus graciosus graciosus*), another recent addition to the candidate list, may occur in the area. The species has been reported from Lake County (Nussbaum et al., 1983). This lizard generally inhabits sagebrush habitats, but also occurs in mountain brush

and forested areas. According to Stebbins (1985), "requirements seem to be good light, open ground, and scattered low bushes." The species is primarily a ground dweller. Stebbins states that to the west of the Great Basin, this species generally occurs at higher elevations than the western fence lizard (*Sceloporus occidentalis*), but that at intermediate altitudes, the range of these two species may overlap. The proposal to list this species originated in the Dakotas (personal communication, Robin Hamblin U.S. Fish and Wildlife Service). Several western sources were contacted regarding local populations. Dr. Ron Panik (Western Nevada Community College, Carson City, Nevada) was not aware of population declines in Nevada. Dr. Robert Storm (Oregon State University, Corvallis) thought good populations occurred in suitable habitats in Oregon, though some displacement by western fence lizards could be occurring. Dr. Richard Wallace (University of Idaho, Moscow) was also not aware of recent declines, though he did identify off-road vehicle use as a potential problem. One of Dr. Wallace's students, Lowel Diller, felt land conversions (from a native sagebrush type) could represent a threat. Nussbaum et al. (1983) state the species is one of the northwest's more common lizards.

Several candidate bat species may utilize crevices in the cliffs on Tucker Hill as roosting sites. Several candidate or sensitive shorebird species utilize the Chewaucan Marsh, including the greater sandhill crane (*Grus canadensis*) and the white-faced ibis (*Plegadis chihi*). The Oregon Lakes tui chub (*Gila bicolor oregonensis*) (also known as XL spring tui chub) and the interior redband trout (*Oncorhynchus mykiss gibbsi*) occur in waters of the Chewaucan drainage.

Land Uses/Access

The proposed access to the Tucker Hill Quarry crosses 0.8 mile of private lands owned by Simplot Company, which is operated as a cattle ranch. Atlas acquired permission to use and/or improve the road where it crosses private lands. Non-roaded access to Tucker Hill is available to the public as public lands extend to Highway 31, where visitors can park and hike to various points of Tucker Hill. Land status within the vicinity of the proposed project is shown on Figure 2.

Socioeconomics

Population

Population for the Lake County and Lakeview area has increased over the last five years. Table 3-3 shows population figures from the 1960 through 1990 Censuses. As of July 1, 1994, the population of Oregon had grown to 3,082,000; the population of Lake County has grown to 7,400; and the population of Lakeview, the county seat, had grown to 2,575 (Wineberg, 1995). However, the population trend over the last 34 years has been relatively stable.

TABLE 3-3 POPULATION FROM 1960 - 1994

	1960	1970	1980	1990	1994*
Lake County	7,158	6,343	7,532	7,186	7,400
Lakeview	3,260	2,705	2,770	2,526	2,575

Source: Portland State University, Center for Population Research and Census

*Source: Wineberg, 1995.

Employment

In 1990, unemployment for the town of Lakeview was considerably higher than the state average (10.00 percent as compared to 6.20 percent). In the 1990 Census, occupations are broken into the following categories: managerial and professional specialty; technical, sales, and administrative support; service; farming, forestry, and fishing; precision production, craft, and repair; and operators, fabricators, and laborers. For Lake County, the highest percentage of employees are in the category of technical, sales, and administrative support occupations, followed by managerial and professional specialty occupations. For the town of Lakeview, the highest percentage was found in managerial and professional specialty occupations, followed by technical, sales, and administrative support occupations. Principal industries in the town of Lakeview are lumber and wood products, agriculture, and government (Oregon Employment Department, 1993).

The per capita income for the state was higher than that for the county (by \$2,187) and the town of Lakeview (by \$2,133). Incomes for the county and the town were nearly equal (a difference of only \$54).

Housing

Table 3-4 shows housing information from the 1990 Census for the state of Oregon, Lake County, and the town of Lakeview. Currently, housing is relatively available in the town of Lakeview. There are an average of six to 10 rental properties at any given time. In addition, there are generally 20 to 30 houses, ranches, and mobile homes for sale at any given time. There is a mobile home dealership in town and an average of seven to 10 mobile home lots available at any given time. The community is relatively stable and turnover is low. However, there are also four motel/lodges in the area that rent by the month during the winter season (personal communication, Virginia Vernon, High Country Real Estate).

TABLE 3-4 1990 CENSUS FIGURES FOR HOUSING

Category	State of Oregon	Lake County	Lakeview Town
HOUSING			
Housing units	1,193,567.00	3,434.00	1,145.00
Total occupied housing units	1,103,313.00	2,765.00	1,010.00
Total vacant housing units	90,254.00	669.00	135.00
Homeowner vacancy rate	1.40	3.60	3.50
Rental vacancy rate	5.30	10.20	10.20

Education

There are eight schools in Lake County, three of which are in the town of Lakeview. All the schools outside Lakeview include grades K-12. In Lakeview, Fremont and Hay are combined to serve grades K-6, Daily Middle School serves grades 7-8, and Lakeview High School serves grades 9-12 (personal communication, Michele Totten, Lake County ESD).

Fire Control and Law Enforcement

Lakeview has two fire districts: Lakeview Fire District and Lakeview Rural Fire District. Included among these are one fire station, four fire engines, six paid full-time and one part-time fire personnel, one paid fire chief, and 35 to 40 volunteers (also with two fire engines). Of these, the six paid full-time and the one part-time employees also serve as 911 dispatchers for fire control and law enforcement (personal communication, Dennis Morrill, Lieutenant, Lakeview Fire District). The Lakeview Interagency Fire Center is responsible for fire suppression at Tucker Hill.

Law enforcement for Lakeview is provided by the Lakeview Police Department, the Lake County Sheriff's Office, and the Oregon State Police. The Lakeview Police Department has five officers, 15 reserve officers, and one station. Dispatch is handled by fire department personnel (personal communication, Dennis Morrill, Lieutenant, Lakeview Fire District).

The State Police has an office in Lakeview as well which acts as an outpost for the Medford Office and includes one sergeant, three patrol officers, and one game officer (personal communication, Dennis Morrill, Lieutenant, Lakeview Fire District).

Emergency 911 service includes parts of Crook, Deschutes, and Modoc Counties as well as Lake County (personal communication, Dennis Morrill, Lieutenant, Lakeview Fire District).

As the county seat, Lakeview is also home to the only correctional facility for Lake County. It includes fourteen beds, eight full-time corrections officers, one full-time cook, and two part-time cooks. The facility averages eight inmates, and has been above capacity many times. In another section of the same building is the courthouse and also the Sheriff's Office. The Sheriff's Office includes three rural deputies, one civil process deputy, and one sheriff (personal communication, Deputy Simpson, Lake County Sheriff's Office).

Health Care

The Lake District Hospital and Long Term Care Facility in Lakeview has full outpatient services and a Trauma 4 designation allowing it to treat most forms of trauma. For trauma it cannot treat, there are heliport and ambulance services available. There are 21 acute beds and 47 skilled nursing beds at the hospital. Of these, an average of 5.2 acute beds and 35 skilled nursing beds are occupied each day. Staff includes four doctors (with two more planned to be hired in October), 20 acute care Registered Nurses (RNs), seven long-term care RNs, and five Licensed Practitioner Nurses (LPNs) (personal communication, Linda Michaelson, Administrative Assistant, Lake District Hospital and Long Term Care Facility).

The ambulance corps of Lakeview includes three ambulances and 30 volunteers at the EMT1 or EMT2 (first responder) level. The corps can provide basic life support, but the ambulances are not designed for advanced life support. They serve parts of Oregon, California, and Nevada (personal communication, Dennis Morrill, Lieutenant, Lakeview Fire District).

Utilities

Power for Lakeview and outlying areas is provided by Pacific Power and Light. The current system is not near capacity and could easily absorb new demands, be they residential, commercial, or industrial. There is no natural gas supplied to the town, but there is a limited use of propane (personal communication, Richard Booth, General Business Manager, Pacific Power and Light).

Water availability for the area is also not near capacity and could handle a 10 to 15 percent increase with no new development (personal communication, Darryl Anderson, Lakeview City Engineer, Anderson Engineering).

Noise

A description of the environment potentially affected by noise levels from the proposed project includes identification of noise-sensitive receptors, existing noise sources in the area, characterization of natural features that may affect noise transmissions, and estimation of existing noise levels. Noise is defined as sound that bears no information and whose intensity usually varies randomly with time; noise is often considered to be unwanted sound (Olishifski and Standard, 1988).

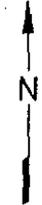
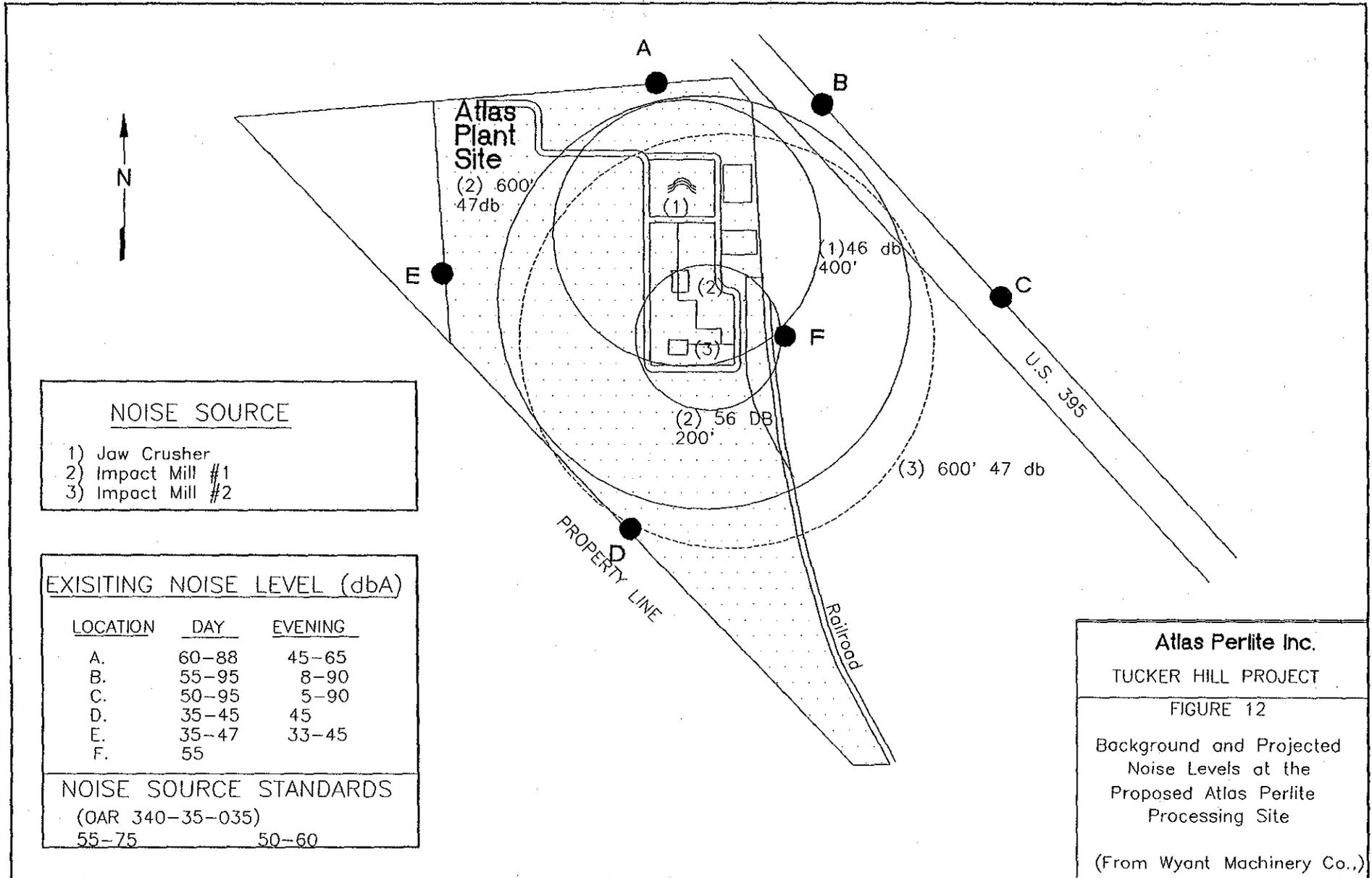
The decibel (dB) is the unit for measuring sound. One decibel is the minimum difference in loudness that is usually perceptible under controlled audiometric testing conditions; the minimum difference in loudness most people with normal hearing ability can detect is two to three dB. The human ear does not respond linearly to all frequencies of sound and is generally less sensitive to low frequency sounds, particularly those below 1000 Hertz (Hz, cycles per second). Weighting networks are incorporated into sound level meters to allow the meter to respond to some frequencies more than others. The very low frequencies are severely discriminated against by the A-weighting network which is designed to simulate human hearing. A-weighted sound levels are designated dBA. The C-weighting network (dBC) introduces only minor discrimination against low frequencies.

Tucker Hill Quarry Site

The nearest receptors to Tucker Hill are ranches near the site. Baseline noise levels at these ranches have been estimated based on published information for typical average day and night sound levels for various population densities. In small rural communities and areas such as these ranches, baseline noise levels would be expected to range from 33 to 50 dBA, with nighttime noise levels at the lower end of the range (Cunniff, 1977). Higher sound levels may occur occasionally as a result of recreational activities in the area and transient noise sources. Baseline noise levels at the quarry site on Tucker Hill have not been measured, but values have been estimated to be consistent with ambient noise levels occurring in a rural community with adjacent recreational spaces.

Lakeview Processing Site

Baseline noise levels at six locations adjacent to the site of the proposed processing facility have been determined to range from 35 to 95 dBA, as shown on Figure 12. Noise levels are highest along U. S. Highway 395 and County Road 2-18C. Traffic is the greatest noise contributor along these roads although other noise sources include industrial and commercial facilities in the area and ambient sounds resulting from small town environments. Noise levels at the six locations are lower at night when activity levels decline.



NOISE SOURCE

- 1) Jaw Crusher
- 2) Impact Mill #1
- 3) Impact Mill #2

EXISTING NOISE LEVEL (dba)

LOCATION	DAY	EVENING
A.	60-88	45-65
B.	55-95	8-90
C.	50-95	5-90
D.	35-45	45
E.	35-47	33-45
F.	55	

NOISE SOURCE STANDARDS
(OAR 340-35-035)

55-75	50-60
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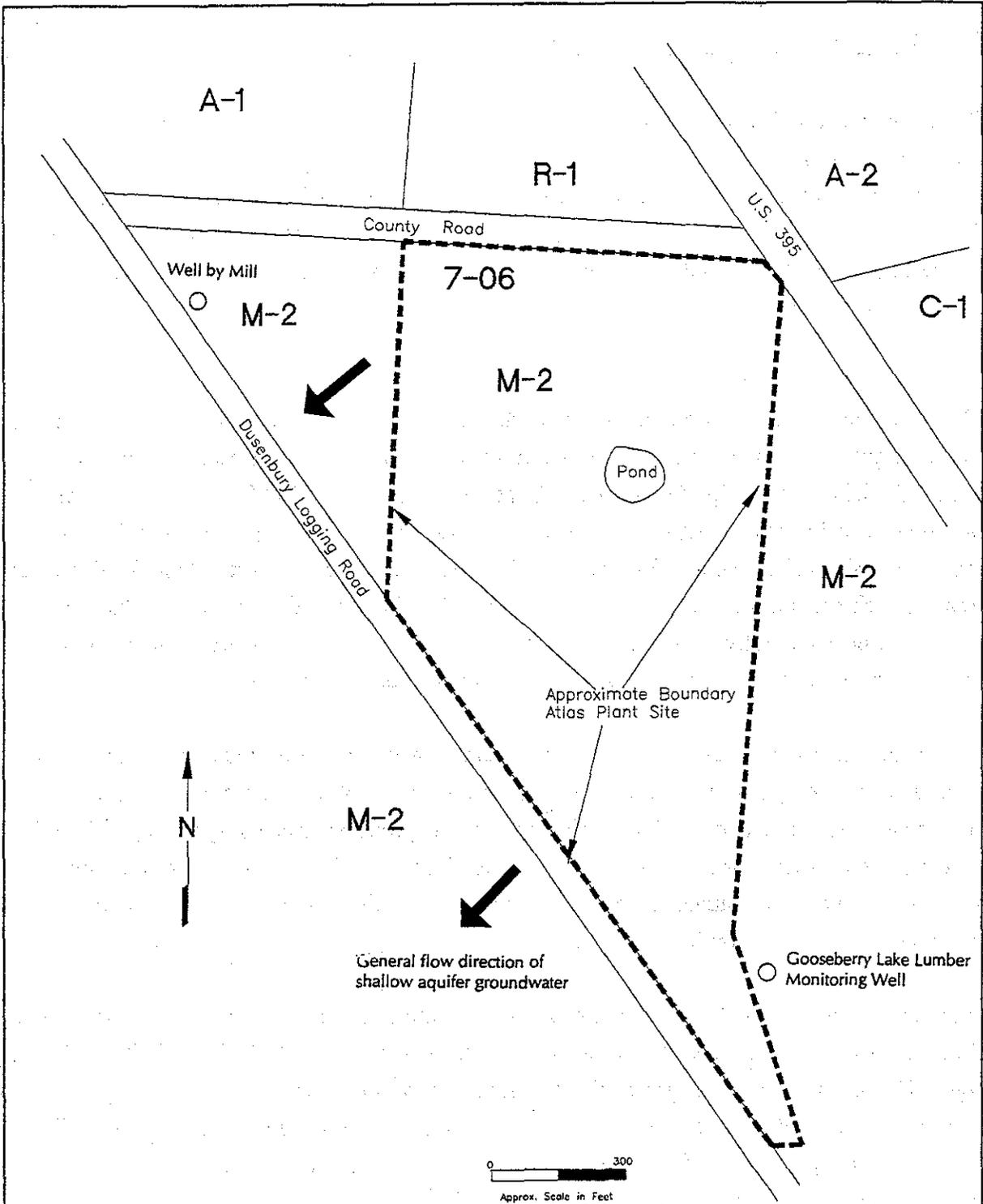
Atlas Perlite Inc.
TUCKER HILL PROJECT

FIGURE 12

Background and Projected
Noise Levels at the
Proposed Atlas Perlite
Processing Site

(From Wyant Machinery Co.,)

The zoning classification of properties adjacent to the proposed site are shown in Figure 13. A residential zone (R-1) is located north of County Road 2-18C, just north of the proposed processing facility site. This area may be considered a "noise sensitive property" as defined by the Oregon Department of Environmental Quality (ODEQ) Noise Control Regulations [340-35-015(38)]. The nearest noise sensitive receptor is in excess of 400 feet from the proposed location of the noise generating processing equipment. The other adjacent properties are not noise sensitive.



Explanation

- A-1 Exclusive Farm Use
- A-2 Agricultural Use
- C-1 Commercial Use
- M-2 Heavy Use Industrial
- R-1 Rural Residential
- 7-06 Taxing District

Atlas Perlite Inc.

TUCKER HILL PROJECT

FIGURE 13

Zoning, Nearby Groundwater
Wells, and General Groundwater
Flow Direction Map

Groundwater and Water Quality

Tucker Hill Quarry Site

The Tucker Hill quarry site is situated on a low hill located over 300 feet above any surface waters. The site is relatively arid and receives only 10.25 inches of precipitation per year. The water table is relatively deep. Additionally, no surface waters, other than intermittent waters from storm events, exist at the quarry site.

Lakeview Processing Site

Abundant shallow groundwater is present at the processing facility at depths as little as five feet below the ground surface. The groundwater occurs under unconfined and semi-confined conditions within alluvial and lacustrine deposits (U.S. Department of Energy [D.O.E.], 1985). The well which would be used for processing operations is an artesian well which produces water from a lower, semi-confined aquifer. Hunter Hot Springs is located about 0.4 miles north of the facility, and the area has high subsurface heat flow. Some wells in the vicinity of the plant are geothermal (up to 173°F) and have naturally poor water quality; however, the onsite production well is not known to be geothermal (personal communication, Larry Gorell, Atlas Perlite, Inc.).

A uranium processing facility was formerly located at the proposed Lakeview processing site. Tailings from the facility were deposited in a tailings pile and in evaporation ponds which were located between 1,800 and 4,300 feet to the west of the proposed processing facility. The tailings were removed to an off-site location after it was discovered that leachate from the tailings had produced a contaminant plume in the shallow groundwater which contained elevated concentrations of sulfate, antimony, chromium, iron, cadmium, and manganese.

The potentiometric surface map of the area's shallow groundwater aquifer shows a groundwater flow direction "from northeast to southwest under a hydraulic gradient of 0.01" (U.S. D.O.E., 1985; see Figure 13). Both the proposed processing facility and two wells located on or near the property are located in an up-gradient direction of the former contaminant plume, and impacts to the wells from the contaminant plume would not be expected. At least 97 other wells were located within a two-mile radius of the proposed Lakeview processing facility; however, only three of the wells were located down-gradient (U.S. D.O.E., 1985). Two of these wells were deeper domestic wells located 7000 feet down-gradient of the tailings. The shallow saturated zone (above 30 feet) down-gradient (southwest) of the tailings site was not used as a source of groundwater (U.S. D.O.E., 1985), and groundwater from deeper aquifers did not exceed metal standards and had lower sulfate values.

Water quality samples were recently collected from the two wells nearest the proposed processing facility. Analytical results of both water samples are provided in Table 3-5. The "well by mill" is located immediately west of the proposed processing facility, while the "Goose Lake Lumber monitoring well" is located south of the facility (see Figure 13). The sample analytical results show that levels of iron and manganese are present in the water samples which exceed drinking water standards; however, sulfate, chromium and cadmium associated with the tailings pile and evaporation ponds were either not detected or were present in very low concentrations. The source of the elevated iron and manganese concentrations in the two wells has not been determined, but may be related to the input of geothermal fluids or other natural sources. No other contaminants were detected in levels which exceed MCLs or Guidance Levels.

TABLE 3-5 ONSITE WATER PRODUCTION WELL WATER QUALITY ANALYSIS

Substance	Well by Mill (mg/l)	Goose Lake Lumber MW (mg/l)	Guidance Level or MCL* (mg/l)
pH	6.73	6.75	6.0 to 9.0
Hardness	56.8	90.3	250
TDS	298	271	500
Sulfate	5	10.5	250
Nitrate	N.D.*	0.11	10
Iron	0.69	2.72	0.3
Manganese	0.321	0.64	0.05
Zinc	0.432	N.D.	5
Copper	N.D.	0.017	1.3
Arsenic	N.D.	0.0034	0.05
Cadmium	0.0003	0.0003	0.004
Lead	0.003	0.004	4
Chromium	N.D.	N.D.	0.1
Mercury	N.D.	N.D.	0.002
Fluoride	0.24	0.07	4
Selenium	N.D.	N.D.	0.05

*MCL = Maximum Contaminant Level; N.D. = Not Detected

Health and Safety

The following discussion, although not technically a description of the existing environment, is included to provide basic information about perlite in order to evaluate any potential health risks that might be associated with the perlite operation.

Perlite is a specialized type of high-silica rhyolite, and dust produced during processing can be a contributor to lung disease (silicosis). As discussed by Kadey, 1983 (Industrial Minerals and Rocks, 5th Edition, S.J. Lefond, Ed., Chapter on Perlite):

"Perlite per se is not known to present a health hazard either in the mining, milling, or processing of the material. As a glass, it is amorphous and regarded as innocuous. Most environmentally conscious companies, however, consider all dusts to be a nuisance, and in this regard, protect their workers with dust masks and practice dust control at considerable cost. Furthermore, as an abrasive and glassy material, crude and expanded perlite dust can be a serious irritant to the eyes and safety glasses are a necessity in the quarry and in the plant.

"With the recent emphasis on pollution of the environment, any operation that emits dust is suspect. Blasting, crushing, screening, and expansion of perlite are all dusty operations. Most perlite deposits are located in remote places and are not likely to cause complaints. The expansion of perlite is usually carried out in populated and industrial locations so dust collection and waste disposal problems must be recognized and dealt with effectively."

Atlas tested the quarry for crystalline silica and, based on current information, crystalline silica does not appear to be a concern for the Tucker Hill operation.

Oregon Department of Transportation studies for 1993 indicated Average Daily Traffic was 1,000 vehicles near the US 395 and Highway 31 junction (Valley Falls area) and 730 vehicles near the Clover Flat Road which is just northwest of the project area. Access from the haul road onto Highway 31 is on a straightaway and should not present any unusual safety problems.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

The following resources and/or critical elements of the human environment as described in the BLM NEPA Handbook, H-1790-1, Appendix 5 are not present or are not affected by the proposed action or alternatives and therefore, are not discussed in the evaluation of effects associated with the proposed action and alternatives to the proposed action:

- Areas of Critical Environmental Concern
- Aquatic Resources
- Farm Lands (prime or unique)
- Floodplains
- Forest Resources
- Hazardous Materials
- Other Minerals
- Paleontological Resources
- Wetlands/Riparian Zones
- Wild Horses
- Wild and Scenic Rivers
- Wilderness

The following discussions focus on the direct and indirect impacts of the proposed action and the alternatives, including the No Action alternative.

ALTERNATIVE A - PROPOSED ACTION

Native American Concerns

Potential direct and/or indirect impacts of the project are generally associated with the physical archeological features found on Tucker Hill and the use of the area by Native American peoples for traditional uses. While no direct evidence of current use of the formation specifically for religious uses has been identified, it is considered a sacred location by some of the Native American consultants. They have expressed a desire to use the formation in the future and state that it is important for the maintenance of their cultural and spiritual values.

The impact of the project on the archeological resources is described in the Cultural Resources section of this chapter. Although there are several cultural sites within the area of direct impact, the significance of these sites has not been formally evaluated using the process set forth in 36 CFR 800, section 106, as required by the Historic Preservation Act of 1966, as amended. However, the field

evaluation of the cultural sites and uses indicates that the sites and the Tucker Hill formation potentially qualify for National Register listing both as an Archaeological District and a Traditional Cultural Property. The development and implementation of an HPTP as described in the Cultural Resources section would provide mitigation as much as is possible but would not fully mitigate the impacts. The disturbance of religious uses, both past and future, cannot be mitigated because of their nature.

There would be a disturbance of an additional 29.3 acres, adding to the present 8.4 acres of disturbance for a total of approximately 37.7 acres at the top of the formation and along the haul road to Highway 31. This would be out of approximately 1,300 acres on Tucker Hill. The disturbance would include the loss of culturally important plants, and, according to some Native American consultants, the disturbance of the spiritual nature of the formation. There would be short-term and long-term loss of plants in the area of the quarry. Overall, the loss of individual plants would be small. Many of these plants may tend to re-establish themselves on the reclaimed portions of the project. Within the quarry which would not be reclaimed, they would not. Visual impacts of the quarry to spiritual values of the formation cannot be mitigated completely since a portion of the formation would be removed and a visible scar would be left on the formation.

There will be no physical disturbance to any known burials, pictographs, petroglyphs, caves, or rock shelters. Two stacked stone features may be destroyed if they cannot be avoided.

The Tucker Hill complex is a relatively small area within the larger Chewaucan Basin, much of which has been modified for agricultural purposes. However, it is centrally located and its geologic features make it an important location within the larger basin for Native Americans. It is also seen as important because of the concentration of cultural sites and features found on the formation. The Tucker Hill project would result in both short-term and long-term impacts to the cultural values present. Some of the impacts to cultural values can be mitigated and some cannot. Some Native American consultants have indicated that the cumulative impacts of the project on Native American values and future uses of the Tucker Hill formation are significant in their view.

Tucker Hill would continue to be accessible to the Native American people during the life of the quarry and after the quarry closes. However, since the haul road has no legal public access, access to the formation by vehicle may be in question which would make access by elders of the tribes difficult, if not impossible. Access would only be guaranteed from BLM administered lands which extend from Tucker Hill north to Highway 31, where there is only foot access to the formation. In

addition, the presence of activity and persons on the formation might have an impact upon uses of the formation which require solitude.

Cultural Resources

Ten sites that were either determined to be eligible to the NRHP or were unevaluated would be directly impacted by the proposed project. An HPTP must be developed and approved by the Oregon State Historic Preservation Officer and the Historic Preservation Advisory Council prior to any development of the project. Three mitigation strategies would be included in the HPTP:

- 1) Avoidance of sites deemed eligible for nomination to the NRHP, where feasible;
- 2) Collection and curation of artifacts on the surface of eligible sites within the area of potential effect which would not be directly threatened with destruction; and
- 3) A research design for excavation and data recovery for those eligible sites and portions of eligible sites directly threatened with destruction.

The sites within the proposed road corridor and several of the sites within the proposed perlite quarry on the top of Tucker Hill would be directly impacted by the quarrying operation. Suggested management options to be included in the HPTP for the sites which are recommended as eligible or unevaluated follow:

- a) Site KEC-32-1 (Large Lithic Scatter) - Mitigation for the portion of the site affected by the haul road;
- b) Site KEC-32-10 (Large Lithic Scatter) - Mitigation for the portion of the site affected by the haul road;
- c) Site KEC-32-18 (Lithic Scatter, Obsidic quarry with flaked stone tools, three prehistoric stacked stone features and two historic stacked stone features) - Mitigation for the entire site;
- d) Site KEC 32-19 (Sparse Lithic Scatter) - Recommend testing and possible mitigation for the entire site;
- e) Site KEC 32-20 (Lithic Scatter with flaked stone tools) - Testing and possible mitigation for the entire site;

- f) Site KEC 32-21 (Sparse Lithic Scatter) - Testing and possible mitigation for the entire site;
- g) Site KEC 32-27 (Lithic Scatter) - Testing and possible mitigation for the entire site;
- h) Site KEC 32-32 (Two stone cairns) - Avoidance or mitigation for the entire site (If these rock cairns are religious, which they have been identified to be by some of the Native American consultants, then the impacts to them cannot be fully mitigated if they are to be destroyed. Avoidance of physical disturbance may still not mitigate the impacts of the presence of the quarry in their immediate vicinity);
- i) Site KEC 32-34 (Lithic scatter with flaked stone tools, a single metate fragment and two apparent house depressions) - Avoidance, preservation, or mitigation for the portion affected by the haul road; and,
- j) Site KEC 32-35 (Lithic scatter) - Avoidance, preservation, or mitigation for the portion affected by the haul road.

Avoidance is recommended for all other eligible or unevaluated sites. Implementation of the HPTP would provide for mitigation of impacts to cultural resource sites. Mitigation would not prevent the permanent loss from the archaeological data base of the sites or portions of sites which would be destroyed. Once destroyed, even with mitigation, they would be irrevocably and irretrievably lost from the non-renewable body of archeological sites. The stacked stone features that appear to be more likely associated with religious activities are located well north of the project and would not be directly impacted by the quarry proposal. Although the project would not directly impact the feature, there could be some indirect impacts. The presence of the quarry and of operations personnel may destroy the religious values present in the stone cairns.

Development of the project would not preclude the nomination of the region as an archeological district. However, the destruction of portions of the potential National Register District would be a negative impact which may lessen the chances of being listed on the grounds of integrity of the location.

The effects of the project on the suitability of the area for potential listing on the National Register of Historic Places as a Traditional Cultural Property are difficult to assess. The existing integrity of Tucker Hill (1,300 acres) will be changed. There will be a permanent disturbance of 20 acres (quarry) and a temporary disturbance of 18.7 acres that will be reclaimed upon mine closure.

Although the project will result in some changes to the integrity of the area, this should not affect its potential to qualify as a TCP as described in National Register Bulletin 38.

Recreation

There would be no impact on the recreation resources.

Visual Resources

The proposal includes a 20-acre quarry, parts of which would be visible from Highway 31, a waste rock dump which may be visible, and improvement of the existing road to serve as a haul road. The road improvement should increase the visibility of the haul road as viewed from Highway 31 traveling east.

Three key observation points (KOPs) were established to rate the degree of visual contrast from the proposed project. The KOPs were located to the east and west of Tucker Hill along Highway 31 (Figure 8) where the number of potential viewers would be the highest.

Visual simulations of the proposed project were prepared from each KOP and are provided in Appendix II. From KOP #1, the proposed waste rock dump would be visible as a lightly colored area during the lifetime of the project. Following successful reclamation of the project, the waste rock dump would blend with the surrounding environment and would not be noticeable. It was determined that, from KOP #1, a moderate visual impact would result in the short-term, with slight long-term visual impact after reclamation.

From KOP #2, the quarry highwall would remain as a long-term visual impact. The highwall would be at the top of the hill, and would be silhouetted against the sky. Long-term visual impacts from the quarry highwall are expected to be strong to moderate. Visitors traveling south and east on Highway 31 are drawn to the dramatic Abert Rim and Coglan Buttes to the north of the Highway, although just north of KOP# 2 on Highway 31, traffic would be aimed more directly at the mine site. This would result in a visual impact on the foreground and middle ground view and with a contrasting background and impact on line and color at the quarry. The impacts from this location would be in the line of sight to the traveler.

From KOP #3, the quarry highwall would be silhouetted against the dark background of the Warner Mountains and the long-term impacts would be moderate to high. The road cuts and fill would be

seen from this KOP and the lower portion of the road could be clearly seen by motorists while traveling down the highway. The waste rock dump site would not be visible from this KOP.

These types of visual impacts are consistent with the Class III Visual Resource Management objectives.

Soils

A maximum of an additional 29.3 acres over and above the 8.4 acres of existing disturbance of soil are expected by the proposed action over the 10 year projected project life. A permanent disturbance of up to 20 acres in the vicinity of the quarry would remain with a temporary disturbance of 17.7 acres. The quarry and its associated waste rock dump would make up the majority of the disturbance. These disturbances would affect primarily the Lorella Gravelly Sandy Loam (soil 145C) and some Redcanyon-Rock Outcrop Complex (soil 222F).

The Lorella soil is shallow (less than 12 inches) and subject to high rates of erosion. Erosion by wind and water would be likely on this soil, especially during construction. Incorporation of the proposed erosion control measures would minimize the impact of soil erosion.

The Redcanyon soil has moderate and low soil erosion rates. This deep soil (over 30 inches) is quite coarse. For this reason, the impact of soil erosion would not be significant. However, soil erosion control measures would be implemented.

Stockpiling of the top layers of the existing soils could aid in reclamation success; however, soils over much of the disturbed areas are quite shallow. If there is insufficient soil for reclamation, soil would need to be brought in from outside the project area (See guidelines in Vegetation section). Seeding the stockpiled soils with aggressive native plant species such as squirreltail grass would minimize erosion of growth medium and possibly out-compete invasive weeds. Since the waste rock dump would be covered with growth medium prior to seeding, and since test plots would be established to determine the most effective reclamation treatments, it is expected that the areas would be successfully reclaimed following the closure of the operations. However, existing presence of invasive weeds already present on the formation would also have to be dealt with in order to prevent their taking over of disturbed and stockpiled areas.

Range

The project would have no impact on the range resource.

Vegetation

At present 8.4 acres are disturbed due to previous activities, and a maximum of an additional 29.3 acres for a total of 37.7 acres of vegetation over a projected 10 year period are expected to be disturbed by the proposed action over the 10 year projected project life (see Figure 3). The quarry and its associated waste rock dump would make up the majority of the disturbance. These disturbances would affect primarily Area 1 of Figure 10 which consists mostly of big sagebrush and sparsely scattered western juniper with an understory of mustards, cheatgrass, and various forbs (including several plants which are culturally significant). The short-term impacts would be the loss of 37.7 acres of native vegetation, which would also be prime areas for weed invasion. The long-term impacts of future mine closure and reclamation would result in re-establishment of many of the native plants if the reclamation plans are successful. Up to 20 acres at the quarry site would remain as a permanent loss of vegetation as present plans are not to rehabilitate the quarry site, with 17.7 acres of temporary loss.

Threatened, Endangered and Sensitive Plant Species

No known threatened, endangered or sensitive plant species would be affected by the project. However, if the quarry were to be expanded beyond that projected in the Proposed Action, the project may potentially impact the sensitive snowberry plants. This impact would be quantified in future environmental documents, if operations are planned to extend beyond the currently proposed boundaries.

Noxious Weeds

The potential for the introduction of noxious weeds to Tucker Hill was evaluated in accordance with BLM Handbook 9015 and is considered low. Seeding of squirreltail grass as proposed for temporary stabilization of the soil would help reduce the potential for a noxious weed invasion. Finally, the seed source to be used for final reclamation would be certified weed-free and approved by the BLM prior to the seeding operation. A monitoring program would be established for noxious weed invasion which would include inventory every year of the project and for three years after closure of the project. If noxious weeds are found, the preferred treatment would be physical or manual extermination with selective chemicals as the least preferred method of eradication. This will take place in accordance with Environmental Assessment #OR-013-93-03.

Air Quality

Tucker Hill Quarry Site

Proposed operations at the quarrying site are expected to have some direct short-term and long-term impacts on the air quality in the general area. Over time, it is anticipated that vegetation would cover much of the exposed areas except for the quarry, thereby eliminating the majority of the fugitive dust emissions.

In addition to the emissions generated during the quarrying process, the dirt haul roads would be a source of short-term impact to the air quality in the area. Fugitive dust emissions from haul roads would be controlled by using water sprays as necessary. In addition to particulates from the haul road, the haul trucks would be a source of emissions of all criteria pollutants, except lead. Fugitive emissions resulting from fuel combustion from haulage vehicles are anticipated to be negligible. Visual impacts from fugitive dust emissions would be minimized by the use of water sprays on the roads.

Long-term impacts to the air quality of the quarrying site are anticipated to be the result of surface disturbance in the area. Successful reclamation of the waste rock dump and haul road would eliminate the majority of the fugitive dust emissions.

Lakeview Processing Site

The proposed processing facility would also be expected to have short-term and long-term impacts on the Lakeview area. Because of the non-attainment status of the Lakeview area, the proposed processing facility must limit or offset PM₁₀ emissions. Short-term impacts would result from hauling, crushing, screening, and drying the ore. These processing activities are likely to generate fugitive dust emissions. Additional fugitive dust emissions are anticipated to be generated from the storage of materials in stockpiles and the transport of material on roads within the processing area. Fugitive dust emissions would be controlled to the extent possible using water sprays, cyclones, and a baghouse to ensure a minimal impact to the air quality of the area. In addition to emissions of fugitive dust in the processing area, short-term impacts would include fugitive emissions of sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), particulates, and hydrocarbons (HC) from fuel combustion. These emissions would be expected to cease when the processing activities cease, and the air quality would return to its previous condition.

Long-term impacts at the plant site are expected to be minimal. If the processing plant is removed upon cessation of operations, fugitive dust emissions would be likely. Additionally, fugitive dust

emissions would be expected from wind erosion of exposed ground resulting from vehicle travel or stockpile locations. However, over time, vegetation is expected to become established over these exposed surfaces, thereby eliminating the majority of the fugitive emissions resulting from wind erosion.

Atlas applied for and received the Air Contaminant Discharge Permit from the Oregon Department of Environmental Quality for this project. Permit No. 19-0001 was issued to Atlas Perlite, Inc. May 16, 1995.

Wildlife

Approximately 29.3 additional acres of native habitat would be disturbed by the proposed project. This would include greasewood on the valley floor, big sagebrush growing on deeper soils in draws and side slopes, and big sagebrush/scattered western juniper on the hilltops of Tucker Hill. This habitat would be unavailable as breeding habitat for small birds, mammals and reptiles and as foraging habitat for raptors and larger mammals. This habitat also receives use as winter range by mule deer. Chukar and possibly sage grouse may also make limited use of these habitats. The direct loss of 20 acres of habitat permanently and 17.7 acres of temporary loss represents a minimal impact to these species, relative to available surrounding habitat. Until these species become accustomed to the presence of people and several pieces of equipment, deer, antelope and chukar may avoid the area during periods of activity.

Since the majority of the blasting would not occur during the raptor nesting season (February 1 - June 30) with the exception of the start-up year, 1996, and that any blasting conducted between July 1 and July 31 would be coordinated/authorized by the BLM Wildlife Biologist, the impacts to late fledging raptors (golden eagles) would be eliminated or minimized.

Threatened, Endangered, and Candidate Wildlife Species

Bald eagles winter in the area, and utilize the Chewaucan Marsh as foraging habitat. The bald eagle and peregrine falcon may occasionally forage over the Chewaucan Marsh at other times, and could use the cliffs of Tucker Hill as perch sites. The infrequent blasting could disturb these species if they were present in the area during a blast. Most of the blasting would, however, occur during two campaigns per year, and would not occur during the raptor nesting season (February 1 through June 30). This would eliminate impacts to nesting raptors, late wintering bald eagles, and bat colonies. There may be a one week (seven day) period needed for blasting during 1996 only from February 1 through June 30, 1996. This blasting schedule would be coordinated/authorized by the BLM

Lakeview Resource Area biologist to minimize or eliminate impacts to wintering bald eagles, nesting raptors, roosting bats, and other sensitive wildlife species. BLM has consulted with the US Fish and Wildlife Service concerning the bald eagle and have written a biological evaluation with a "No Effect Determination" with the planned mitigation in place. As described in the Blasting Schedule (Appendix IV), any blasting conducted December 1 through January 31 will be coordinated/authorized by BLM biologist to minimize or eliminate impacts to wintering bald eagles and maintain the No Effect Determination.

There would be some minimal loss of potential pygmy rabbit habitat by development of the Proposed Action. Previous studies and surveys conducted during the preparation of this DEIS suggest that the cover present is probably too sparse to represent good pygmy rabbit habitat. These surveys also indicate that the western sage grouse probably does not frequent Tucker Hill itself. The northern sagebrush lizard generally inhabits areas of open brush. Impacts on the northern sagebrush lizard should be minimal. The candidate or sensitive shorebird species which utilize the Chewaucan Marsh, and the candidate fish species which occur in the waters of the Chewaucan drainage, would not be impacted by the project.

Land Uses/Access

Atlas has obtained access from the private landowner to allow access along the haul road to the perlite quarry on public lands. No measurable impacts to traffic on Oregon State Highway 31 or U.S. Highway 395 are anticipated as a result of the project, due to the small number of trucks (two) and the few trips (ten trips/day/truck) that would be made. The long-term management of the haul road, including the issue of providing for public access where the road crosses through private lands, would be evaluated during development of the Reclamation Plan.

Tucker Hill can be reached by parking near the gravel pit and hiking from the highway, as the public lands extend down to Highway 31.

Socioeconomics

Employment can be divided into two categories: direct and indirect. Direct employees are employed by the proposed operation itself. In this case, up to 12 full-time jobs would be generated by the proposed project. Indirect employment is generated as a result of spending either by the quarry or its employees. These jobs are typically in such sectors as retail, service, or construction. Indirect employment can be estimated using a non-industry specific multiplier of 1.5, indicating for each job at the quarry, 1.5 jobs are created. This gives a total of 18 direct and indirect jobs in the

community. Applied to an average number of 2.52 people per household, up to 45 people would be affected. Given the high unemployment rate, it is expected that the work force would come from the currently unemployed residents of Lake County who are actively seeking employment (253 in 1990). This would represent a 1.5 percent drop in unemployment.

Impacts to housing, schools, and community services would be minimal and, in the highly unlikely event that all employees would immigrate into Lakeview for jobs, the increase in population could be easily absorbed into the community. Though the population is stable and housing is limited, it would not be expected that there would be a problem for so few people to find available housing, if that contingent became necessary.

There would also be an increase in tax revenue for the area due to those taxes paid by Atlas.

Noise

Tucker Hill Quarry Site

Based upon published estimates of noise from equipment similar to that planned for use at the proposed quarrying site, noise levels are not expected to exceed 91 dBA at a distance of 50 feet from the source. Using the USAF guideline of a 6 dB reduction for each doubling of distance, sound levels from the quarrying are estimated to be 55 dBA at a distance of 0.6 miles. No structures lie within this distance from the proposed project site, so noise from the quarry is not expected to exceed the ODEQ standards. Topography and wind are expected to provide further attenuation.

Blasting noises are typically of lower frequency than other noises from mining operations. Pressure waves transmitted outward from the blast are termed "air blasts" and usually contain both audible and subaudible frequencies. The A-weighted sound measuring scale discriminates against low frequencies so a different weighting network, such as the C-weighted network, should be used to measure sound levels from blasting activities. The lower frequency sound waves generated by blasting can create higher frequency vibrations in windows and doors. These secondary vibrations are often perceived as annoying noise, even though the initial sound waves were of low frequency and may not have been audible. The U.S. Bureau of Mines has proposed guidelines for preventing glass breakage from air blast overpressure. Levels for protecting glass were proposed because glass breakage occurs from much lower levels of overpressure than structural damage. Sound levels of 120 dBC are considered "safe" (Bureau of Mines, 1974).

Most of the blasting for the proposed project would occur only twice each year and would occur during the summer and fall. However, some minimal blasting may be required during December through, July, periodically to meet demand for the product. Noise levels resulting from blasting are estimated to be approximately 130 dBC or 115 dBA at a distance of 900 feet from the sources (U.S. Bureau of Mines 1976). Using a 6 dB reduction for each doubling of distance, the "safe" overpressure level of 120 dBC would be reached at a distance of 3600 feet (approximately 0.7 miles) from the blast site. Levels would continue to decrease with distance. No sensitive structures are located within 0.7 miles from the proposed quarry site, so noise and secondary vibrations from blasting are not expected to be problematic.

Lakeview Processing Site

Noise levels resulting from the proposed processing facility in Lakeview were estimated based upon equipment noise levels provided by the manufacturer and supplier of the equipment, Wyant Machinery of Seminole, Oklahoma. Projected noise levels resulting from the jaw crusher and the mills are shown in Figure 11. Additional noise sources at the proposed processing facility would include trucks and other ore handling equipment, occasional rail cars, and start-up warning alarms. These noise sources would be intermittent and of short duration. Only the warning alarms would be expected to exceed the noise levels of the processing equipment.

The Oregon Department of Environmental Quality (ODEQ) noise control regulations state that daytime (7 a.m. to 10 p.m.) noise levels from industrial sites, as measured at the nearest point on the noise sensitive property line, shall not equal or exceed 55 dBA more than 50 percent of the time (30 minutes in an hour) and noise levels shall not equal or exceed 60 dBA more than 10 percent of the time (six minutes in an hour). Nighttime noise standards have also been established by the ODEQ but are not an evaluation criteria for the proposed project since the facility would not operate at night. The EPA's guidelines state that a day time average sound level of 55 dBA protects hearing and prevents undue interference with routine activities (EPA, 1974).

The estimates presented in Figure 11 show that noise levels at point F would be approximately 56 dBA and the existing daytime noise level is approximately 55 dBA. The point is within 100 feet of the property line bordering an industrial zone (M-2) which is not noise sensitive so the ODEQ noise limits do not apply at this point. The minimum difference in loudness most people with normal hearing ability can detect is approximately two dBA, so the slight increase in sound would not be apparent to most people and would not adversely affect human health or the environment. Similarly, point D (Figure 11) is on the property line southwest of the proposed crushing facility and the

adjoining property is zoned for industrial use and is not noise sensitive. Existing noise levels at this location are 35 to 45 dBA and the estimated noise from the proposed facility is 46 dBA. The slight difference would not be noticeable to most individuals and no adverse affects are expected.

The nearest noise sensitive property is north of the proposed processing facility and north of County Road 2-18C. The existing daytime noise along the County Road (point A, Figure 11) is 60 to 88 dBA. The noise levels estimated to result from the processing facility would be approximately 47 dBA at the property line; this is below the 55 dBA noise level allowed by the ODEQ regulations and recommended by EPA. The existing noise levels at this location are greater and would be expected to mask much of the noise generated by the processing equipment. Noise from the proposed facility is not expected to adversely affect the nearest noise sensitive residents.

Warning devices/start-up alarms are exempt from the ODEQ noise control regulations, provided the devices do not operate continuously for more than five minutes. These alarms are designed to alert workers to the impending start-up of machinery and must be audible above background noises in the work area. The alarms typically operate for one or two minutes. Depending on the sound level of the alarm at the source, the sound may be audible at the property lines. Since these alarms sound infrequently and for short duration, the resultant noise is not expected to be problematic or disturbing.

Ten truckloads of ore per day per truck (total of two trucks hauling) are estimated to be delivered to the processing facility and five truckloads of processed material are expected to be shipped from the facility each week. This amounts to a very slight increase in the traffic volume along U.S. Highway 395. A doubling of traffic volume typically produces a three dBA increase in sound level (AASHTO, 1987). An increase of 20 truckloads per day is not equivalent to doubling the traffic volume along this highway and the resultant effect would be an increase of less than three dBA that would not be audibly noticed by most residents. The noise from the additional truck traffic along County Road 2-18C is also expected to be negligible since the baseline sound levels along the road range from 60-88 dBA and the trucks would generate noise levels within this range.

Summary

Noise levels from the processing equipment are not expected to be significantly higher than the existing noise levels in the Lakeview area and would not be expected to exceed the allowable levels at the nearest point on the noise sensitive property line. Noise from the quarry operations would be attenuated by distance, topography, and wind and is not expected to be a problem. Sound and

vibrations from blasting operations would be infrequent and are expected to be naturally attenuated to safe levels.

Groundwater and Water Quality

Tucker Hill Quarry Site

Water used for dust suppression activities at the quarry site and on access roads would be purchased from a nearby ranch. There are no other private wells in the vicinity of the Tucker Hill quarry at which impacts from the mining operation would be anticipated. No groundwater would be encountered during pit development.

Perlite is a special type of volcanic glass, typically of rhyolitic composition, which contains a small amount of water in the glass structure. The glass forms by relatively rapid cooling of a molten body of magma, which prevents crystallization of the silicate minerals. As shown in Table 4-1, the perlite is comprised entirely of basic oxide rock minerals.

Although surface waters from storm events would be expected to infiltrate into the pit bottom, no contamination to groundwater would be expected from the quarry operation. Most metal mines which are sources of heavy metals and acid rock drainage are found in hydrothermally-altered rocks which contain large quantities of sulfide minerals. Due to its high silica (quartz) (74.2%) and low sulfide and heavy metal contents, the glass would be expected to be essentially inert and would not be expected to have any of the environmental hazards associated with some types of high-sulfide metal deposits. Precipitation percolating through glassy perlite placed on waste rock dumps would not be expected to transmit contaminants, nor cause acid rock drainage. (See Appendix 6 for an analysis of the material collected from Tucker Hill)

TABLE 4-1 TYPICAL WHOLE ROCK COMPOSITION OF TUCKER HILL PERLITE

Component	Percent*
SiO ₂	74.2
Al ₂ O ₃	12.6
K ₂ O	4.5
Na ₂ O	3.8
LOI	3.3
CaO	1.3
Fe ₂ O ₃	0.52
MgO	0.1
Moisture	0.2
TiO ₂	0.06
Total	100.58

*Adds to more than 100% due to rounding.

Lakeview Processing Site

The Lakeview processing facility would use a small quantity of water, obtained from an existing well previously used for other industrial applications, predominantly for dust suppression on material conveyors. The dust suppression would utilize misters or sprinklers on all ore transfer points or stockpiles where dust is likely to originate. Water would be applied in quantities sufficient to suppress dust but would not result in runoff. Crushers at the plant would use baghouses for dust control which do not utilize groundwater.

Because of the abundance of water in the area, the artesian flow from the production well, the relatively small quantities of groundwater to be used at the proposed facility, the historic use of the onsite wells which did not result in any reported impacts to surrounding water users, and the relative absence of nearby water users, it is not anticipated that water production at the proposed processing facility would have any noticeable impact to nearby groundwater users. Further, because dust control activities would not produce runoff or sludges, no indirect impacts related to the use of groundwater for dust control would be anticipated.

Health and Safety

Atlas' operations would mitigate potential dust problems through the use of dust collection and/or suppression devices at the processing facility. In addition, water would be applied as necessary to all gravel roads both at the plant site and at, and leading to and from, the quarry. Water sprays would be used as necessary to minimize dusting at the raw ore stockpile during truck unloading, at the truck dump hopper, at the vibrating screen located just upstream of the jaw crusher, and at the jaw crusher itself. Dust would be collected at the plant site using a negative pressure system from those points downstream of the crushed ore stockpile where dusting may occur. All air thus collected, would pass through a high efficiency (99.9 percent) baghouse prior to exhausting to the atmosphere. The dust collected in the baghouse would be either returned to the quarry or sold as a by-product for use in filtration systems.

The additional truck traffic (total of ten trips/day/truck) would only slightly increase the traffic along Highway 31 and 395 into Lakeview and should not present a serious safety problem. The additional 20 roundtrips from the quarry operation will be only a slight increase to the estimated traffic of 730 vehicles using Highway 31 daily near the project.

ALTERNATIVE B - ALTERNATE TUCKER HILL WASTE ROCK DUMP LOCATION

Native American Concerns

The location of the waste rock pile could have an impact on religious uses. The alternative dump site is located near one rock cairn and would potentially impact the value of the cairn located near the quarry. The indirect impacts are the same as described for Alternative A.

Cultural Resources

Compared to Alternative A, the implementation of Alternative B would result in direct disturbance to an additional stacked stone feature considered to be potentially eligible to the National Register of Historic Places and considered sacred by some of the Native American consultants. Implementation of the treatment plan would partly mitigate the impacts to archaeological values. It probably could not mitigate the impacts to religious values.

Visual Resources

Compared to Alternative A, the implementation of Alternative B would result in a lessening of the moderate visual impact at KOP #1. A slightly magnified visual impact would result from KOP #2 and #3. The visual simulations in Appendix II illustrate the visual impact of Alternative B.

Soils

A difference in the number of acres of soils to be impacted would result. Under Alternative B, approximately 36.7 acres of disturbance (29.3 new acres, 8.4 acres previously disturbed) would occur, compared with 37.7 acres under Alternative A. There would be a permanent impact on 20 acres (quarry) and a temporary impact of 16.7 acres.

Vegetation

Approximately 36.7 acres (29.3 new acres, 8.4 acres previously disturbed) of disturbance to vegetation would occur under Alternative B. Twenty acres would be permanently lost (quarry) and 16.7 acres of vegetation temporary lost until completion of reclamation.

Threatened, Endangered, and Sensitive Plant Species

No known threatened, endangered or sensitive plant species would be affected by the project. The sensitive snowberry population would not be affected.

Other Resources

The impacts for the following resources would be the same as described for Alternative A.

Recreation**Range****Noxious Weeds****Air Quality****Wildlife****Threatened, Endangered, and Candidate Wildlife Species****Land Uses/Access****Socioeconomics****Noise****Groundwater and Water Quality****Health and Safety****ALTERNATIVE C - ALTERNATIVE GRAVEL PIT WASTE ROCK DUMP LOCATION****Native American Concerns**

This alternative eliminates the siting of the waste rock pile dump on Tucker Hill as the waste rock material would be hauled off Tucker Hill and placed in the existing county gravel pit located adjacent to Highway 31. The elimination of the waste rock dump on Tucker Hill would reduce the

impacts on Native American traditional uses as compared to Alternatives A and B. The impacts of the quarry, and haul road are the same as described for Alternative A. The indirect impacts are the same as described for Alternative A.

Cultural Resources

Compared to Alternative B, the implementation of Alternative C would not result in direct disturbance to the additional stacked stone feature considered to be potentially eligible to the National Register of Historic Places and considered sacred by some of the Native American consultants. Direct and indirect impacts associated with the quarry and haul road would be the same as described for Alternative A.

Visual Resources

Compared to Alternative A, the implementation of Alternative C would result in a lessening of the moderate visual impact at KOP #1 as the waste rock dump would not be located on Tucker Hill. The gravel pit location for the waste rock material is already disturbed and the temporary placement of the waste rock in the gravel pit would not change the existing condition of the gravel pit. There may be some long-term visual improvements that could occur to the existing county gravel pit when the county closes down the gravel operation and if the material is used as fill. The impacts as viewed from KOP #2 and #3 would be the same as described for Alternative A. The visual simulations in Appendix II illustrate the visual impact of Alternative C.

Soils

A difference in the number of acres of soils to be impacted would result. Under Alternative C, approximately 31.7 acres of disturbance (23.3 new acres and 8.4 acres existing) would occur, compared with 37.7 acres under Alternative A. There would be a permanent loss of 20 acres (quarry) and a temporary disturbance of 11.7 acres.

Vegetation

Approximately 31.7 acres (23.3 new acres and 8.4 acres existing) of disturbance to vegetation would occur under Alternative C. Twenty acres (quarry) of vegetation would be permanently lost and a temporary loss of 11.7 acres that would be reclaimed when the quarry is closed and reclamation is completed.

Threatened, Endangered, and Sensitive Plant Species

No known threatened, endangered or sensitive plant species would be affected by the project. The sensitive snowberry population would not be affected.

Other Resources

The impacts for the following resources would be the same as described for Alternative A.

Recreation**Range****Noxious Weeds****Air Quality****Wildlife****Threatened, Endangered, and Candidate Wildlife Species****Land Uses/Access****Socioeconomics****Noise****Groundwater and Water Quality****Health and Safety****ALTERNATIVE D - NO ACTION ALTERNATIVE**

The No Action Alternative provides a baseline from which environmental, social, and economic effects are evaluated. The assumption under this alternative is that there would be no project and no further disturbance of public lands would occur. The existing exploration activities (bulk sample sites and drill access roads) would be reclaimed under provisions of the existing exploration Plan of Operations. However, exploration may continue as in the past.

Native American Concerns

Currently, no specific uses of the area by Native Americans have been identified. The area is probably visited by some individuals and/or family groups for traditional uses as with other areas. There would be no changes under the No Action Alternative, as current levels of activities would continue. However, some increase in use may occur as more Native Americans know about the area due to the consultation process associated with the project.

Cultural Resources

The cultural sites which have not been evaluated for significance would remain unevaluated. The treatment plan would not be implemented. Cultural resource sites would not be disturbed by construction of the proposed project.

Recreation

The limited recreation use, primarily hunting for upland game birds, would continue at the current rates.

Visual Resources

The moderate to strong visual impacts that would accrue under Alternative A, B and the reduced impacts under Alternative C would not occur under the No Action Alternative.

Soils

No additional disturbance to native soils would result. Reclamation of the existing exploration related disturbances would lessen wind and water erosion of those disturbed sites. The permanent (quarry) and temporary soil disturbance associated with Alternatives A, B and C would not occur.

Range

There would be no impacts on the range resource for any of the project alternatives, including the No Action Alternative.

Vegetation

The plant communities would not be disturbed as a result of the project. Reclamation of the exploration related disturbance would be expected to result in revegetation of those areas with native plant species. The permanent (quarry) and temporary disturbance of native plant communities associated with Alternatives A, B and C would not occur.

Threatened, Endangered, and Sensitive Plant Species

There are no known threatened, endangered or sensitive species in the area that would be impacted by any of the alternatives, including the No Action Alternative.

Noxious Weeds

There are no known populations of noxious weeds within the Tucker Hill project area identified through the vegetative baseline studies, and the probability of an introduction of noxious weeds to Tucker Hill under current conditions is considered slight to low.

Air Quality

Reclamation of the exploration disturbance would result in lessened fugitive dust emissions at the Tucker Hill quarry site. Air quality impacts projected to occur as a result of the quarry operation and the processing facility under Alternatives A, B and C would not occur.

Wildlife

The permanent and temporary loss of wildlife habitat associated with Alternatives A, B and C would not occur.

Threatened, Endangered, and Candidate Wildlife Species

As no threatened, endangered and candidate species are known to occur, the selection of the No Action Alternative would not impact any of these species.

Land Uses/Access

Selection of the No Action Alternative would result in no changes to land uses or access.

Socioeconomics

There will be no change to social and economic issues.

Noise

There would be no noise impacts.

Groundwater and Water Quality

No impacts to groundwater or water quality would occur under the No Action Alternative at either the Tucker Hill quarry site or the Lakeview processing site.

Health and Safety

Under the No Action alternative, no impacts to health and safety would occur.

CUMULATIVE IMPACTS

Cumulative effects analysis of the Tucker Hill project proposal is based on a ten year project proposal or the Most Reasonable Foreseeable Future. All resource values have been evaluated for cumulative impacts. Some of the cumulative impacts are address in specific resource sections. The following address the cumulative impacts that have been identified in addition to the impacts described by specific resource section by Alternative. The proposed reclamation as described in Alternatives A, B and C would lessen the cumulative effects of mine exploration in the general area.

As described previously, future development is effectively controlled by demand for the perlite product. Although the potential supply of perlite on Tucker Hill is extensive, there is no indication that the demand for the product would increase significantly in the future. Therefore, it is difficult to project mining beyond ten years other than to speculate that if the mine is successful, and if mining were to continue at the same rate (150,000 tons/year), there would be an additional disturbance of 2.5 to 3.0 acres per year. The pit would be enlarged and at some point it could require the development of an additional site to store the waste rock. There are no other mines in the Chewaucan River drainage other than sand and gravel operations within the area. The principal activity in the area is the on-going agricultural, grazing, and timber operations.

If the project were to continue beyond the projected ten year life, the cumulative impacts correspondingly on the resources described below would continue and increase. The greatest impact or benefits would be on values identified by some of the Native Americans, visual impacts, archeological values and economic benefits. These potential impacts would be addressed in a future environmental document, as required by NEPA and BLM guidelines.

The landscape within the river basin has been modified significantly. The marshes have been drained and used for agriculture along with the development of communities and roads. Tucker Hill has been explored for minerals since 1949 with intensive exploration beginning in 1982. The landscape on Tucker Hill has been somewhat modified as the result of the construction of four to five miles of road, drilling of over 100 exploration holes, and mining of about 50 tons of perlite ore. Between 1987 and 1990, an additional 18 exploration holes were completed and a number of samples were collected for testing. Much of the previous exploration has been rehabilitated, but there is clear evidence of the previous and current exploration. Overall, although evidence of exploration is evident, most of Tucker Hill remains undeveloped and retains much of its integrity when compared to many areas within the river drainage. Although most of the development has

occurred on the lowlands (previously marsh areas), the uplands that do not support a timber resource remain essentially undeveloped.

The Tucker Hill area is a part of the larger Chewaucan River Basin that was historically important to Native Americans based on the archeology inventory and interviews with tribal members. Tucker Hill was used in conjunction with other areas in the river basin, was an important source of obsidian, and was used for a variety of traditional activities.

Although the Native American consultants are concerned about the total Chewaucan River Basin, there may be both direct and indirect impacts to the spiritual/religious nature of the Tucker Hill formation. These impacts have been identified by some of the Native American consultants as being a major impact to the values of Tucker Hill for traditional Native American uses. The impacts to spiritual/religious values, in their view, cannot be mitigated and the impacts would be irreversible from the Native American viewpoint. The cumulative effects on the sacred values of the Chewaucan River Basin with development of the Tucker Hill project are difficult to measure, as it is not known if there are other sites within the basin with the same values and importance, to some of the Native Americans, as Tucker Hill.

The cultural landscape, of which Tucker Hill is a part, is important to some of the Native American consultants, and would be permanently impacted by the presence of the quarry. A portion of the hill would be removed for the quarry resulting in a permanent disturbance. The development of the 20-acre quarry would result in an irreversible impact on soils, vegetation, and visual resources.

While the direct impacts are only 37.7 acres (8.4 existing and 29.3 new), this new disturbance is seen as having a direct impact upon the spiritual and religious values on the entire formation. Spiritual values would be impacted over the entire formation, not just within the area of the disturbance. There are also concerns that the increase in activity on the formation would lead to the collection of important artifacts from the sites which have been identified.

There has been an overall loss of archeological resources in the Chewaucan River Basin due to development. This would continue to some extent with the Tucker Hill project as there would be some impacts to archaeological values on the Tucker Hill formation. Although many of the sites can be avoided, there would be some sites that would be directly impacted. In these cases, even with implementation of a recovery strategy, the loss of the site is permanent and would be considered an irreversible impact.

The cumulative impacts of the project on recreation, range, wildlife, soils, potential for increasing noxious weed populations, vegetation, air quality, land uses and access, noise, groundwater and water quality, threatened, endangered, or sensitive plants and animals, and health and safety would be minimal when viewed in the context of activities in the larger Chewaucan River Basin.

The cumulative effects of the project on the economics and unemployment rates are important due to the high unemployment rates in Lake County and sluggish economy since the reduction in the timber industry. The additional jobs (12 direct and 6 indirect) along with the additional income, taxes, and employment diversity provided by the mine would be significant to Lake County.

IRREVERSIBLE OR IRRETRIEVABLE IMPACTS

Irretrievable and irreversible impacts that would result from this project include:

- Native American Traditional Uses - Impacts on use of the area for traditional uses by Native Americans. The degree of the impacts are difficult to measure, but the loss of integrity associated with 37.7 acres of disturbance with 20 acres permanently disturbed is a serious concern for some of the Native American consultants.
- Archeological Resources - Although the archeological resources would be mitigated through development and implementation of a HPTP as required under Section 106 of the Historic Preservation Act, any physical removal of the sites would result in a permanent impact. The HPTP would emphasize avoidance, so a permanent removal of the sites would be minimized.
- Visual Resources - The development of the quarry, associated waste rock dump site, and improvement of the haul road would have a long-term, largely irreversible impact on the visual resources, even with mitigation. However, the area would still meet the objectives prescribed for a Visual Resource Management Class III area.
- Other Resources - The 20 acre quarry would result in a permanent change and would result in an irreversible impact on vegetation, soils and wildlife.

MITIGATION

Native American Concerns

The development and implementation of an HPTP as described in the Cultural Resources section, would provide mitigation as much as is possible but would not fully mitigate the impacts. The disturbance of religious uses, both past and future, cannot be mitigated because of their nature. Visual impacts of the quarry to spiritual values of the formation cannot be mitigated completely since a portion of the formation would be removed and a visible scar would be left on the formation.

Cultural Resources

In the event that previously undiscovered cultural resources are encountered during construction of the proposed project, all such activities would cease and the District Manager of the Lakeview District BLM would be notified immediately.

In addition, those sites discovered during the course of the cultural resource inventories conducted at the site would be mitigated as outlined in the HPTP, as described above.

Visual Resources

If the visual impacts associated with the highwall of the quarry result in a sharp color contrast with the surrounding vegetation, consideration will be given to using a varnish or staining material to reduce the visual impacts.

Soils

Implementation of the soil erosion control measures, as proposed, would be sufficient mitigation to ensure minimization of soil erosion from the project. In addition, implementation of the reclamation plan would result in long-term minimization of soil erosion.

Noxious Weeds

Seeding of squirreltail grass, as proposed, for temporary stabilization of the soil would help reduce the potential for a noxious weed invasion. The seed source to be used for final reclamation would be certified weed-free and approved by the BLM prior to the seeding operation. A monitoring program would be established for noxious weed invasion which would include inventory every year during the life of the project and for three years after closure of the project. If noxious weeds are found, the preferred treatment would be physical or manual extermination with selective chemical treatment as the least preferred method of eradication. This would take place in accordance with

Environmental Assessment #OR-013-93-03. Successful reclamation would result in minimization of the opportunity for a noxious weed invasion.

Air Quality

Fugitive dust emissions from haul roads would be controlled by using water sprays as necessary. Fugitive dust emissions at the processing site would be controlled to the extent possible using water sprays, cyclones and a baghouse to ensure a minimal impact to the air quality of the area.

Threatened, Endangered and Candidate Wildlife Species

The blasting schedule would be coordinated/authorized by the BLM Lakeview Resource Area biologist for the periods of December 1 through January 31 and July 1 through July 31. No blasting will occur between February 1 and June 30 to minimize impacts to wildlife.

CHAPTER 5 CONSULTATION AND COORDINATION

LIST OF PREPARERS AND REVIEWERS

TABLE 5-1 BLM REVIEWERS

Name/Title	Degrees	Experience	EIS Responsibilities
Scott Florence	BS Range Science	20 years	Area Manager
Ted Davis	BS Forest Biology	17 years	Project Manager
Doug Troutman	BA Biology	27 years	Visual Resources
Dennis Simontachi	BA Geology	27 years	Geologist
William Cannon	MA Anthropology	25 years	Archeologist
Paul Whitman	BA Biology MS Zoology	10 years	Environmental Coordinator
Ken Tillman	BS Agriculture	22 years	Surface Protection
Vern Stofleth	BS Wildlife Management	12 years	Wildlife Biologist
Lucile Housley	MS Botany	40 Years	Botanist/Ethnobotanist

TABLE 5-2 JBR ENVIRONMENTAL CONSULTANTS, INC., PREPARERS

Name/Title	Degree	Experience	EIS Responsibilities
Terry Randolph	BS Forestry	34 years	Project Manager
Rita Bates	BS Biology	5 years	Assistant Project Manager, Visual/Cultural Resources
Dave Worley	BS Biology MS Zoology	17 years	Wildlife/TEC (Animals)
Chuck Saulisbury	BS Range Management	40 years	Vegetation, TEC Plants, Noxious Weeds
Cindie Geddes	BS Range, Wildlife, Forestry	7 years	Vegetation, TEC plants, Socioeconomics
Ted Oleson	BS/MS Economics	11 years	Socioeconomics (review)

Name/Title	Degree	Experience	EIS Responsibilities
Jim Webster	MLA Landscape Architecture	26 years	Visual Simulations
Mark Hanneman	BS/MS Geology	15 years	Water Resources
Doug Jones	BS Mining Engineering	12 years	Air Quality
James Hutchins	Ph.d. Anthropology	3 years	Archeology (Principal Investigator)
Robert Kautz	Ph.d. Anthropology	22 years	Archeology (Project Manager)
Robert Winthrop	Ph.d. Anthropology	13 years	Ethnography

**LIST OF AGENCIES, GROUPS AND PERSONS TO WHOM COPIES OF DEIS SENT TO
United States Congressional Delegation**

Senator Mark Hatfield
Senator Robert Packwood
Congressman Wes Cooley

Federal Agencies

Advisory Council on Historic Preservation
Air Force Pentagon, Office of Deputy A/S of USAF
Bureau of Reclamation, Denver Federal Center
Bureau of Land Management
Minerals Management Service, Environmental Management and Policy
Environmental Protection Agency, Region 10
Environmental Protection Agency, Washington DC
National Park Service, Division of Environmental Compliance
Office of Civil Engineers, USAF/CEVP, Director of Environmental Quality
Superintendent of Documents
US Government Printing Office
US Geological Survey, Environmental Affairs Program
US Bureau of Mines, Minerals Assessment Branch
US Department of Energy, Office of Environmental Policy
USDI Office of Environmental Affairs
US Fish and Wildlife Service, Division of Environmental Contaminants
US Bureau of Mines, Western Field Operations
US Fish and Wildlife Service, Russ Peterson
US Forest Service, Office of Environmental Coordination
US Army Corps of Engineers, South Pacific Division

Native American Representatives

Burns Paiute Tribe
Confederated Tribes of Warm Springs Reservation
Fort Bidwell Indian Community Council
Klamath Tribes, Dino Herrera, Confederated Modoc and Paiute Tribes
Linda Reed, Burns Paiute Tribe

Oregon State Government

Governor John Kitzhaber

Senator Eugene Timms

Representative Denny Jones

State Historic Preservation Officer

Department of Geology and Mineral Industries (DOGAMI)

Department of Environmental Quality

Donald Forbes, Department of Transportation

Oregon Department of Fish and Game (Lakeview)

Lake County and Communities

Lake County Commissioners

Modoc County Board of Supervisors

Harney County Library

Klamath County Library

Lake County Library

Oregon High Desert Museum

Groups/Individuals

Izaak Walton League of America

Oregon Wildlife Federation

Sierra Club, Klamath Group

The Wilderness Society

Melvin Adams

National Wildlife Federation

Ginger Alman

Sierra Club, Northwest Office (Bill Arthur)

Carolyn Brown, Concerned Citizens for Responsible Mining

John Cremin

Jim Dingman, Pacific Industrial

Jim Friemark (The Wilderness Society)

S.D. Garrett, M.D., (Native Plant Society of Oregon)

Don Hamblin

Joseph Levay

Keith Papke

Tom Pringle
Edward Stabb, Crump Ranch
Paula Surmann, Sierra Club, Oregon Chapter
Frank Vaughn
Wendell Wood, Oregon Natural Resources Council

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Western Nevada Community College, Carson City, Nevada
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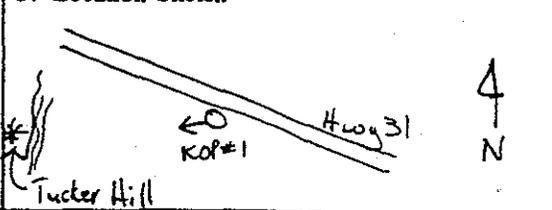
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Date 7/95
District Lakeview
Resource Area Lakeview
Activity (program) Minerals

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name <u>Tucker Hill Perlite Quarry</u>	4. Location Township <u>34S</u> Range <u>19E</u> Section <u>34</u> <u>SW 1/4 SE 1/4</u>	5. Location Sketch 
2. Key Observation Point <u>#1</u>		
3. VRM Class <u>III</u>		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	F: Flat, regular valley floor M: Rolling to rugged hill B: Steep, rugged mountains	F: Simple, patchy, amorphous M: Indistinct B: Patchy, contrasting, bold	F/M/B - None
LINE	F to M: Sharp contrast, bold, straight line M to B: Curving, complex	F: Weak, irregular M: Weak B: Broken, bold, irregular	
COLOR	F: Tan M: Brown to dk brown B: Brown to dk brown	F: Golden to grey/green M: Grey green B: Dark green to dark grey	
TEXTURE	F: Fine, smooth M: Fine to coarse, patchy B: Coarse, patchy	F: Medium, stippled M: Fine, patchy B: Medium, patchy	

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	M: Angular waste rock dump added to top of hill	M: No vegetation (short term) on waste rock dump. No change (long term)	None
LINE	M: Angular, hard line at interface	M: Broken (short term) No change (long term)	
COLOR	M: Light tan waste rock	M: No veg. on dump (short term) No change (long term)	
TEXTURE	M: No change	M: No veg. on dump (short term) No change (long term)	

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

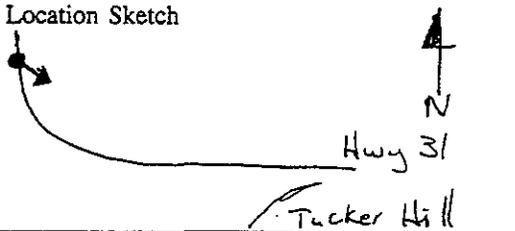
1. DEGREE OF CONTRAST	FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side) <u>Class III VRM</u>
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	
ELEMENTS	Form		X										3. Additional mitigating measures recommended <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reverse side)
	Line		X										
	Color		X										
	Texture			X									
Evaluator's Names												Date	
<u>Rita Bates</u>												<u>7/7/95</u>	

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 8/95
District Lakeview
Resource Area Lakeview
Activity (program) Minerals

SECTION A. PROJECT INFORMATION

1. Project Name Tucker Hill Perlite Quarry
2. Key Observation Point # 3
3. VRM Class III
4. Location
Township 34S
Range 19E
Section 7
SE 1/4 NE 1/4
5. Location Sketch


SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	F: Foreground	M: Middleground	B: Background	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	F: Flat fields	m: Rolling hills (Tucker Hill)	B: Bald Abert Rim	F: Simple, amorphous	m: Indistinct, simple	B: Indistinct
LINE	F: Weak, flat	m: Complex, broken	B: Bold, horizontal	F: Bold where fields meet native veg.	m: Weak	B: Indistinct
COLOR	F: Grey/brown	m: Dark brown, greys	B: Purplish	F: Golden/green	m: Grey/green	B: Indistinct
TEXTURE	F: Fine/indistinct	m: Patchy, rough, coarse	B: Coarse	F: Fine, uniform, smooth	m: Patchy, fine	B: Indistinct

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	F: Foreground	M: Middleground	B: Background	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	M. Rolling hills, patches of angular features.	No vegetation on quarry highway or road.	m: Add visible road cut, quarry high wall			
LINE	M. Broken, geometric	M. No vegetation along highway against dark background	m: Straight + diagonal elements added			
COLOR	M. Additional light browns grey land visible	M. - converted to grey rock from ground vegetation.	m: Light brown road cut, light grey high wall			
TEXTURE	M. Directional elements added.	M. No vegetation on quarry highway or road.	m: Directional, patchy			

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST	FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)	
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
Form			X			X				X				3. Additional mitigating measures recommended <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side)
Line	X				X				X					
Color		X			X				X					
Texture		X			X				X					
EVALUATOR'S NAMES												DATE		
Doug Treatment												9/25/95		

APPENDIX III

List of Plant Species

PLAN APPENDICES

Appendix

- I Traditional Cultural Property and Eligibility Analysis Worksheets 1 and 2
- II Visual Contrast Simulations and Ratings
- III List of Plant Species
- IV Blasting Schedule
- V NMBMMR Chemical Analysis

APPENDIX I

**Traditional Cultural Property Eligibility Analysis
Worksheets 1 and 2**

Traditional Cultural Property Eligibility Analysis Worksheet 1

Hunting Activities	Evidence of hunting activities are available from the interviews, and is consistent with Paiute subsistence patterns described ethnographically. Archeological data shows evidence of campsites and travel through the area and use over a long period of time.
Religious	Direct evidence through testimony of tribal consultants for past use. The archeological evidence (rock stacks, "prayer seats, etc.") indicates such use. No specific testimony for specific current use by any individual. Evidence of importance of area for sacred values given by one tribe in the form of tribal resolution.
Burial Sites	One known site w/one or more burials at the base of Tucker Hill. Have received comments in general terms that Tucker Hill may have additional burials which would indicate long term residency.
Stone and Tool Features	Supported by archeological survey.
Cache caves	Supported by archeological survey and indicates early occupancy
Rock Art	Supported by archeological survey

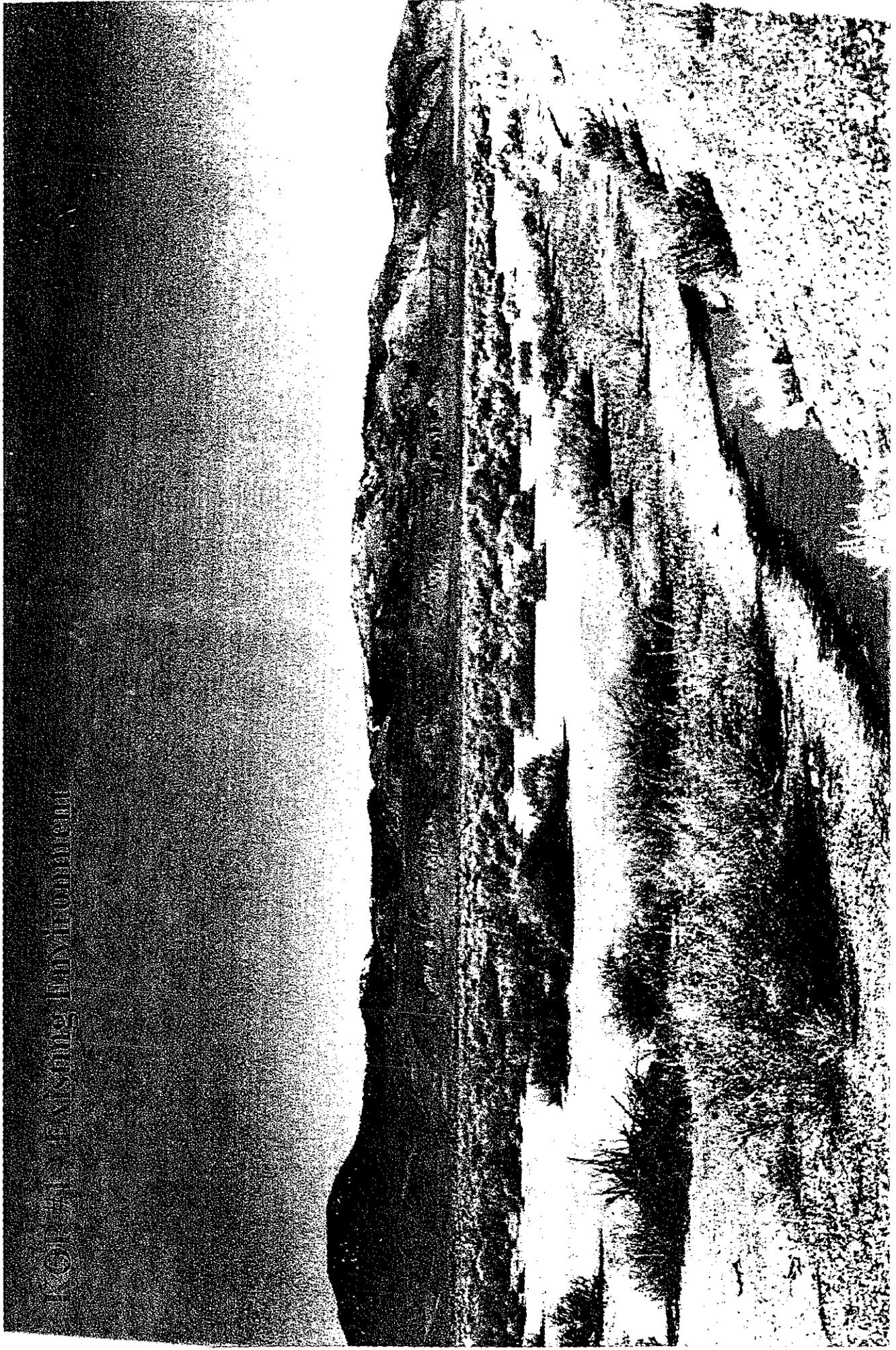
**Traditional Cultural Property Eligibility Analysis Worksheet 2
(Based on Bulletin 38)**

Bulletin 38 Criteria	Discussion
Step 2: Consider the property's integrity.	
1) Does the property have an integral relationship to traditional cultural practices or beliefs, and	There is evidence available that meets this test, based on archeological evidence and consultation with the tribes..
2) Is the condition of the property such that the relevant relationships survive?	Condition of the property as 5/22/95 meets criteria. The existing exploration, roads, fences etc. meet the criteria.
3 (a) Association with events that have made a significant contribution to broad patterns of our history	Meets criteria
3(b) Association with the lives of persons significant in our past.	Not Applicable
3(c) Embodiment of the distinctive characteristics of a type, period, or method of construction.	Not Applicable
3(d) Representative of the work of a master	Not Applicable
3(e) Possession of high artistic values.	Not Applicable
3(f) Representative of a significant and distinguishable entity whose components may lack individual distinction.	Fits criteria for Archeological District and for Traditional Cultural Property.
3(g) History of yielding or potential to yield information important in prehistory or history.	Research data applies to Archeological District and a TCP
4 (a) through (g) deals with reasons that would make the property ineligible including - ownership by a religious institution or use for religious purposes, relocated properties, birthplaces and graves, cemeteries, reconstruction, commemoration, and significance achieved within the past 50 years.	Not Applicable

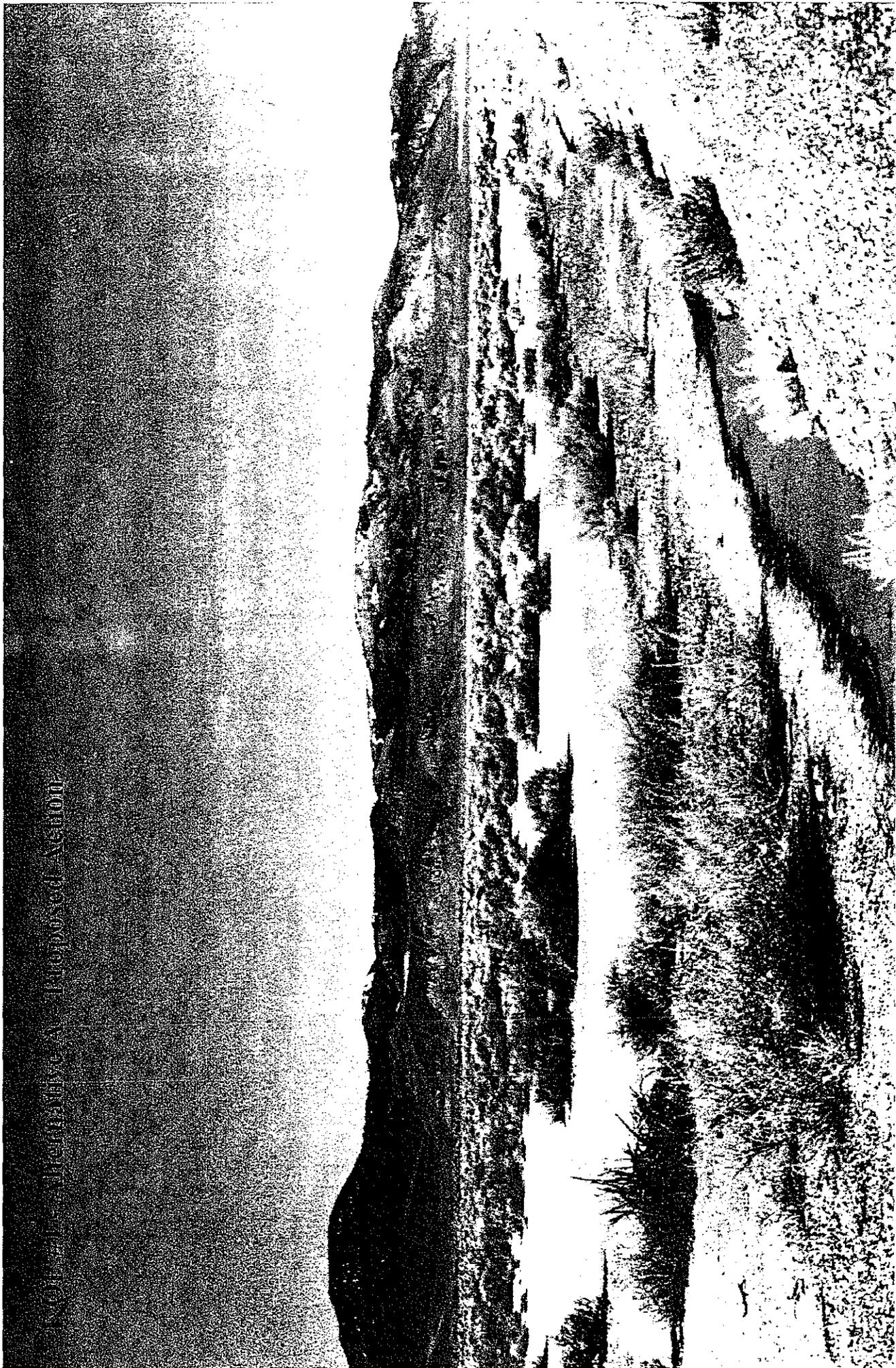
APPENDIX II

Visual Contrast Simulations and Ratings

1967-1968



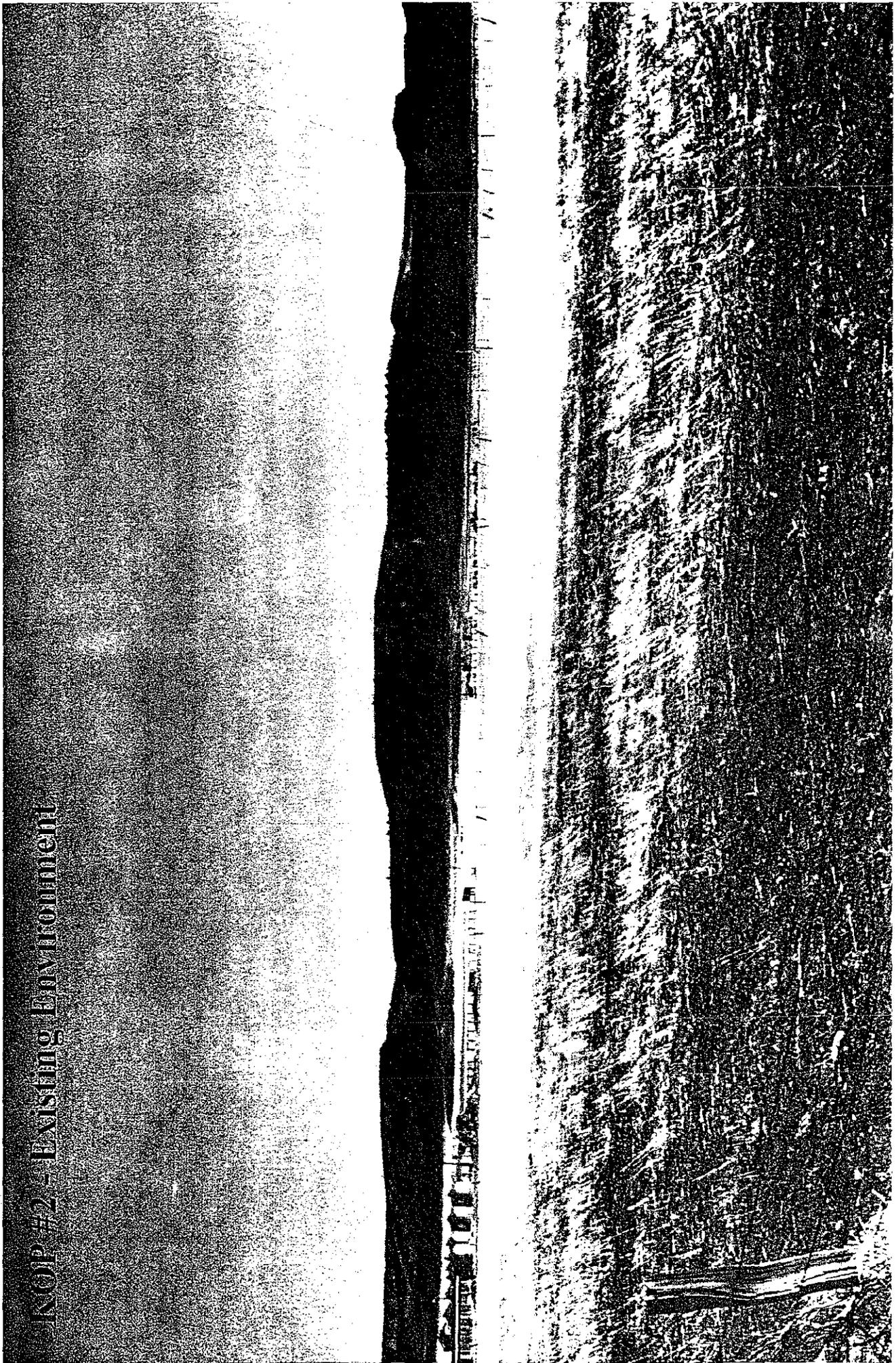
Proposed Highway A - Proposed Section

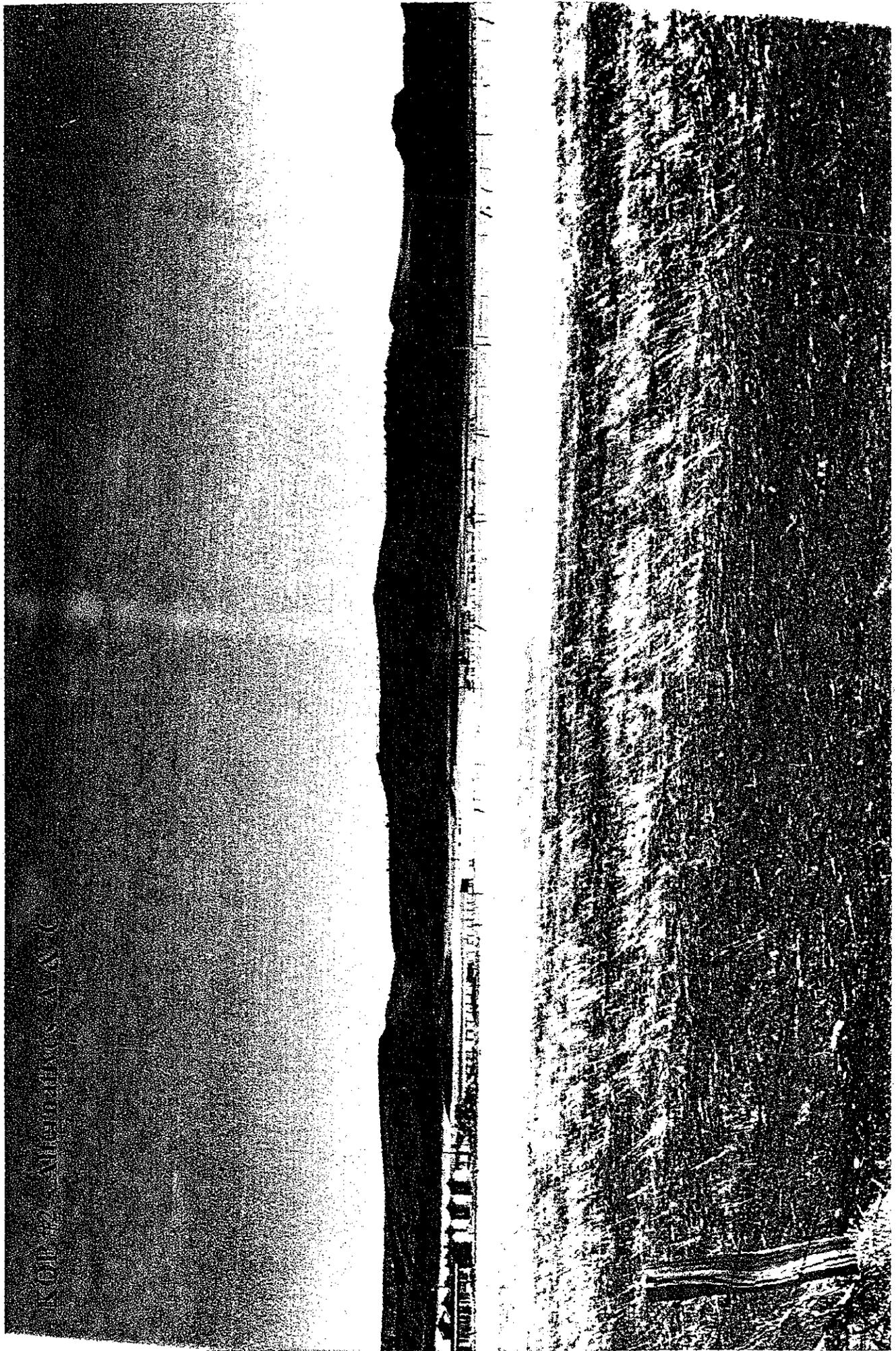


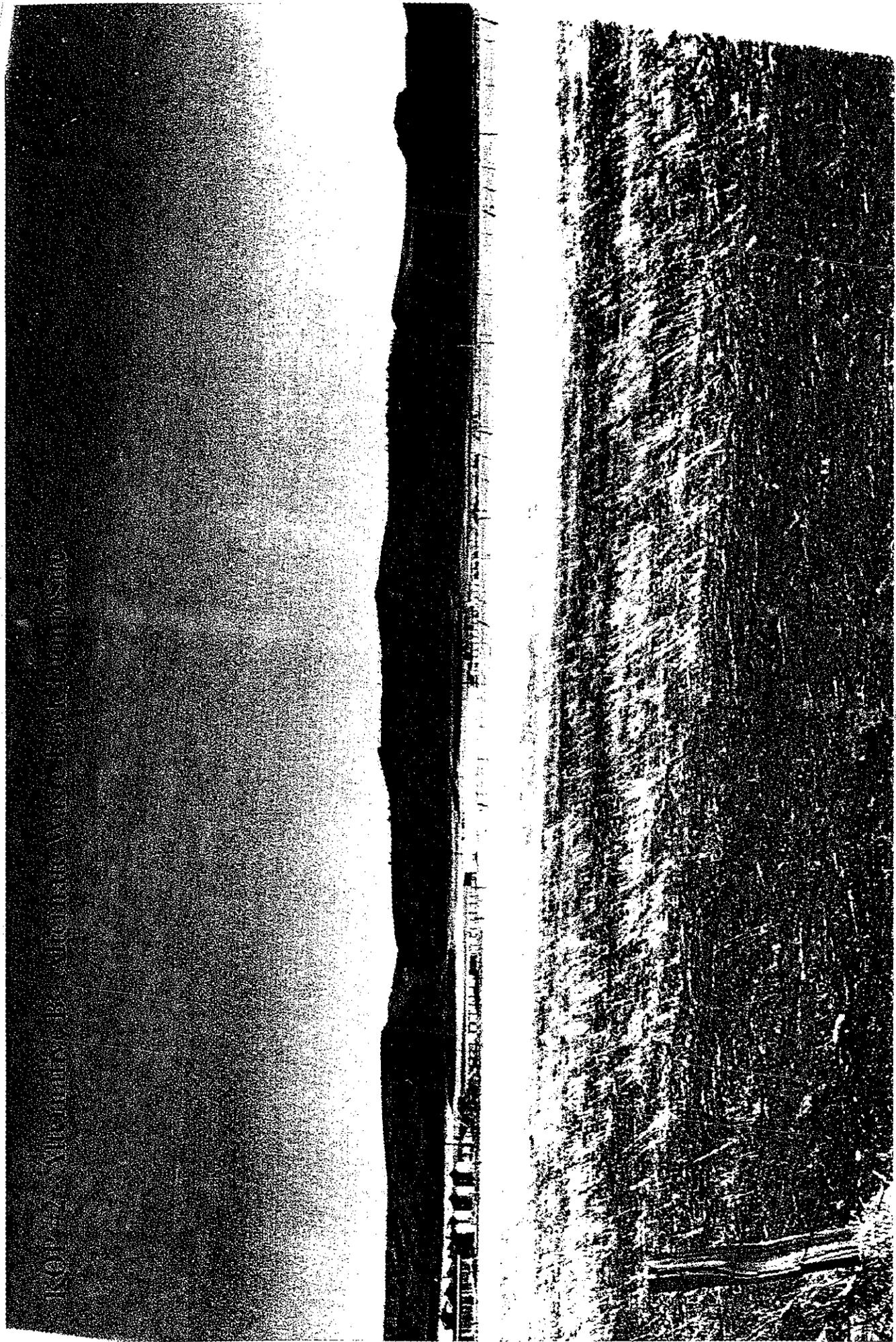
Thomas P. Albright, Wino-Koot Pump Site



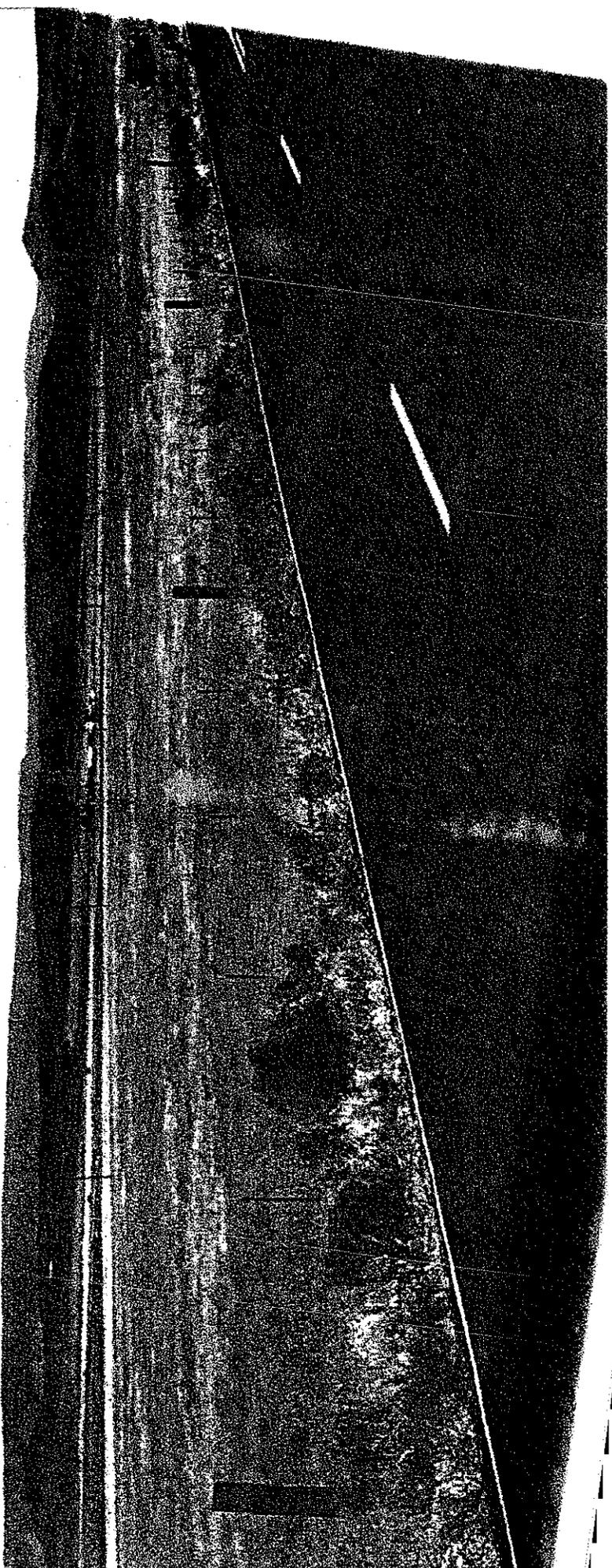
NOIP #2 - EXISTING ENVIRONMENT



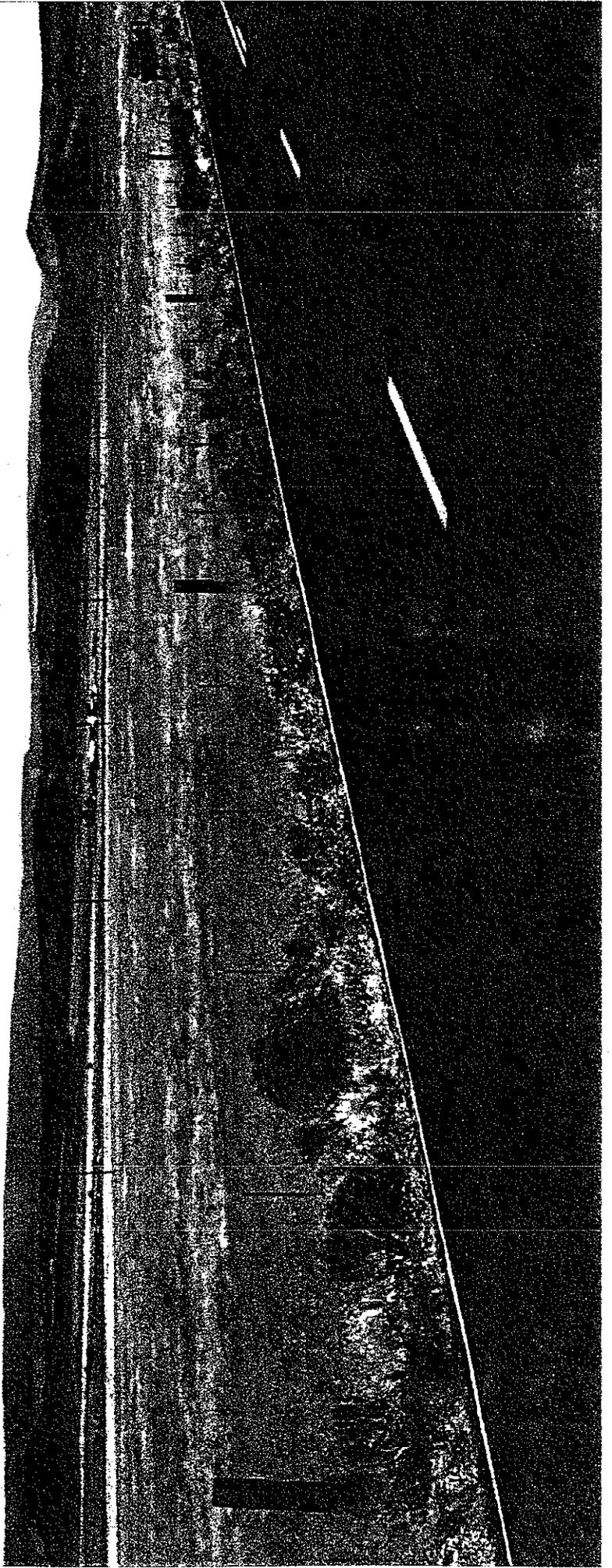




KOP #3 - Existing Environment



KOP #3 - Alternatives A, B & C



Plant Species Identified on Tucker Hill, Lake County, Oregon

<i>Achnatherum (Oryzopsis) hymenoides</i>	Indian ricegrass
<i>Achnatherum (Stipa) thurberianum (thurberiana)</i>	Thurber's needlegrass
<i>Agoseris retrorsa</i>	spear-leaved agoseris
<i>Agropyron spicatum</i>	bluebunch wheatgrass
<i>Allium parvum</i>	Indian onion
<i>Amsinckia tessellata</i>	fiddleneck/devil's lettuce
<i>Antennaria dimorpha</i>	
<i>Arabis holboellii</i>	Holboel's rock cress
<i>Artemisia arbuscula</i>	low sagebrush
<i>Artemisia tridentata tridentata</i>	basin big sagebrush
<i>Artemisia tridentata wyomingensis</i>	Wyoming big sagebrush
<i>Astragalus curvicaarpus</i>	coiled locoweed
<i>Astragalus filipes</i>	thread-leaved locoweed
<i>Astragalus purshii</i>	Pursh's sheeppod
<i>Atriplex confertifolia</i>	shadscale
<i>Bromus tectorum</i>	cheatgrass/downy brome
<i>Calochortus macrocarpus</i>	sego lily
<i>Camissonia parvula</i>	evening primrose
<i>Canbya aurea*</i>	
<i>Castilleja angustifolia</i>	desert paintbrush
<i>Chaenactis douglasii</i>	dusty maidens
<i>Chenopodium incanum</i>	goosefoot
<i>Chrysothamnus nauseosus</i>	rubber rabbitbrush
<i>Chrysothamnus viscidiflorus</i>	green rabbitbrush/yellow rabbitbrush
<i>Collinsia parviflora</i>	blue-eyed Mary
<i>Crepis acuminata</i>	hawksbeard
<i>Cryptantha ambigua</i>	
<i>Cryptantha circumscissa</i>	
<i>Cryptantha watsonii</i>	
<i>Delphinium andersonii</i>	common larkspur
<i>Descurainia pinnata</i>	tansy mustard
<i>Distichlis spicata var. stricta</i>	saltgrass
<i>Draba sp.</i>	draba
<i>Elymus (Sitanion) elymoides (hystrix)</i>	squirreltail
<i>Erigeron linearis</i>	linear-leaf daisy
<i>Eriogonum sp.</i>	wild buckwheat
<i>Eriogonum cespitosum</i>	tufted buckwheat
<i>Eriogonum nudum</i>	naked eriogonum
<i>Eriogonum ovalifolium</i>	oval-leafed desert buckwheat
<i>Eriogonum strictum</i>	
<i>Eriophyllum lanatum</i>	woolly Sunflower
<i>Erodium cicutarium</i>	storksbill
<i>Gayophytum decipiens</i>	
<i>Gilia leptomeria</i>	great basin gilia
<i>Gilia sinuata</i>	
<i>Grayia (Atriplex) spinosa</i>	spiny hopsage
<i>Hesperostipa (Stipa) comata</i>	needle and thread grass

<i>Juniperus occidentalis</i>	western juniper
<i>Layia glandulosa</i>	white layia
<i>Lepidium perfoliatum</i>	clasping pepperweed
<i>Leptodactylon pungens</i>	granite gilia
<i>Leucocrinum montanum</i>	sand lily
<i>Leymus (Elymus) cinereus</i>	basin wildrye
<i>Lithospermum ruderale</i>	western puccoon
<i>Lomatium macrocarpum</i>	giant-seeded lomatium
<i>Lomatium nevadense</i>	desert celery
<i>Lupinus</i> sp.	lupine
<i>Mentzelia albicaulis</i>	white-stemmed stickleaf
<i>Microseris</i> sp.	microseris
<i>Mimulus suksdorfii</i>	
<i>Monolepis</i> sp.	poverty weed
<i>Nama densum</i>	purple mat
<i>Oenothera deltooides</i>	devil's lantern/lion-in-a-cage/basket evening primrose
<i>Orobanche fasciculata</i>	clustered broom-rape
<i>Oxyria dendroides*</i>	
<i>Penstemon humilus</i>	lowly penstemon
<i>Phacelia bicolor</i>	trumpet phacelia
<i>Phacelia linearis</i>	narrow-leaved phacelia
<i>Phlox stansburyi (longifolia)</i>	longleaf phlox
<i>Plagiobothrys kingii</i> var. <i>harknesii</i>	Great Basin pocorn flower
<i>Plectritis macrocera</i>	rotund plectritis
<i>Poa secunda (canbyi)</i> ssp. <i>secunda</i>	one-sided bluegrass
<i>Poa secunda</i>	Sandberg bluegrass
<i>Purshia tridentata</i>	bitterbrush
<i>Ribes cereum</i>	squaw currant/wax currant
<i>Sarcobatus vermiculatus</i>	greasewood
<i>Senecio canus</i>	ragwort
<i>Sisymbrium altissimum</i>	tumble mustard/Jim Hill mustard
<i>Stephanomeria (Lygodesmia) spinosa</i>	skeleton weed
<i>Symphoricarpos longiflorus</i>	fragrant snowberry
<i>Tetradymia canescens</i>	gray horsebrush
<i>Tetradymia glabrata</i>	smooth horsebrush
<i>Thelypodium laciniatum</i>	thelypodium
<i>Tiquilia nuttallii</i>	
<i>Tragopogon dubius</i>	yellow salsify
<i>Zigadenus venenosus</i>	death camas

* from BLM list, in Hitchcock

() other commonly known names

APPENDIX IV

Blasting Schedule

**BLASTING SCHEDULE
1996**

JAN	FEB	MARCH	APRIL	MAY	JUN E	JULY	AUG	SEPT	OCT	NOV	DEC	
Wintering bald eagle clearance required LRA Biologist.		Wildlife clearance required to minimize / eliminate impacts to nesting raptors, later wintering bald eagles, roosting bats, and other sensitive wildlife species.				Late fledging raptor clearance required LRA Biologist.		No blasting coordination required			Winter bald eagle clearance required LRA Biologist.	

**BLASTING SCHEDULE
1997 - 2006**

JAN	FEB	MARCH	APRIL	MAY	JUN E	JULY	AUG	SEPT	OCT	NOV	DEC	
Wintering bald eagle clearance required LRA Biologist.		No blasting February 1 - June 30.				Late fledging raptor clearance required LRA Biologist (usually golden eagles due to Eagle Protection Act).		No blasting coordination required.			Wintering bald eagle clearance required LRA Biologist.	

Appendix V

NMBMMR Chemical Analysis

NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES
SOCORRO, NEW MEXICO 87801

REPORT OF ANALYSES

Lab No.	Identification	Acid Soluble								TCLP*							Tons CaCO ₃ /1000 tons		
		Cd ppm	Cr ppm	Pb ppm	Cu ppm	Sc ppm	Ag ppm	As ppm	Hg ppm	Cd ppm	Cr ppm	Pb ppm	Se ppm	Ag ppm	As ppm	Hg ppm	NP	APP	NAPP
1345	5 yr. com	<1.2	24	25	16	<0.06	0.10	2.3	0.03	<1.0	<5.0	<5.0	<1.0	<5.0	<0.5	<0.2	108	0.9	-107
	1345 dup	<1.2	20	27	15	<0.06	0.10												
1346	1 yr. com	<1.2	24	25	16	<0.06	0.21	2.1	0.03	<1.0	<5.0	<5.0	<1.0	<5.0	<0.5	<0.2	111	ND	-111
	1346 dup	<1.2	22	24	13	<0.06													
1347	3 yr. com	<1.2	24	26	17	<0.06	0.21	1.5	0.01	<1.0	<5.0	<5.0	<1.0	<5.0	<0.5	<0.2	111	ND	-111
	1347 dup	<1.2	24	23	15	<0.06											111		
1348	1 yr. com	<1.2	28	28	10	<0.06	0.21	1.3									610	ND	-610
1349	3 yr. com	<1.2	23	23	12	<0.06	0.06	1.5									840	ND	-840
1350	5 yr. com	<1.2	21	28	11	0.09	0.10	2.0									970	ND	-970

TCPL* = Toxic Characteristic Leaching Procedure: if leach liquid contains less than the listed values, the sample passes the TCLP test. Samples listed above pass for all inorganics.
 NP = Neutralization Potential as tons CaCO₃ per 1000 tons material
 APP = Acid Producing Potential as tons CaCO₃ per 1000 tons material.
 NAPP = Net Acid Producing Potential; (APP-NP) negative number indicates netralizing potential.

Source: NMBMMR Chemistry Laboratory.